

# Cross-Country Differences in Capital Structure Determinants of Multinational Corporations

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## ABSTRACT

Most of the existing studies on the capital structure of multinational corporations (MNCs) were conducted for American enterprises, and mainly within a framework that opposes MNCs against domestic firms. Such analyses underline the influence of international diversification over the financing structure of MNCs. However, a lack of comparative studies of the multinational enterprises financing structure in a geographical dimension can be noted. Since countries are often differentiated in function of their *market-* or *bank-oriented* financial system, such a comparative study could quantify the influence of the originating country financial market over the multinational corporate financial decisions. In order to fill this lack, an empirical study of the determinants of capital structure of American, European, and Japanese multinational corporations is conducted.

**Keywords:** capital structure, multinational corporations, trade-off theory, pecking order theory, market-timing theory.

JEL classification: F23, G32

## INTRODUCTION

Since the 90's, the international financial framework is marked by the liquidity excess, which explains the downward trend of interest rates and the investment rush in the financial markets. The credit markets have considerably grown and transformed. Beyond the increasing concern raised by the multiple credit market innovations, the rapid spread of new credit instruments led to the creation of a broader and deeper market. The direct result is the reduction of banks share in the total credit. Differences in financial markets are nevertheless persistent amongst countries, thus leading to possible differences in the capital structure related decisions taken by companies<sup>1</sup>. In the light of this, the natural question that arises is whether MNCs, i.e. companies that have offices, production and sales facilities in more than one country, started to overpass their domestic financial market habits, thus enhancing convergence process in term of corporate finance policy around the world, or not. Furthermore, if such a convergence process would exist, it would be useful to define the targeted system (financial market-led, bank-based or an intermediary).

The capital structure analysis, in general, and that of multinational corporations, in particular, is largely tributary to the work of Modigliani & Miller (1958). In their seminal paper, Modigliani & Miller (1958) postulate the irrelevance of capital structure for corporate value. Under perfect capital market assumptions, it is not the capital source that increases the firm value, but the assets that the capital finances. The cost of different capital sources varies in a non-independent manner. Hence, there is no reason for an opportunistically switch between equity and debt. The usually retained hypotheses leading to the neutrality of the capital structure are: lack of taxes, lack of bankruptcy risk, efficient and integrated capital markets.

By relating the particularly restrictive hypotheses of Modigliani & Miller, numerous consequent studies aim at showing an existing dependence between financial choices and

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<sup>1</sup> The Rajan & Zingales (2003) study highlights the persistence of capital market differences amongst European countries, as well as between European countries and USA.

corporate value. The conditions making one capital structure better than the other, hence optimal, are successively debated. Thus, corporate financing decisions are analyzed in the presence of corporate tax (Modigliani & Miller, 1963), income tax (Miller, 1977), bankruptcy costs (Stiglitz, 1972; Titman, 1984), agency costs (Jensen & Meckling, 1976; Myers, 1977), and informational asymmetry (Myers, 1984). From these perspectives, the external financing has costs and advantages whose consideration is necessary. Thus, the financing structure (in other words, the income distribution between stockholders and bondholders) is dictated by the arbitrage between the costs of different financing sources.

The debt tax shield provides one of the first arguments confronting the Modigliani & Miller (1958) postulate. The fiscal deductibility of debt financial costs constitutes an incentive for debt financing in opposition with equity financing. Considering the debt fiscal advantage renders the optimal capital structure analysis more complex, since the repartition between debt-related tax advantages and costs must be accounted for. The value of an indebted corporate would equal to the value of an equivalent debtless corporate increased by the actual value of debt tax shield. Nevertheless, the conclusion is less obvious if the dividend tax is taken into account (Miller, 1977).

Besides the debt tax shield, another advantage of debt consists in the solution provided to the problem of informational asymmetry between corporate insiders and outsiders. The managers' financing decisions represent a communication channel toward financial investors: the corporate debt level testifies of the management quality and, therefore, of the corporate performance (Ross, 1977). The higher the corporate debt level is, all else being equal, the more important the managers' struggle for improved corporate efficiency will be, in order to increase the benefit of corporate owners. This is perceived by outsiders as signals sent by managers about their efforts in improving corporate efficiency.

