Diversification strategy and capital structure of multinational corporations

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Abstract

This study examines the relationship between the capital structure of multinational corporations (MNCs) and their diversification strategy. Both the international market (multi-country operations) and the product (multi-industry operations) dimension of diversification are integrated into the analysis and a switching of regression regimes methodology is employed that accounts for the bi-dimensional nature of the diversification strategy pursued by MNCs. The model identifies four types of diversification regimes. The results suggest that leverage increases with both international and product diversification. It is also found that the combination of both types of diversification leads to lower levels of bankruptcy risk. Although the role of the determinants of MNC capital structure varies with the diversification strategy, there seem to be common determinants. In particular, profitability and bankruptcy risks are negatively related to the debt ratio of MNCs. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

It is often argued that the international diversification of earnings should enable multinational corporations (MNCs) to sustain a higher level of debt than purely domestic corporations (DCs), without increasing their default risk (Shapiro, 1996; Eiteman et al., 1998). However, the empirical evidence indicates that MNCs have both a lower debt ratio and a higher agency cost of debt than DCs (Lee and Kwok, 1988; Burgman, 1996; Chen et al., 1997; Doukas and Pantzalis, 1997). This suggests that the effect of higher agency costs of debt for MNCs, as a result of international capital and labor market imperfections, complexity of international operations and higher proportions of intangible assets, exceeds the possible benefits of international diversification and leads to lower debt ratios for MNCs. While the effect of agency costs of debt on the capital structure of MNCs has been thoroughly investigated (Burgman, 1996; Chen et al., 1997; Doukas and Pantzalis, 1997), it was believed that the relationship between debt ratios and the degree of international diversification of MNCs deserves further investigation. First, by comparing the debt ratios of a sample of MNCs and DCs, previous empirical studies implicitly assume that their sample of MNCs is made up of firms that follow similar international diversification strategies. However, as pointed out by Allen and Pantzalis (1996), each multinational is unique with its own distinct foreign subsidiary network structure. Second, these studies have ignored the literature suggesting that MNCs pursue a dual strategy of international diversification and product diversification (e.g. Geringer et al., 1989; Kim et al., 1993; Sambharya, 1995). Third, the relationship between the debt policy and the degree of multinationality may be non-linear and depend on the strategy of diversification. Thus, the effect of agency costs and international environmental factors such as foreign exchange risk and political risk on the debt policy of an MNC could vary with its diversification strategy. Interestingly, Chen et al. (1997) show that MNCs use less leverage than DCs but that the debt ratios of MNCs increase with their degree of foreign involvement. This non-linearity may be explained by the combination of opposing effects of the two types of diversification on the determinants of capital structure. On the one hand, theoretical and empirical arguments of previous studies suggest that geographically diversified firms face higher debt agency costs than DCs. As discussed in Lee and Kwok (1988), MNCs tend to have a higher proportion of intangible assets than DCs for two main reasons. First, this type of asset is less vulnerable to expropriation by host governments (Phillips-Patrick, 1989). Second, the value of these assets increases when the firm goes abroad, providing MNCs with excess market value (Kim and Lyn, 1986; Morck and Yeung, 1991; Allen and Pantzalis, 1996). However, the nature of these assets is source of conflicts between shareholders and bondholders because it raises the Myers (1977) underinvestment problem. Moreover, monitoring activities in order to reduce this agency problem are more costly when the firm has operations in many countries. According to Wright, Madura and Wiant (1997), these increasing costs are due to the distance and the difference in the corporate and national culture between the parent and the subsidiaries as well as the difference in the level of economic development between
the parent and the subsidiary host nations. Hence, debt providers will require higher returns to finance geographically diversified firms, which leads to an increase of the debt financing cost for these firms and therefore reduces their leverage. On the other hand, firms diversifying their operations over many industries with non-perfectly correlated performances reach a higher stability of their cash flows which reduces their default risk. This risk reduction enables these firms to sustain a higher level of leverage. Empirical evidence indicates that industrially diversified firms have higher debt ratios due to risk reduction (Barton and Gordon, 1988; Chung, 1993; Taylor and Lowe, 1995). Furthermore, the combination of international and product diversification decreases the operating risk of MNCs (Kim et al., 1993; Olusoga, 1993; Pantzalis et al., 1997) and thus could lead to an increase in leverage. To the authors’ knowledge, no study has examined the combined effect of international and industrial diversification on the debt ratio.

The objective of this paper is to examine the relationship between the debt level of MNCs and their diversification strategy. By integrating both the international market and the product dimension of diversification into the analysis and by utilizing a switching regressions model that allows the effect of the determinants of the capital structure of MNCs to vary with the strategy of diversification, the paper sheds new light on the debt policy of MNCs. The switching regression methodology allows one to examine the trade-off between the debt reducing effect of agency costs due to international diversification and the debt increasing effect of risk reduction due to industrial diversification. The switching regimes model identifies four types of diversification regimes. The results suggest that leverage increases with two types of diversification. It would also be found that the combination of both these types of diversification leads to lower levels of default risk. Although the role of some of the determinants of MNC capital structure varies with the diversification strategy, there seem to be common determinants. In particular, profitability is negatively related to the debt ratio of MNCs.

Section 2 of the paper reviews the empirical evidence on the capital structure of MNCs. Section 3 describes the data and the sample selection while Section 4 presents the methodology. In Section 5, results are presented and discussed, and in Section 6, conclusions are presented.

2. Literature review

Until very recently, the empirical literature on the capital structure of MNCs was rather scarce. Michel and Shaked (1986) classify Fortune 500 companies engaged in manufacturing as either MNCs or DCs on the basis of both the foreign sales ratio and the number of countries in which the firms have foreign operations. Their evidence indicates that MNCs are less leveraged than DCs. Using the foreign sales ratio as a classification criterion and controlling for industry and size effects, Fatemi (1988) also finds that MNCs have lower debt ratios than DCs. Furthermore, his results suggest that MNCs use more short-term debt financing than DCs do. Fatemi conjectures that the greater access of MNCs to international money
markets and a relative lack of depth in the long-term capital markets elsewhere could explain this result.

In a benchmark study, Lee and Kwok (1988) suggest an analytical framework that examines the impact of international environmental factors (e.g. political risk, foreign exchange risk) on the firm-related capital structure determinants (e.g. agency costs, bankruptcy costs) that in turn influence the capital structure of MNCs. Using the foreign tax ratio to classify companies as either MNCs or DCs, Lee and Kwok then compare the agency costs of debt, the bankruptcy costs and the long-term debt ratios of MNCs and DCs. Their results suggest that even after adjusting for industry and size effects, MNCs have higher agency costs than DCs. In contrast, they report that after controlling for the size effect, there is no difference in the bankruptcy costs of MNCs and DCs. Lee and Kwok also find that MNCs are less leveraged than DCs even when they control for the size effect. However, adjusting for industry renders the difference between the debt ratios of MNCs and DCs insignificant.