The gains provided by debt financing are however balanced by the increasing bankruptcy risk, whose probability increases with the debt weight. Moreover, the more important the debt financing is, the higher are the yield rates required by the stockholders. Added to the bankruptcy costs, the shareholders requirements limit somewhat the corporate debt financing option (Warner, 1977).

Jensen & Meckling (1976) dispute as well the postulated independence between financing and investment decisions. Their arguments set up on the conflict of interest between stockholders and bondholders. This conflict arises from the stockholders opportunity to benefit from the income flow growth inherent to risky investment projects. Contrary to the stockholders, bondholders profit from fixed claims, which makes them prefer low risk projects. In this perspective, the stockholders' preference for superior risk investment projects operates a wealth transfer from bondholders to stockholders. Also known as the *asset substitution problem*, this risk transfer increases the agency cost of debt financing.

In line with Jensen & Meckling, Myers (1977) evokes an agency problem involving the same sides: the stockholders and the bondholders. When corporate leverage is high, the agency conflict between stockholders and bondholders leads to the *underinvestment* problem. The residual character of the stockholders' remuneration in comparison with that of the bondholders makes the stockholders accept only those investment projects whose net present value exceeds the facial value of debt. The incurred risk is to constrain in this way the managers to give up investment projects with positive net present value, thus leading to an underinvestment problem.

All these successive developments of the capital structure theoretical framework proposed since the middle of the past century have highlighted the importance of the institutional dimension (taxation, bankruptcy regulation) but also the relevance of the governance mechanisms (agency theory, transaction costs theory) for the corporate financing decisions. These various contributions laid ground to two approaches crystallized in the 80's: the *trade-off theory* (henceforth, TOT) and the *pecking order theory* (henceforth, POT) (Myers, 1984). Synthesizing the contributions exposed in a wide manner in the post - Modigliani & Miller (1958) corporate finance literature, these two approaches will provide a reference frame for almost all consequent empirical studies.

The *trade-off theory* emerges from the studies highlighting the non-neutrality of taxes, bankruptcy and agency costs in the settling of corporate financial strategies. Debt advantages (fiscal, disciplinary role of debt on managers - Jensen & Meckling, 1976<sup>2</sup>; Grossman & Hart, 1982 -, lower information costs relative to equity finance costs) and drawbacks (bankruptcy costs due to higher debt, agency costs due to information asymmetry between shareholders and creditors etc.) can therefore be identified. The corporate capital structure is thus an outcome of debt advantage-drawback trade-off. Companies acting in line with this theory would continuously adjust their capital structures toward a target debt ratio<sup>3</sup>. Beside the target debt ratio as evidence of the trade-off theory, two prevailing determinants of the leverage can be identified. These are tax benefits and bankruptcy costs. A highly profitable corporation should have a considerable leverage in order to balance (offset) debt costs and debt tax shield. Under the *trade-off* paradigm, a company with a relatively high leverage would be expected to mostly consider the tax advantage of debt than other factors in financing choices.

Contrary to the *trade-off theory*, the *pecking order theory* does not suppose that an optimal debt level exists. The taxes and the financial bankruptcy are important, but not decisive. Essentially constructed on the information asymmetry hypothesis, the POT postulates the existence of a hierarchy in the financing sources choices. Developing its theory around the adverse selection problem, Myers contends that managers will prefer the internal resources to debt and equity finance. The distinction is thus made between three financing sources: retained earnings (no adverse selection problem), debt (small adverse selection problem) and the equity issue (serious adverse selection problem, thus higher risks relative to debt) (Myers, 1984; Myers & Majluf, 1984).

These two *traditional* approaches are the source of a vast literature trying to validate their postulates on corporate capital structure. The early capital structure empirical analysis is mainly realized regardless of the geographic frontiers of corporate activity. Despite the mitigated empirical results, the consensus of a progressive capital structure adjustment toward an optimal leverage ratio emerges (Kremp & alii, 1999; De Miguel & Pindado, 2001; Fama & French, 2002; Leary & Roberts, 2003; Flannery & Rangan, 2004). Furthermore, in a survey conducted on CFOs, Graham & Harvey (2001) find that almost 37% of respondents have a flexible target debt ratio, 34% target a debt ratio in a somewhat tight range and 10% have a strict target<sup>4</sup>.

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<sup>2</sup> Since they are not owners of the firms, managers may work less efficiently. The debt might therefore have a disciplining role, mitigating the principal-agent problem.

<sup>3</sup> The target (or optimal) debt-to-equity ratio is the ratio which perfectly balances the costs and benefits of debt financing. (Leary & Roberts, 2003) The underlying hypothesis of the trade-off theory, which allows corporate to permanently adjust their capital structure, is the absence of adjustment cost (frictionless capital markets).

<sup>4</sup> While less numerous than the econometric empirical studies, several other surveys were conducted since Graham & Harvey (2001) one: Bancel & Mittoo (2004) and Brounen & al. (2006).

Contrary to the trade-off theory, the POT is to a lesser extent validated by studies conducted on 1990s data. The widespread consensus is that slow growth firms mostly rely on equity financing (Frank & Goyal, 2003; Lemmon & Zender, 2004), even when internal or debt financing is available (Fama & French, 2005). The corporate financial decisions are thus following a permanent adjustment process, and the leverage ratio is depending on the corporate characteristics, such as size, growth opportunities, tangibility, and tax rate.

The increasing reliance of corporations to market financing, mostly specific to Anglo-Saxon countries, leads to an increasing interest for the effects of stock prices evolution on corporate financing decisions. Contrary to the traditional capital structure theories relying on debt financing cost, a new theory gains ground: the market timing approach. In this framework, firms are more likely to issue equity when their market values are high, relative to their book and past market values, and to repurchase equity when their market values are low. In this line, “*the capital structure is the cumulative outcome of attempts to time the equity markets*” (Baker & Wurgler, 2002). The managers are hence able to identify the stock mispricing and to act consequently, in function of the relative cost of equity and debt<sup>5</sup>. Therefore, “*firms fail to rebalance their capital structures in response to changes in their leverage brought on by either timed equity issuances or market perturbations to equity values*” (Leary & Roberts, 2003). Since the publication of Baker & Wurgler paper in 2002, many authors challenged the postulate that, on one hand, the corporate financing decisions are more and more dictated by market timing, and, on the other hand, that the market timing has a lasting effect in the capital structure, i.e. there is no target debt ratio.

Initially conducted on the American corporate data, the capital structure empirical literature was extended to cross-country comparative studies. Rajan & Zingales (1995), whose study is amongst the first going in this direction, conclude that the leverage is not varying across countries, at least not between corporations originating in G7 countries. They also highlight the relevance of institutional factors in determining the capital structure. These institutional factors are the bankruptcy legal framework, the fiscal settlement, the property concentration etc. The permanent adjustment of capital is also confirmed by empirical studies conducted on French and German corporations (Kremp & alii, 1999).

The multinational corporations are entering the capital structure literature by studies opposing their financial choices to those of their *purely* domestic counterparts. The internationalization process is thus connected to factors identified by previous literature as dictating the financial decisions. Nevertheless, due to their presence on international capital markets, the MNCs financial decisions are more complex relative to those of *domestic* corporations. The arguments presented in the first section will lay ground to the empirical analysis conducted on the capital structure of multinational corporations in the second section.

#### **OVERTAKING THE TRADITIONAL FRAMEWORK: A MNC VS. MNC STUDY**

Comparisons of the capital structure of *purely domestic* corporations and multinational corporations permitted to identify to what extent the internationalization process exert an influence on corporate financing choices. The MNCs capital structure is therefore examined in relation to both the geographical and operational diversification process (Chkir & Cosset, 2001).

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<sup>5</sup> In this line, the survey conducted by Graham & Harvey (2001) highlights the real importance of stock mispricing in equity issues policy.

The corporate internationalization process, perceived as a geographical activity diversification, leads to a generally accepted conclusion: due to international diversification, MNCs should be able sustain higher debt levels without a corresponding increase in risk (Eiteman, Stonehill & Moffet, 1998). Their presence in less than perfectly correlated markets leads to a diversification of income sources, which translates into lower income volatility, thus lower bankruptcy risk.