Burgman (1996) extends Lee and Kwok’s work by directly estimating the effect of foreign exchange risk and political risk on the capital structure of MNCs. Using the foreign tax ratio to classify firms as either MNCs or DCs and controlling for industry and size effects, Burgman finds that MNCs have lower debt ratios and higher agency costs than DCs. Furthermore, international diversification does not appear to lower earnings volatility. To estimate the sensitivity of a firm to foreign exchange risk, Burgman conducts a regression analysis of the stock returns of each sample firm on the returns of an index of U.S. stocks and on the U.S.$/SDR returns. His political risk measure is based on the following ratio: number of low political risk countries to the total number of countries in which the firm operates. Low political risk countries are the top 20 in the country risk rankings provided by Euromoney in 1989. The results of a regression analysis for his sample of MNCs suggest that the debt ratios of these companies are positively related to both risks. Burgman concludes that this evidence is consistent with the hypothesis that MNCs use debt policy as a tool to hedge foreign exchange risk and political risk.

Very recently, Chen et al. (1997) conducted regression analyses to investigate the effect of international activities (as measured by foreign pre-tax income) on capital

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2 With regard to the issue of MNCs’ agency costs of debt, readers are also referred to Doukas and Pantzalis (1997) and Wright et al. (1997). Doukas and Pantzalis’ evidence suggests that MNCs face higher agency costs of debt than DCs, which lead MNCs to seek less long-term financing than DCs. Employing an event-study methodology, Wright et al. show that security offerings which indirectly affect an MNC’s agency costs have a larger impact on MNCs with a higher degree of international business.

3 The use of this measure has three disadvantages. First, the choice of the top 20 countries is somewhat arbitrary. Second, this measure does not account for the relative involvement of the firm in each foreign country. Third, Euromoney does not really provide political risk ratings. Indeed, this magazine establishes country creditworthiness ratings which include three broad categories of factors: analytical indicators (40%), made up of economic risk (10%), political risk (15%) and economic indicators (15%), credit indicators (20%) and market indicators (40%). Thus political risk directly accounts for 15% of the score assigned to each country.
structure. In conformance with previous findings, the authors report that even after controlling for firm size, agency costs of debt, bankruptcy costs and profitability, the long-term debt ratios of MNCs are lower than those of DCs. However, within their sample of MNCs, debt ratios increase with the level of international activities. As pointed out by the authors, this result is interesting and calls for further investigation.

In summary, the empirical evidence so far suggests that even after controlling for the major determinants of capital structure, MNCs have lower debt ratios than DCs. It appears, however, that within the MNCs, firms with more foreign involvement tend to have more debt. Further investigation reveals that the international environmental factors of foreign exchange risk and political risk are positively related to the debt ratio of MNCs and could provide an explanation for the positive relationship between the debt ratio and international activities. This study builds upon the existing academic evidence but differs in two major aspects. First, one focuses on the effect of the diversification strategy on the debt policy of MNCs. Drawing on the branch of the strategic management literature (e.g. Geringer et al., 1989; Kim et al., 1993; Sambharya, 1995) suggesting that MNCs pursue a dual strategy of both international market and product diversification, the international market and the product dimension of diversification are incorporated into the analysis. Second, a switching of regression regimes methodology is used that enables one to account for the bi-dimensional nature of the diversification strategy pursued by MNCs. This approach allows the influence of the capital structure determinants, and therefore the debt ratios of MNCs, to vary with the diversification strategy.

3. Sample selection and data sources

The sample of U.S.-based MNCs is drawn from all the companies listed on the Standard & Poor’s Compustat Industrial Tapes for which financial data are available for the 1992–1996 period. The initial sample included the 973 firms which report foreign taxes on Compustat. Regulated firms (SIC code 4000–5000) and financial firms were excluded from the sample (for a total of 224 firms) since there may exist a systematic relation between the regulations and the firms’ leverage (Lee and Kwok, 1988) and the debt-like liabilities of financial firms such as banks and insurance companies are not strictly comparable to the debt issued by non-financial firms (Rajan and Zingales, 1995). Of the remaining 749 firms, 336 firms were retained which had a foreign tax ratio greater than 25% and could be classified as MNCs. Finally, limiting the final sample to firms with total assets of more than $10

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4 Note that foreign pre-tax income includes income stemming from both sales by foreign subsidiaries and exports from the parent company. The use of the foreign pre-tax income ratio as a classification criterion has the disadvantage of classifying a firm with exporting activities and no foreign direct investment as an MNC. Chen et al. (1997) note that they found similar results using other measures of international activities (without specifying the alternative measures they considered).
million (Lee and Kwok, 1988) and firms for which data were available for all the variables, there was 219 firms in the finish.

Following Lee and Kwok (1988) and Burgman (1996), the sample of MNCs consists of companies with an average foreign tax ratio greater than 25%. The foreign tax ratio is available on the Compustat tapes and allows the largest sample of MNCs to be constructed. Moody’s National Register’s 1996 Directory of Corporate Affiliations is then consulted to ensure that these firms have foreign subsidiaries. The nature of business (SIC code) and the geographic location of all domestic and foreign subsidiaries of the MNCs were obtained from the same data source.

4. Methodology

Since the path-breaking work of Modigliani and Miller (1958) which showed the irrelevancy of the capital structure, several theories have been developed in an attempt to explain why firms still maintain a target capital structure. Two of the most important theories are the Static Trade-off and the Agency Cost theories. According to these theories, there exists an optimal capital structure that results from trade-offs between the tax advantages of debt financing and the agency costs of debt and expected bankruptcy costs. This paper does not have the ambition to test any of the theories that aim at explaining firms’ capital structure. As pointed out by Myers (1994), there is still no complete and coherent theory of capital structure in the literature. As in Rajan and Zingales (1995), one instead use a model based on a synthesis of the major explanatory variables of debt ratio suggested by the existing literature. Specifically, this model considers the Static Trade-off Theory and the Agency Cost Theory by incorporating the variables bankruptcy risk, agency cost, and tax shield. We also control for two major determinants suggested by the existing literature, namely size and profitability. While these variables are firm-specific, two environmental variables are introduced that are political risk and exchange risk which may affect the capital structure of the firm when it has international operations. The empirical literature on the capital structure of MNCs, reviewed above, suggests the following regression model:

\[
DR = a_0 + a_1 \text{AGEN} + a_2 \text{Z-SCORE} + a_3 \text{SIZE} + a_4 \text{PROF} + a_5 \text{MUL} + a_6 \text{EXCRISK} + a_7 \text{POLRISK} + a_8 \text{NDTS}
\]  

(1)

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5 The tests were rerun with a sample of MNCs consisting of companies with a foreign tax ratio greater than 10% (instead of 25%). Qualitatively similar results were obtained that are available from the authors upon request.