However, the reality shows that multinational corporations have lower leverage ratios than their domestic counterparts (Lee, 1986; Fatemi, 1988; Lee & Kwok, 1988; Burgman, 1996; Chen & *alii*, 1997; Doukas & Pantzalis, 1997). Seemingly, the international diversification of gains does not balance higher debt agency costs, thus leading to lower debt levels. The international diversification is therefore analyzed in relation with the traditional variables, previously identified as determinants of *purely domestic* corporations' capital structure.

Aiming to solve this puzzle, several studies have analyzed the influence of the internationalization process on bankruptcy and agency costs (Fatemi, 1988; Lee, 1986; Lee & Kwok, 1988). The existing empirical studies prove that the corporate geographical diversification induces lower bankruptcy costs, mostly due to lower income volatility. However, the agency costs of debt are higher and this could explain the lower leverage of MNCs.

Burgman (1996) conducts a first empirical study of multinational corporate capital structure which integrates in the estimation of the leverage ratio both traditional determinants and internationalization specific factors. In order to account for the international dimension of MNCs activity, Burgman is taking into account the operating risk, the exchange rate, the internationalization degree measured as the host countries number etc. In opposition with previous results, Burgman proves that the income volatility does not necessarily diminish with internationalization. Furthermore, he found a positive sign in the relation between leverage ratio and both political risk and exchange rate risk, which is suggesting the instrumentation of the capital structure. The financial choices of multinational corporations seem thus responding to risk hedging purposes. This opens the way to several subsequent studies trying to explain the financial pattern of multinational corporations. Mostly conducted on American multinational corporations, the existent literature lacks international comparative studies.

The understanding of MNCs financing decisions must consider the consequences of their simultaneous presence in different markets. There are many elements that could explain the differences between the MNCs financing choices and those of domestic corporations.

The geographical diversification of activities provides MNCs access to different financial markets, thus allowing for a larger field of financing choices. Hence, benefiting of available lower cost financing opportunities seems a natural choice for MNCs. A relative differentiation of MNCs capital structure from that of their domestic counterparts might be observed. Furthermore, facing a broader array of financing choices, the MNCs sensitivity to capital cost might be increasing.

Certainly, the recent financial integration progresses allowed the corporations - regardless the amplitude of their geographic deployment - to mobilize financial resources all over the world. Many *domestic* corporations consider offering directly their capital on foreign capital markets,

ignoring their domestic stock market. Nevertheless, the domestic corporations' capital structure remains largely dominated by opportunities on home capital market.

Besides the supply side aspects of MNCs financing choices, tax optimization purposes might shape the MNCs capital structure. Contrary to their domestic counterparts, the MNCs operate in different tax jurisdictions. As long as the international tax harmonization represents an objective and not a reality, the minimization of the fiscal function of MNCs may make use of the debt tax shield<sup>6</sup>. A higher debt ratio might therefore be noticed. This could also be explained by exchange risk hedging operations. In order to balance assets and liabilities in the same currency, MNCs can prefer debt financing in the host country currency, thus avoiding the exchange rate risk and providing a “*natural hedge*”.

The debt tax shield could also explain the development of a financial market internal to the multinational corporation. In order to optimize the tax bill, MNCs may develop financial strategies between parent companies and affiliates and between affiliates.

Another behavioral particularity of MNCs is the increasing weight of the intangibles in the total assets. Facing a strong competition in the worldwide markets, the MNCs are strongly investing in the acquisition of new technologies. This is supposed to assure them an improved productivity and thus a premise of increasing market parts. From this point of view, the R&D and marketing expenses became a success condition<sup>7</sup> in the contemporaneous economy. On the other hand, the inherent decrease in tangible assets enhances the corporate flexibility. The diminishing part of fixed assets in total assets might let us think that MNCs became largely dependent on stock markets, in opposition to domestic corporations.

A striking difference between MNCs and *purely* domestic corporations might come from their relative size. The MNCs are generally very large corporations, whose debts are mostly built up on the bond issuing, contrary to smaller firms, which rely more on debt financing from banks (Lemmon & Zender, 2004). The bank control over the investment and financing decisions of smaller corporations reduces the conflicts between debtholders and equityholders. On the other hand, the (very) large corporations (such as MNCs) are less subject to outside bondholders control over their financing and investment decisions, thus boosting the conflict of interests between bondholders and equityholders. Hence, contrary to relative smaller firms, the MNCs are more likely to fund the investment and financing decisions in line with the equity-value maximization. The management objectives will thus be different following the firm- or equity- value maximizing purposes.

In the same line of strong competition, combined with the increasing dependence of exchange markets, the capital structure choice might play a role in control contests. In order to become an unattractive takeover target, the MNCs might prefer debt when choosing their capital structure<sup>8</sup>.

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<sup>6</sup> Certainly, the fiscal optimization in an international framework is a very complex problem. Countries are adopting different policies with regard to the corporate income territoriality. Two different kinds of policies can be identified: the credit tax system and the exemption system.

<sup>7</sup> Philip Kotler, one of the well-known experts on marketing practice, postulates that the two drivers of any corporate activity must be innovation and marketing. These are the only earning-enhancing assets; all other assets are representing only costs for corporate.

<sup>8</sup> The leverage ratio, along with the dividend payments, allows corporations to protect themselves in the active control market. Thus, managers must manipulate the stock price in order to avoid any hostile takeover. (Aglietta & Reberioux, 2004)

The framework in which operate MNCs is thus the greatly diversified worldwide landscape. This is completely incompatible with the theoretical situation of perfect capital markets, with fixed exchange rates and harmonized international taxes. Contrary to their *domestic* counterparts, the MNCs financing decisions could be very specific, therefore having a different pattern relative to the existing theoretical postulates. The empirical study presented in the next section will allow us to identify differences and/or similarities in MNCs financing patterns with respect to the existing theoretical and empirical literature.

## ECONOMETRIC ANALYSIS

### 1. Empirical analysis goals

The theoretical background of the empirical analysis is provided by the already traditional *pecking order theory* and the *trade-off theory*, on the one hand, and by the recently formulated *marking-timing theory*, on the other hand. Under the POT, the capital structure is the outcome of the informational asymmetries between insiders and outsiders, while it is the direct result of the *trade-off* between the debt benefits and costs under the *trade-off* theory. The extension of the *trade-off* theory to the cost of equity financing leads to the market timing theory, which, contrary to the existing theories, posits that the capital structure would be the outcome of the balance between equity benefits and costs.

The traditional theoretical framework postulates that collaterals, profitability, size, and growth opportunities are the core explaining factors of the capital structure. Nevertheless, the increasing reliance of corporations on the exchange markets, as well as the high-speed of innovation in credit market instruments, is supposed to reshape the corporate financing pattern. From a cross-country perspective, the distinction is usually made between the *bank-oriented* and the *market-oriented* systems, respectively between France, Germany and Japan, on one hand, and UK and USA, on the other hand. Empirical studies already conducted on the financing pattern of corporations originating in these countries (regardless their international involvement, hence their multinationality) support this distinction. However, the tendency to assign to their respective MNCs the same financing pattern as the one observed for their domestic counterparts might be wrong. A first question that arises, and to which the present study tries to respond, is whether from MNCs' perspective this financial systems separation still works.

Taking into account the international integration of the capital markets<sup>9</sup>, as well as the simultaneous presence of the MNCs in many countries, our intuition says that mitigated financing patterns and capital structure determinants should be observed across countries, i.e. similarities between MNCs belonging to opposing country-groups and/or distinctions between MNCs originating within the same country-group.

A second interrogation concerns the place of the traditional theoretical framework of capital structure determinants, i.e. the contribution of the traditional variables (the collaterals, the profitability, the size, and the growth opportunities) in explaining the MNCs' capital structure.

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<sup>9</sup> Many German and French multinational corporations have increasing parts detained by foreign investors: Hoechst, Bayer AG, Danon, BTP Lafarge, Vinci, all have almost half of their stocks detained by foreign investors. Moreover, foreign investors actually own more than half of the value of CAC40 index (against 25% in 1997), a particular pattern in the industrialized world (Eric Chol, "CAC40: Des fleurons si peu tricolores", *L'Express*, 30.03.2006).