6 As noted by Lee and Kwok (1988), this measure of multinationality, apart from allowing a large sample construction due to its availability for most of the firms listed on Compustat, is a more appropriate proxy for measuring the level of foreign investment than foreign sales ratio since it does not confuse exports and direct foreign investment.
for which the variables are defined below. Unless noted otherwise, all values are computed as 5-year averages over the 1992–1996 period.\textsuperscript{7} In considering a period of 5 years, the literature was followed (from 3 to 5 years) (e.g. Titman and Wessels, 1988; Rajan and Zingales, 1995).

\( DR \) = debt ratio, measured as the book value of long-term debt over the sum of book value of long-term debt and market value of equity.\textsuperscript{8} Although other measures of a firm’s indebtedness are available, the use of this debt ratio allows one to compare the results to those reported in prior studies (Lee and Kwok, 1988; Burgman, 1996; Chen et al., 1997).\textsuperscript{9}

\( AGEN \) = agency costs of debt, measured as the ratio of advertising and R&D expenditures to sales.\textsuperscript{10} The underinvestment hypothesis of Myers (1977) suggests an inverse relationship between agency costs of debt and leverage. The empirical literature suggests that MNCs have higher agency costs of debt than DCs (Lee and Kwok, 1988; Burgman, 1996; Doukas and Pantzalis, 1997).

Z-SCORE: a multidimensional measure of bankruptcy risk proposed by Altman (1968).\textsuperscript{11} This is a surrogate for the firm’s expected bankruptcy cost. Firms with lower default risk (for example, MNCs which diversify in both many geographic areas and many industries, Pantzalis et al., 1997) should be able to sustain a higher debt level.

\( SIZE \) = the natural logarithm of the total assets. By controlling for the size factor, the lead of prior empirical studies on the capital structure of domestic and multinational corporations is followed (e.g. Lee and Kwok, 1988; Titman and Wessels, 1988; Rajan and Zingales, 1995; Burgman, 1996; Chen et al., 1997; Doukas and Pantzalis, 1997). As pointed out by Rajan and Zingales (1995), the effect of size on leverage is ambiguous. Larger firms tend to be more diversified and therefore are less likely to go bankrupt. If so, size should have a positive effect on

\textsuperscript{7} For the sake of robustness one considered the 1987–1991 period and qualitatively similar results to those of the 1992–1996 period were found. These results are available from the authors upon request.

\textsuperscript{8} Market value of debt would be preferable since it is a more accurate measure of debt. However, to use market value, information is needed about the maturity of the debts and the interest rates, which are not always available. Furthermore, Bowman (1980) reported a large cross-sectional correlation between the market value and the book value of debt.

\textsuperscript{9} Note that in the light of the evidence of Fatemi (1988) that MNCs tend to use more short-term debt than DCs, the tests were rerun with the ratio of total debt (both short-term and long-term) to the sum of total debt and market value of equity. Qualitatively similar results were obtained. A thorough discussion of the different measures of leverage appears in Rajan and Zingales (1995).

\textsuperscript{10} The ratio of advertising and R&D expenditures to sales were used as a measure of agency costs to keep our results comparable with the results of previous studies on the capital structure of MNCs (Lee and Kwok, 1988; Burgman, 1996). As pointed out by Titman and Wessels (1988), advertising and R&D expenditures are a good indication of the growth opportunities of the firm. Hence, they can be used to estimate the agency costs related to Myers underinvestment problem (Bradley et al., 1984).

\textsuperscript{11} For details on the computation of the Z-SCORE and a comparative analysis of different measures of bankruptcy risk, see Scott (1981).
leverage. However, if size is a proxy for the financial information outside investors have, large firms may prefer equity relative to debt and size should have a negative impact on leverage.12

PROF = profitability, measured as the average ratio of earnings before interest and taxes to total assets over the 1987–1991 period.13 The Pecking Order Theory of Myers (1984) predicts that leverage will be negatively related to profitability because firms prefer to obtain financing through internally generated funds rather than debt. In the same vein, firms with more cash flow are more able to avoid costly external financing and will use internal financing. Following this reasoning, ceteris paribus, MNCs pursuing both international and product diversification strategies should be less leveraged in so far as these MNCs tend to be more profitable than other MNCs. For example, Sambharya (1995) documents that both international and product diversification individually have no significant effect on firm performance but their interaction leads to a substantial increase in firm performance. International markets may offer a chance to achieve synergies and exploit interdependencies among product groups across multiple markets. Lee et al. (1996) also find that both multinational diversity and product diversification have a significant positive impact on corporate performance of U.S. MNCs.

MUL = degree of multinationality, measured as the foreign tax ratio, that is, the ratio of foreign taxes to total taxes.14 The Results of Chen et al. (1997) suggest that MNCs’ debt ratio is positively related to the degree of international activities. The authors hypothesize that the use of foreign currency-denominated debt to hedge against exchange rate risk and the role of debt as a device to monitor additional agency problems in MNCs should account for the positive relationship between debt ratio and international activities amongst MNCs.

EXCRISK = exchange rate exposure, measured by the following time-series (Jorion, 1990; Burgman, 1996; He and Ng, 1998; Shin and Soenen, 1999):

12 This argument is based on the asymmetric information theory. Myers and Majluf (1984) showed that, if investors have less information about the value of the firm than insiders, issuing equity to finance a new project may result in an underpricing of the firm stocks and an increase of the cost of capital of the project. The firm may prefer to finance the new project using a security that is not undervalued by the market, such as riskless debt. If size is a proxy for the financial information outside investors have, the asymmetric information problem may be less severe for large firms that may decide to issue equity and size should therefore have a negative impact on leverage.

13 The use of earnings before interest and taxes prevents the mode of financing from affecting the firm’s profitability. The measure of profitability is a lagged variable because it is the past profitability that should be a determinant of the current capital structure of the firm (Titman and Wessels, 1988).