The widespread of credit ratings, mostly based on the current assets and liabilities in the balance sheet, combined with the larger interest for operational flexibility, encourage corporations to reduce the part of fixed assets in their total assets. From a *bank- vs. market-oriented* distinction, the common perception is that the leverage ratio of MNCs originating in France, Germany and Japan should still heavily depend of the tangibility ratio, while that of British and American MNCs should not.

The profitability represents a key variable - in theory, as well as in practice - in the financing choices. There is no doubt, the higher the profitability is, all else being equal, the lower the external financing needs are, hence the debt and the equity. Nevertheless, the shareholder-value maximizing corporations must do everything possible in order to increase the shareholders wealth, i.e. the sum between dividends and capital gains. Hence, the greater the dividends are, the greater the need for external finance will be. From a POT perspective, under informational asymmetries, the privileged external finance source will be the debt. On the other hand, the dividends payment leads to lower agency costs of equity. Firms can therefore raise more equity, leading to a lower leverage ratio. Therefore, a negative correlation between profitability and leverage can be the outcome of different mechanisms.

The risk associated to a high volatility of the income leads, under both the POT and the TOT, to lower leverage ratios. The MNC income volatility draws on multiple sources: exchange rate volatility, cross-(host) country different income taxes, more or less synchronized international business cycles, etc. Hence, the MNC debt issues in foreign (host-countries) financial markets are usually dictated by “natural hedge” purposes, keeping the “source of funds” close to the “use of funds”, by favorable tax treatment relative to the home country (Desai, 2004) and lower interest rates. An *ex ante* high level of operating risk enhances the debt financing in the host countries, thus increasing the MNC total debt. Therefore, contrary to the traditional view, the risk could be positively related to the leverage ratio.

Corporate growth opportunities represent another traditional variable identified as determining the financing choices. The market-to-book ratio, the privileged *proxy* in the existing empirical literature, allows taking into account the market perceptions concerning the corporate growth options. The traditional view, as represented by the trade-off theory, is very close to that developed by the market timing approach. In these theories, the firms having growth opportunities will prefer the equity financing instead of debt.

In order to verify whether the market-timing has a lasting effect on the MNCs’ capital structure, the *external finance weighted-average* variable, as identified by the capital structure related market-timing literature, is employed. Contrary to the market-to-book ratio, which documents the short-term market timing effects, this variable allows us to identify, first of all, if there exists a long-term effect of the market timing on the MNCs capital structure, and secondly, whether such an effect would lead to higher or lower leverage.

Another hypothesis tested here is the one assuming a debt adjustment towards a target debt ratio. In line with Frank & Goyal (2002), we consider that the corporate leverage is not only determined by the financing deficit, but that there is also a mean reversion, an adjustment process. In order to analyze the MNCs debt adjustment pattern, the industry leverage ratio is used as proxy for the target debt ratio, ensuring the corporate market-/equity- value maximization. Besides testing the validity of the debt adjustment hypothesis, the adjustment speed is also analyzed. As long as the adjustment implies a wealth transfer from shareholders to debtholders, the speed of adjustment will be lower for equity-maximizing corporations, in

opposition to value-maximizing corporations. The equity-maximizing corporations perceive the transaction costs and the wealth transfer from shareholders to bondholders as exceeding the added value. On the other hand, the value-maximizing corporations will adjust their debt ratio as long as the transaction costs will be inferior to the value added by the adjustment process. (Titman & Tsyplakov, 2006)

After all, there is a lack of cross-country comparative empirical analysis of multinational corporations' capital structure with respect to existing theories. The purpose of the present study is thus to highlight, in a home country comparative framework, the differences in multinational corporations capital structure and their corresponding determinants. To this end, the leverage ratios of multinational corporations originating from France, Germany, Japan, United Kingdom and United States of America are statistically analyzed and estimated.

## 2. Econometric method

The Generalized Method of Moments (GMM henceforth) for dynamic panel-data estimation was chosen in order to control for the simultaneity and endogeneity problems, inherent when manipulating corporate balance sheet data. Dynamic panel models permit to explain the current level of the dependent variable in function of its past realizations. The relations between an endogenous variable and its lagged values would be difficult to estimate in a static fixed or random effects panel model due to the correlation between the lagged values and the error term.

The Arellano & Bond (1991) one-step GMM estimator is here used. Despite the improved efficiency of the two-step GMM estimator relative to the one-step GMM, our choice is justified by the data sets size. Arellano & Bond (1991) recommend using one-step results for inference on the coefficients for small samples. For this later, the two-step standard errors tend to be biased downward.

The dynamic model is therefore:

$$y_{it} = \sum_{j=1}^p \alpha_j y_{it-j} + \beta_1 x_{it} + \beta_2 w_{it} + v_i + \varepsilon_{it} \quad (8)$$

where:

$i$ - individuals, (MNCs);

$t$ - year ( $t = \overline{1996}, \overline{2005}$ );

$\alpha_j$  and  $p$  -parameters to be estimated;

$x_{it}$  - a  $(1 \times k_1)$  vector of strictly exogenous covariates;

$\beta_1$  - a  $(k_1 \times 1)$  vector of parameter to be estimated;

$w_{it}$  - a  $(1 \times k_2)$  vector of endogenous covariates;

$\beta_2$  - a  $(k_2 \times 1)$  vector of parameter to be estimated;

$v_i$  - random effects that are independent and identically distributed (i.i.d.) over the panels with variance  $\sigma_v^2$ .

$\varepsilon_{it}$  - are i.i.d. over the whole the sample with variance  $\sigma_\varepsilon^2$

### 3. Data

The empirical study is conducted on corporate annual financial account data extracted from the Bureau Van Dijk's ORBIS database. For the current study, only the corporations publicly quoted over the analyzing period (1996-2005) have been retained. The corporate financial data is provided by the Standard & Poors' Global Vantage COMPUSTAT database.

Considering the specific regulation of the capital structure of financial corporations and the different balance sheet items, the financial sector is excluded from this study. In addition, firms involved in mergers and acquisitions are not included in the data set. The country panel size is significantly reduced, due to the lack of fulfillment of data series and due to delayed time series across companies. The study is therefore conducted on a considerably smaller number of corporations than initially predicted. The final panel size is: France - 68 over 204, Germany - 59 over 142, Japan - 78 over 92, United Kingdom - 114 over 292, and United States of America - 640 over 783. The within-country business sector repartition is illustrated in Figure 7. The business sector classification is following the General Industrial Classification Standard, developed by Morgan Stanley Capital International<sup>10</sup> (MSCI).

The estimations are conducted on balanced panel data. In order to assure the cross-country comparability of the estimations results, the endogenous and exogenous variables are calculated using the same formulas, presented in what follows.

### 4. Variables

The endogenous variable, the corporate leverage ratio, is differently calculated in the existing literature. Usually, the *debt-to-equity ratio*, *total liabilities and debt to total assets ratio* and the total long-term debt to capital are the recurrent proxies for the leverage ratio.

In the present study, the leverage ratio is calculated as follows:

$$lev_t = \frac{long\ term\ debt_t}{total\ assets_t} * 100 \quad (1)$$

The non-debt liabilities are thus excluded when analyzing the debt ratio pattern. It is generally agreed that the default risk is not well suggested by including the non-debt liabilities in the debt leverage ratio and that the accounts payable are used for transactions purposes rather than financing (Rajan & Zingales, 1995; Hovakimian, 2006). In the same line, there is no distinction made here between debt and convertible debts. Therefore, like most of previous empirical studies, convertible debts are treated as debt (Rajan & Zingales, 1995; Fama & French, 2002; Hovakimian, 2006), and not as equity (Baker & Wurgler, 2002).

The exogenous variables are chosen amongst those identified by the capital structure theoretical framework and validated by previous empirical studies: the size, the profitability, the tangibility, the operating risk and the growth opportunities. Their respective measure is exposed bellow.