14 Note that one distinguished the concepts of diversification and multinationality. Although there may be a relationship between the two, it was believed that they are different concepts. For example, MNC A which has a subsidiary in three different foreign countries is more internationally diversified than MNC B which has only one foreign subsidiary. However, according to the measure of multinationality, MNC B is considered as more multinational than MNC A if the taxes paid by the foreign subsidiary of MNC B account for a larger proportion of total taxes than do the three subsidiaries of MNC A.
\[ R_{it} = \beta_{i0} + \beta_{ix} R_{xt} + \beta_{im} R_{mt} + \epsilon_{it} \]  

(2)

where \( R_{it} \) is the rate of return on the ith company’s common stock, \( R_{xt} \) is the rate of return on the trade-weighted exchange rate, measured as the dollar price of the foreign currency, \( R_{mt} \) is the rate of return on the CRSP value-weighted market index, and \( \epsilon_{it} \) is the error term.\(^\text{15}\) The regression coefficient \( \beta_{ix} \) is therefore the foreign exchange-rate exposure measure.

POLRISK = political risk exposure, measured by an index of political risk ratings (PRRs). Specifically, POLRISK for each company is equal to the weighted-average of the PRRs assigned to each host country in which the company has operations, where the weight of each country \((j)\) is equal to the ratio of the number of subsidiaries in the country \((n_j)\) to the sum of the company’s foreign subsidiaries \((n)\):

\[ \text{POLRISK} = \sum_{j=1}^{N} \frac{n_j}{n} \text{PRR}_j \]  

(3)

where \( N \) is the number of foreign countries in which the company has subsidiaries.\(^\text{16}\)

Political risk ratings were obtained from Political Risk Services (PRS), one of the world’s leading agencies providing assessments of political risk. PRS’ monthly newsletter, Political Risk Letter, publishes 18-month and 5-year political risk forecasts in 85 countries. These forecasts rely on independent judgments from over 250 country experts in the US and overseas. PRS provides ratings for three types of risk: financial transfer risk, direct investment risk and export market risk. An MNC’s political risk is associated with the second type of risk that takes into account such factors as restrictions on local operations, taxation discrimination, repatriation restrictions and exchange controls.\(^\text{17}\) Therefore, direct investment risk ratings are used for a 5-year horizon as published in the December 1991 issue of the Political Risk Letter. The effect of political risk and exchange risk on the debt policy of MNCs is ambiguous (Burgman, 1996). The traditional argument is that the more exposed the firm is to exchange risk and political risk, the higher the expected bankruptcy cost and thus the lower the optimal debt level. However,
MNCs can protect themselves from political risk and exchange risk by raising local debt. It can therefore be argued that the more exposed the firm is to political risk and exchange risk the higher the debt ratio.

\[ \text{NDTS} = \text{non-debt tax shields, measured by the ratio } \left( \frac{\text{operating income} - \text{interest expenses}}{\text{total taxes paid}} \right) \times \frac{\text{corporate tax rate}}{\text{sales}}. \]

Following Doukas and Pantzalis (1997), the average corporate tax rate is assumed to be 43%, i.e. 38% federal tax rate and 5% state tax rate. NDTS reduce the firm’s tax burden and thus the need for acquiring debt related tax shields (Doukas and Pantzalis, 1997). Fatemi (1988) hypothesizes that a higher level of expected NDTS, among other factors, could account for the lower debt ratio of MNCs.

To estimate the effect of the diversification strategy on the debt policy of MNCs, a switching regressions model proposed by Goldfeld and Quandt (1973) and recently used by Allen and Pantzalis (1996) was used.\(^\text{18}\) The switching regressions model with unknown sample separate points maximizes the explanatory power of the debt ratio model (1) by testing for all possible combinations of international diversification and product diversification until critical values are obtained. Thus, an important hypothesis of this work is that the diversification strategy of the MNCs is an exogenous variable with respect to its financial policy. As pointed out by Allen and Pantzalis (1996), a typical MNC has a network of operations in various product markets with both domestic and international links. Every link between product markets is a potential synergy source. A flexible network has just enough links to enable adjustments to absorb external shocks and exploit opportunities to a maximum net of costs. The choice of the optimum subsidiaries network structure is a long term strategic decision dictated by managerial considerations. Once its optimum network structure is fixed, the MNC will take the financial decisions that maximize its value.\(^\text{19}\) These decisions have effects on the capital structure determinants. In particular, the switching regression methodology allows one to examine the trade-off between debt reducing effect of agency cost due to international diversification (Lee and Kwok, 1988; Burgman, 1996; Chen et al., 1997), and the debt increasing effect of risk reduction due to industrial diversification (Barton and Gordon, 1988; Chung, 1993; Taylor and Lowe, 1995). This approach also allows the regression coefficients to vary across diversification regimes and therefore enables one to test the impact of the different diversification strategies on the debt policy of MNCs. As pointed out by Allen and Pantzalis, this frees the analysis from errors introduced by improper model specification and

\(^{18}\) Goldfeld and Quandt (1973) have proposed several econometric techniques for dealing with switching regression. The purpose is to test shifts in financing decision due to the diversification strategy. The deterministic switching technique used here simultaneously pools, estimates and tests linear regression models when the model structural shift is based on a priori pooling variables (here product and international diversification variables). Other techniques test model shifts based on time or a latent variable.

\(^{19}\) Note that this stress on the value of operating flexibility for MNCs is also consistent with Kogut (1983) and the view of Kogut and Kulatilaka (1994) that MNCs are firms that hold a string of real options on international outcomes.
allows a differentiation between the two dimensions of the diversification strategy. To measure international diversification (INTDIV), the diversification index of Berry (1975) was used, which is defined as one minus the Herfindhal index of concentration:\(^{20}\) \(\text{INTDIV} = 1 - \sum s_j^2\), where \(s_j\) is the proportion of a firm’s subsidiaries in each country \(j\). The same approach is used to measure product diversification (PRODIV): \(\text{PRODIV} = 1 - \sum s_j^2\), where \(s_j\) is the proportion of a firm’s subsidiaries in each four-digit SIC industry \(j\). Using INTDIV and PRODIV as switching variables, the following model is estimated:

\[
\text{DR} = a_{0,k} + a_{1,k} \text{AGEN} + a_{2,k} \text{Z-SCORE} + a_{3,k} \text{SIZE} + a_{4,k} \text{PROF} + a_{5,k} \text{MUL} + a_{6,k} \text{EXCRISK} + a_{7,k} \text{POLRISK} + a_{8,k} \text{NDTS}
\]

where \(k\) is an index of different diversification strategies:

\[
k = I \quad \text{if} \quad \text{INTDIV} \leq \text{INTDIV}^* \quad \text{and} \quad \text{PRODIV} \leq \text{PRODIV}^*
\]

\[
k = II \quad \text{if} \quad \text{INTDIV} \leq \text{INTDIV}^* \quad \text{and} \quad \text{PRODIV} > \text{PRODIV}^*
\]

\[
k = III \quad \text{if} \quad \text{INTDIV} > \text{INTDIV}^* \quad \text{and} \quad \text{PRODIV} \leq \text{PRODIV}^*
\]

\[
k = IV \quad \text{if} \quad \text{INTDIV} > \text{INTDIV}^* \quad \text{and} \quad \text{PRODIV} > \text{PRODIV}^*
\]

The switching regressions model provides the critical values of the switching points \(\text{INTDIV}^*\) and \(\text{PRODIV}^*\). The critical combination \(\text{INTDIV}^*\) and \(\text{PRODIV}^*\) is the combination that maximizes the log-likelihood function value. The significance of this combination is measured by comparing the log-likelihood value from the switching regressions model (4) \((\log L_1)\) with that of the regression model (1) (no switch point) \((\log L_0)\) and computing the statistic \(-2 \log(L_0/L_1)\) which is asymptotically \(\chi^2\) distributed. Thus there is four subsamples of MNCs which have different international and product diversification strategies. The debt ratios of these firm samples as well as the effect of the major determinants on capital structure were then compared.

5. Results

The switching regimes model, whose results are summarized in Table 1, provides the critical values for the international and product diversification strategies (\(\text{INTDIV}^*; \text{PRODIV}^*\) = (0.70; 0.48).\(^{21}\) The log-likelihood values of the switching

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\(^{20}\) Herfindhal-type indices are widely accepted and extensively used in the literature (see, e.g. Tallman and Li, 1996; Denis et al., 1997; Gomez-Mejia and Palich, 1997).

\(^{21}\) These levels of diversification can be obtained with different combinations of countries, industries and subsidiaries. For example, in the special case of an equally diversified MNC (that is, with the same number of subsidiaries in each country and industry) the transformations \(1/(1 - \text{INTDIV})\) and \(1/(1 - \text{PRODIV})\) respectively correspond to the number of countries and industries in which this MNC should have subsidiaries to reach the values INTDIV and PRODIV (see Clarke, 1986 for a discussion of these transformations). Thus the values 0.70 and 0.48 correspond to an equally diversified MNC operating in at least four countries and two industries.
regressions model (4) and of the pooled regression model (1) indicate that the null hypothesis of no switch point is rejected at the 0.5% significance level. This result suggests that the debt ratio of MNCs depends upon whether these firms have an international diversification index lower or higher than 0.70 and a product diversification index lower or higher than 0.48. The model of switching regimes thus identifies four diversification regimes which are depicted in the figure below Table 1:

Type I: \( \text{INTDIV}^* \leq 0.70 \) and \( \text{PRODIV}^* \leq 0.48 \). These MNCs exhibit low levels of both international and product diversification. Sixty-eight firms belong to this category.

Type II: \( \text{INTDIV}^* \leq 0.70 \) and \( \text{PRODIV}^* > 0.48 \). These are MNCs with a low international diversification level but with a high product diversification level, owning subsidiaries in at least

Table 1
Summary of results of switching regressions for model (4)*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>((\text{INTDIV}^<em>, \text{PRODIV}^</em>))</th>
<th>(\log(L_1))</th>
<th>(\log(L_0))</th>
<th>(-2\log(L_0/L_1))</th>
<th>Significance Level</th>
</tr>
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<tbody>
<tr>
<td>( \text{DR} ) = ( a_{11} + a_{12} \text{AGEN} + a_{13} \text{ZSCORE} + a_{14} \text{SIZE} + a_{15} \text{PROF} + a_{16} \text{MUL} + a_{17} \text{EXCRISK} + a_{18} \text{POLRISK} + a_{19} \text{NDTS} )</td>
<td>((0.70, 0.48))</td>
<td>159.461</td>
<td>100.057</td>
<td>118.808</td>
<td>0.005</td>
</tr>
</tbody>
</table>

\[ \text{INTDIV} \]

\[ \text{PRODIV} \]

Type III: \( \text{INTDIV} > 0.70 \) and \( \text{PRODIV} \leq 0.48 \)
N=54

Type IV: \( \text{INTDIV} > 0.70 \) and \( \text{PRODIV} > 0.48 \)
N=69

Type I: \( \text{INTDIV} \leq 0.70 \) and \( \text{PRODIV} \leq 0.48 \)
N=68

Type II: \( \text{INTDIV} > 0.70 \) and \( \text{PRODIV} > 0.48 \)
N=28

* This Table reports the critical cut-off points \((\text{INTDIV}^*, \text{PRODIV}^*)\), log-likelihood values for the switching regression model \((\log L_1)\), and the pooled sample \((\log L_0)\) and \( \chi^2 \)-statistic \((-2 \log(L_0/L_1))\) for the test of significance of the cut-off point.

22 The possibility of another critical combination of international and product diversification strategies that would provide a higher explanatory power of the debt ratio model was investigated and statistically rejected.
Table 2
Descriptive statistics for the four MNC types produced by the switching regression model (4) with one cut-off point (INTDIV* = 0.70, PRODIV* = 0.48)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type I (N = 68)</th>
<th>Type II (N = 28)</th>
<th>Type III (N = 54)</th>
<th>Type IV (N = 69)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.E.</td>
<td>Mean</td>
<td>S.E.</td>
</tr>
<tr>
<td>DR</td>
<td>0.1106</td>
<td>0.1633</td>
<td>0.1860</td>
<td>0.1823</td>
</tr>
<tr>
<td>AGEN</td>
<td>0.0522</td>
<td>0.1167</td>
<td>0.0590</td>
<td>0.0831</td>
</tr>
<tr>
<td>Z-SCORE</td>
<td>3.9117</td>
<td>5.7798</td>
<td>4.9073</td>
<td>1.4042</td>
</tr>
<tr>
<td>SIZE</td>
<td>6.9221</td>
<td>1.6986</td>
<td>7.2420</td>
<td>1.5847</td>
</tr>
<tr>
<td>PROF</td>
<td>5.4939</td>
<td>8.7706</td>
<td>5.4473</td>
<td>3.1867</td>
</tr>
<tr>
<td>MUL</td>
<td>0.5144</td>
<td>0.1945</td>
<td>0.4731</td>
<td>0.1563</td>
</tr>
<tr>
<td>EXCRISK</td>
<td>0.4492</td>
<td>0.4323</td>
<td>0.4592</td>
<td>0.3680</td>
</tr>
<tr>
<td>POLRISK</td>
<td>0.6911</td>
<td>0.5166</td>
<td>0.6273</td>
<td>0.3959</td>
</tr>
<tr>
<td>NDTS</td>
<td>40.6381</td>
<td>29.6676</td>
<td>52.6975</td>
<td>29.3583</td>
</tr>
</tbody>
</table>

* Type I: INTDIV ≤ 0.70 and PRODIV ≤ 0.48; Type II: INTDIV ≤ 0.70 and PRODIV > 0.48; Type III: INTDIV > 0.70 and PRODIV ≤ 0.48; Type IV: INTDIV > 0.70 and PRODIV > 0.48. DR, long-term debt/(long-term debt + market value of equity); AGEN, (advertising and R&D expenditures)/sales; Z-SCORE, Altman Z-score; SIZE, log(total assets); PROF, (earnings before interest and taxes)/total assets; MUL, foreign taxes/total taxes; EXCRISK, foreign exchange rate exposure; POLRISK, index of political risk ratings; NDTS, [operating income − interest expenses − (total taxes paid/corporate tax rate)]/sales; INTDIV, international diversification index; PRODIV, product diversification index.

two four-digit SIC industries. Twenty-eight firms belong to this category.

Type III: INTDIV* > 0.70 and PRODIV* ≤ 0.48. These are MNCs with a low product diversification level but with a high international diversification level, owning subsidiaries in at least four countries. Fifty-four firms belong to this category.

Type IV: INTDIV* > 0.70 and PRODIV* > 0.48. These MNCs exhibit high levels of both international and product diversification. Sixty-nine firms belong to this category.

Table 2 reports the means and standard errors of the different variables for each MNC group while Table 3 presents the results of a Mann–Whitney U-Test of means equality among the four MNC groups. Type I MNCs are significantly less leveraged than the three other groups of MNCs. Previous studies showed that leverage increases with product diversification (Barton and Gordon, 1988; Chung, 1993; Taylor and Lowe, 1995). The results suggest that the debt ratio of MNCs increases with both the international diversification and the product diversification of these firms. Type IV MNCs have the highest debt ratio. However, their leverage is not significantly different from that of Type III MNCs. It is also of interest to note that the debt ratios of Type II and Type III MNCs are significantly different.
only at a 10% level. These results suggest that, as far as their impact on capital structure is concerned, these two diversification strategies act more as substitutes for each other than as complements. A higher level of bankruptcy risk could account for the lower debt ratio of Type I MNCs. The Z-SCORE increases with the two types of diversification. It reaches its minimum for Type I firms and it is significantly lower than that observed for Type III and Type IV MNCs. Therefore the two types of diversification lead to a reduction in the probability of bankruptcy, and the combination of both types enables MNCs to reach the lowest level of default risk. This result is consistent with the evidence provided in Kim et al. (1993) and Pantzalis et al. (1997). Hence, by integrating the product and the international dimensions of diversification, the results reveal the existence of a diversification effect on the MNCs’ bankruptcy risk that previous studies which compare samples of MNCs and DCs were not able to detect (e.g. Burgman, 1996). Diversifying activities across products and markets provides the MNCs with operational flexibility over the non-diversified firms and helps them reduce their level of corporate risk. Kim et al. (1993) discuss these flexibilities and consider that they consist of three unique options: the option of riposting to aggressive moves made by competitors over the multiple national markets, the option of minimizing the effect of adverse changes in country’s interest rates, wages and prices and the option of hedging against supply and demand fluctuations on any markets.

The results shown in Tables 2 and 3 suggest that Type III and Type IV MNCs, which have a high level of international diversification, have agency costs of debt

Table 3
Means difference significance test among Type I, II, III and IV MNCs (Mann–Whitney U-Test)a,b

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RD</td>
<td>−2.831***</td>
<td>−4.010***</td>
<td>−5.213***</td>
<td>−1.632*</td>
<td>−2.566**</td>
<td>−0.938</td>
</tr>
<tr>
<td>AGEN</td>
<td>−0.364</td>
<td>−5.608***</td>
<td>−3.039***</td>
<td>−2.259**</td>
<td>−2.942***</td>
<td>−1.854*</td>
</tr>
<tr>
<td>Z-SCORE</td>
<td>−1.838*</td>
<td>−1.904*</td>
<td>−2.236**</td>
<td>−1.798*</td>
<td>−2.349**</td>
<td>−2.302**</td>
</tr>
<tr>
<td>SIZE</td>
<td>−0.822</td>
<td>−0.861</td>
<td>−0.581</td>
<td>−0.186</td>
<td>−0.247</td>
<td>−0.868</td>
</tr>
<tr>
<td>PROF</td>
<td>−0.854</td>
<td>−1.397</td>
<td>−1.852*</td>
<td>−0.605</td>
<td>−1.767*</td>
<td>−1.802*</td>
</tr>
<tr>
<td>MUL</td>
<td>−0.750</td>
<td>−2.103**</td>
<td>−1.138</td>
<td>−2.013**</td>
<td>−0.792</td>
<td>−1.029</td>
</tr>
<tr>
<td>EXCRISK</td>
<td>−0.364</td>
<td>−2.534**</td>
<td>−1.971**</td>
<td>−2.344**</td>
<td>−1.935**</td>
<td>−2.352**</td>
</tr>
<tr>
<td>POLRISK</td>
<td>−0.332</td>
<td>−1.167</td>
<td>−1.282</td>
<td>−0.290</td>
<td>−0.943</td>
<td>−1.148</td>
</tr>
<tr>
<td>NDTS</td>
<td>−2.533***</td>
<td>−3.649***</td>
<td>−4.460***</td>
<td>−0.196</td>
<td>−0.908</td>
<td>−0.917</td>
</tr>
</tbody>
</table>

a Reported are the Z statistics.
b Type I: INTDIV ≤ 0.70 and PRODIV ≤ 0.48; Type II: INTDIV ≤ 0.70 and PRODIV > 0.48; Type III: INTDIV > 0.70 and PRODIV ≤ 0.48; Type IV: INTDIV > 0.70 and PRODIV > 0.48. DR, long-term debt/(long-term debt + market value of equity); AGEN, (advertising and R&D expenditures)/sales; Z-SCORE, Altman Z-score; SIZE, log(total assets); PROF, (earnings before interest and taxes)/total assets; MUL, foreign taxes/total taxes; EXCRISK, foreign exchange rate exposure; POLRISK, index of political risk ratings; NDTS, [operating income−interest expenses−(total taxes paid/corporate tax rate)]/sales; INTDIV, international diversification index; PRODIV, product diversification index.

*** Significance at the 1% level;
** Significance at the 5% level;
* Significance at the 10% level.
that are significantly greater than those of Type I and Type II MNCs. Since agency costs are measured using advertising and R&D expenditures that are intangible assets, this result is consistent with the internalization theory, which predicts that firms with a high proportion of intangible assets will internalize the market for these assets by diversifying their activities across many countries. In contrast, these costs do not differ significantly in relation to the level of product diversification (Type I vs. Type II being insignificant and Type III vs. Type IV being significant only at the 10% level). The existing literature (Lee and Kwok, 1988; Burgman, 1996; Doukas and Pantzalis, 1997) has shown that MNCs have higher agency costs of debt than DCs. The analysis conducted in this paper suggests that the MNCs of the sample having a high level of international diversification face higher agency costs.

The combination of both types of diversification enables MNCs to achieve higher levels of profitability than those of MNCs pursuing a single diversification strategy (Type IV vs. Types I, II and III). Once more, this is consistent with the empirical evidence concerning the relationship between diversification strategy and performance of MNCs (Geringer et al., 1989; Kim et al., 1993; Sambharya, 1995; Lee et al., 1996). Gomes and Ramaswamy (1999) report a curvilinear relationship between performance and multinationality. Hitt et al. (1997) report the same relationship between international diversification and performance. They also find that product diversification positively moderate the relationship between international diversification and performance which is consistent with the results concerning Type IV MNCs.

Furthermore, Type III and Type IV firms have a significantly higher coefficient of exchange rate exposure than the Type I and Type II MNCs, suggesting that the former firms, operating in more foreign countries than the latter ones, are more sensitive to exchange rate fluctuations. Burgman (1996) provided evidence that MNCs, due to their greater ability to manage and hedge exchange risk, are less sensitive to exchange rate fluctuations than DCs. The results suggest that, among MNCs, the firms with the highest geographical dispersion of their operations are the most exposed to exchange risk.

Type III and Type IV MNCs, as shown in Tables 2 and 3, have a higher political risk exposure than Type I and Type II MNCs. Although the difference is not statistically significant, this result suggests that the Type I and Type II MNCs, which focus on a few foreign countries, select low political risk countries. Finally, with the exception of Type I firms which exhibit a significantly lower level of NTDS than the three other types of firms do, there exists no significant difference in the NTDS for the Type I, II and III firms.

Table 4 reports the coefficient estimates of the regression model (Eq. (4)) for each of the four sub-samples of MNCs and the full sample of MNCs (Eq. (1)).²³ The AGEN variable is negatively related to debt ratios for the four types of MNCs.

²³ Note that the correlation coefficients between explanatory variables are low and generally are not significantly different from zero. Furthermore, our estimates of variance inflation factors do not suggest the presence of multicollinearity.
Table 4
Coefficient estimates from switching regression model (4) with two switching variables and one cut-off point and the pooled model (1)\textsuperscript{a}

\[
\text{DR}_k = a_{0,k} + a_{1,k} \text{AGEN} + a_{2,k} \text{Z-SCORE} + a_{3,k} \text{SIZE} + a_{4,k} \text{PROF} + a_{5,k} \text{MUL} + a_{6,k} \text{EXCRISK} + a_{7,k} \text{POLRISK} + a_{8,k} \text{NDTS}
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Type IV</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 68)</td>
<td>(R^2 = 0.623)</td>
<td>(N = 28)</td>
<td>(R^2 = 0.600)</td>
<td>(N = 54)</td>
</tr>
<tr>
<td>Coefficient</td>
<td>(t)</td>
<td>Coefficient</td>
<td>(t)</td>
<td>Coefficient</td>
<td>(t)</td>
</tr>
<tr>
<td>AGEN</td>
<td>(-0.120)</td>
<td>(-2.34^{**})</td>
<td>(-0.088)</td>
<td>(-1.84^{*})</td>
<td>(-0.060)</td>
</tr>
<tr>
<td>Z-SCORE</td>
<td>(0.003)</td>
<td>(0.02)</td>
<td>(0.012)</td>
<td>(1.54)</td>
<td>(0.030)</td>
</tr>
<tr>
<td>SIZE</td>
<td>(0.006)</td>
<td>(0.71)</td>
<td>(0.007)</td>
<td>(0.91)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>PROF</td>
<td>(-0.008)</td>
<td>(-1.59)</td>
<td>(-0.015)</td>
<td>(-4.04^{***})</td>
<td>(-0.018)</td>
</tr>
<tr>
<td>MUL</td>
<td>(0.064)</td>
<td>(0.98)</td>
<td>(0.059)</td>
<td>(0.31)</td>
<td>(0.177)</td>
</tr>
<tr>
<td>EXCRISK</td>
<td>(0.030)</td>
<td>(1.01)</td>
<td>(0.016)</td>
<td>(0.77)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>POLRISK</td>
<td>(-0.062)</td>
<td>(-1.75^{*})</td>
<td>(-0.191)</td>
<td>(-1.72)</td>
<td>(-0.098)</td>
</tr>
<tr>
<td>NDTS</td>
<td>(-0.00002)</td>
<td>(-1.30)</td>
<td>(-0.0004)</td>
<td>(-1.31)</td>
<td>(-0.0019)</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>(0.341)</td>
<td>(1.88^{*})</td>
<td>(0.229)</td>
<td>(1.31)</td>
<td>(0.178)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Heteroskedastic-consistent \(t\)-ratios are reported. Switch variables are INTDIV and PRODIV (INTDIV* \(= 0.70\), PRODIV* \(= 0.48\)). Type I: INTDIV \(\leq 0.70\) and PRODIV \(\leq 0.48\); Type II: INTDIV \(\leq 0.70\) and PRODIV \(> 0.48\); Type III: INTDIV \(> 0.70\) and PRODIV \(\leq 0.48\); Type IV: INTDIV \(> 0.70\) and PRODIV \(> 0.48\). DR, long-term debt/(long-term debt + market value of equity); AGEN, (advertising and R&D expenditures)/sales; Z-SCORE, Altman Z-score; SIZE, log(total assets); PROF, (earnings before interest and taxes)/total assets; MUL, foreign taxes/total taxes; EXCRISK, foreign exchange rate exposure; POLRISK, index of political risk ratings; NDTS, [operating income – interest expenses – (total taxes paid/corporate tax rate)]/sales; INTDIV, international diversification index; PRODIV, product diversification index.

\* Significance at the 1% level;
\** Significance at the 5% level;
\* Significance at the 10% level, respectively.
This relationship is no longer significant when MNCs pursue an extensive strategy of international diversification (Types III and IV). The regression coefficient for the agency costs of debt is significant at the 5% level in the case of Type I MNCs and at the 10% level for Type II MNCs. Thus, the coefficient of this variable has the expected sign which supports the idea that intangible assets are a source of underinvestment problems and hence increase the cost of debt financing. However, this effect is no longer significant for Type III and IV MNCs. This result may explain why these firms are more leveraged than Type I and II MNCs. A possible explanation for this result is that managers of MNCs pursuing a global expansion strategy are prone to adopt all profitable investments (Shapiro, 1996). Hence, for these MNCs, the detention of intangible assets is unlikely to be viewed by debt providers as a source of potential underinvestment decisions. The fact that the effect of agency costs on debt ratio varies with the degree of international diversification cannot be detected when one considers the whole sample of MNCs.

The Z-SCORE has a positive effect on the debt ratio of MNCs. This coefficient is significant only for Type III and IV MNCs. This result suggests that the MNCs benefit from the debt increasing effect of default risk reduction only once they reach a certain level of diversification. It is worth noting that the Z-SCORE is not significant when the model is estimated over the whole sample of MNCs. This result likewise suggests that it is crucial to consider the different MNCs’ diversification strategies so as to analyze the relation between their leverage and their risk.

The relationship between the debt ratio and size is positive although it is not significant. One possible explanation for this result is the relatively large size of the sampled MNCs. Profitability is negatively and most often significantly related to the debt ratio of MNCs, providing evidence in support of the Pecking Order Theory. The coefficient of this variable is highly significant except for Type I MNCs. The degree of multinationality is positively related to the debt ratio of MNCs. This relationship is significant for Types III and IV. This result lends support to the hypothesis that the relationship between leverage and the degree of multinationality is not linear. The positive relationship between the debt ratio of MNCs and the degree of multinationality is also consistent with the findings of Chen et al. (1997), although these authors use another measure of multinationality and do not take account of the diversification strategy pursued by MNCs. As discussed by these authors, a possible explanation is based on the monitoring role of debt (Jensen and Meckling, 1976). Since international operations are more difficult to monitor, MNCs may increase their debt level for monitoring purposes.

Only in the case of the MNCs pursuing an extensive strategy of international diversification (Types III and IV) is exchange risk significantly related to leverage. Thus, it is only with respect to these highly geographically diversified MNCs that the results are consistent with Burgman’s conclusion that MNCs use debt policy to manage exchange rate exposure. The regression coefficient of political risk is negative and generally highly significant. This result suggests that MNCs operating

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24 Note that the coefficient of political risk is not significant for Type II MNCs. The results of this type of MNC should be interpreted with caution because of the small sample size.
in many politically risky countries have more difficulties in raising debt and must rely more on internal financing. Finally, the non-debt tax shields have the expected sign, but the effect of this variable on the leverage of MNCs is generally not significant. This result is consistent with the findings of Burgman (1996) and explains why the existing empirical literature on the capital structure of MNCs tended to disregard this variable.

Two major results emerge from the above analysis. First, the findings point to the importance of the diversification strategy in explaining the financing decisions of MNCs. In particular, by integrating both the international and product dimension of diversification into the analysis, evidence is provided that the debt ratios of MNCs increase with their diversification level. Second, the existing literature reveals that one should not consider MNCs as a homogeneous group on the basis of certain attributes (e.g. their subsidiary network structure, their level of product and international diversification, etc.). The results suggest that not only does this heterogeneity extend to the financial profiles of MNCs but also to the relationship between the capital structure of MNCs and their determinants.25,26

6. Conclusion

This study examines the relationship between the debt policy of MNCs and their diversification strategy. Drawing on the branch of the strategic management literature (e.g. Geringer et al., 1989; Kim et al., 1993; Sambharya, 1995) suggesting that MNCs pursue a dual strategy of international market diversification and product diversification, both the international market and the product dimension of diversification are integrated into the analysis. A switching of regression regimes methodology is also employed that enables one to account for the bi-dimensional nature of the diversification strategy pursued by MNCs. This approach allows the influence of the capital structure determinants, and therefore the debt ratios of MNCs, to vary with the diversification strategy.

25 One considered alternative measures of diversification in order to test the robustness of the results. To compute INTDIV, the measure of concentration of Allen and Pantzalis (1996) was used, DEPTH, which is the ratio of the sum of the subsidiaries in the two countries with the largest number of the MNC’s subsidiaries to the MNC’s total number of foreign subsidiaries. Thus, in this case, the second measure of INTDIV is defined as one minus DEPTH. In the second measure of PRODIV, an industry is determined at the two-digit level (in place of the four-digit level) of SICs. This is therefore a stricter measure of product diversification. Conceptually, by utilizing two-digit SIC codes, this second measure corresponds to an index of product diversification in unrelated sectors (Sambharya, 1995; Gomez-Mejia and Palich, 1997). The tests were rerun with these alternative measures of diversification and obtained qualitatively similar results. In particular, the switching regressions model still identifies four diversification regimes (with INTDIV* = 0.44 and PRODIV* = 0.40) and the Type I MNC, i.e. with a low level of international and product diversification, is less leveraged than the three other groups of MNCs.

26 Following a reviewer’s suggestion, model (4) was rerun including the asset turnover variable to control for efficiency. The results concerning this variable are not significant and are available upon request.
It was found that MNCs with a high level of international and product diversification face lower levels of default risk. Furthermore, the MNCs at the low end of the diversification strategy scale are less leveraged than the three other groups of MNCs. The combination of both types of diversification enables MNCs to achieve higher levels of profitability than those of MNCs pursuing a single diversification strategy. Furthermore, the effect of agency costs and default risk on the debt ratio of MNCs varies with the diversification regime.

The results of the switching regimes regression suggest that one should not consider all MNCs as a homogeneous group when one assesses the role of the capital structure determinants of MNCs, since it was found that the effect of some of the explanatory variables varies with the diversification strategy pursued by MNCs. While the experience of each type of MNC is unique, there seem to be common determinants of MNC capital structure. In particular, profitability is negatively related to the debt ratio of MNCs.

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