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<sup>10</sup>The initial NACE classification of industries (as found in the ORBIS database) is regrouped in the following MSCI business sectors identified in our datasets: Energy, Materials, Capital Goods, Commercial Services & Supplies, Transportation, Automobiles & Components, Consumer Durables & Apparel, Consumer Services, Media, Retailing, Food & Staples Retailing, Food, Beverage & Tobacco, Household & Personal Products, Health Care Equipment & Services, Pharmaceuticals, Biotechnology & Life Sciences, Real Estate, Software & Services, Technology Hardware & Equipment, Telecommunication Services. Details can be found at: <http://www.msicibarra.com/products/gics/>.

In order to account for the corporate size, the natural logarithm of net sales is used:

$$size_t = \ln(sales_t) \quad (2)$$

The corporate size effect on the leverage, as identified by the existing literature, is ambiguous (Rajan & Zingales, 1995). On one hand, the larger the companies are, the less likely they are to go bankrupt. Hence, in a *trade-off theory* perspective, leverage and corporate size should be positively related. On the other hand, corporate size might be regarded as a proxy for the availability of financial information (larger companies have to provide more information on their financial choices). And, since outside investors are likely to prefer equities over debt, the availability of detailed financial information might be regarded as an obstacle to a higher leverage. Thus, corporate size could also be negatively related to leverage.

The tangibility ratio is calculated as:

$$tng_t = \frac{tangible\ assets_t}{total\ assets_t} * 100 \quad (3)$$

The tangible assets are supposed to lower the lender agency costs, and thus the moral hazard risk, under informational asymmetries. The higher is the tangible assets weight in the total assets, the higher should the leverage ratio be.

The profitability is the ratio between net income and turnover:

$$prof_t = \frac{net\ income_t}{total\ assets_t} * 100 \quad (4)$$

The profitability influence on the leverage ratio is mainly exposed by the *pecking order theory*: under informational asymmetries, the internal financing is preferred to the external one. Hence, a negative sign must characterize the relation between the leverage ratio and the profitability. However, according to *trade-off* theory postulates, highly profitable corporations could be concerned with fiscal optimization purposes. In order to benefit from debt tax advantages, highly profitable companies would thus increase their leverage. A positive sign of this variable will then suggests fiscal optimization strategies.

The foreign sales ratio provides a proxy for the corporate internationalization degree. There are also other, more complex, indicators accounting for internationalization, such as those calculated as a weighted average of assets, sales and number of employees deployed in corporate destination countries<sup>11</sup>. The lack of complete data series on foreign assets and number of employees for the analyzed corporations led us to consider only the foreign sales ratio in quantifying the internationalization degree. The foreign sales ratio is, in fact, recurrent in studies opposing multinational and *purely* domestic corporations.

The foreign sales ratio is calculated as the part of the foreign sales in the total sales:

$$fsales_t = \frac{foreign\ sales_t}{total\ sales_t} * 100 \quad (5)$$

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<sup>11</sup> OECD index of transnationality.

The sign of this variable suggest the MNCs financing pattern relative to the international deployment. A positive sign testifies about operational hedging policies. In order to minimize the operational and political risk, thus the exchange loss generated by high exchange rate volatility, or significant juridical change, an adjustment between assets and liabilities libeled in a same currency might be observed. On the other hand, a negative sign is explained by the use of equity financing (new equities and retained earnings) in financing the corporate expansion. Moreover, a negative correlation between international diversification and leverage ratio would also suggest the lack of an international pool of risk, mostly due to the increasing correlation in international economy which is diminishing the positive risk-related effects of geographical diversification. However, in an agency costs perspective, a negative sign suggests that increasing international involvement boosts the conflicts between shareholders and debtholders, leading to lower debt financing (Doukas & Pantzalis, 2003).

The agency and bankruptcy costs, usually quantified by the income volatility, represent a leading variable for creditors. Since higher income volatility, synonym of higher risk, is associated with a higher probability of default, a negative correlation between leverage and risk should be observed. On the other hand, the traditional intuition does not apply when considering very large corporations. In order to avoid bankruptcy, creditors are persisting in providing funds to risky firms. Hence, a positive correlation between leverage and risk could also be observed.

Herein, the risk is quantified by (Kremp & alii, 1999)<sup>12</sup>:

$$risk_{it} = \left[ \frac{net\ income_{it}}{turnover_{it}} - \left( \frac{net\ income_t}{turnover_t} \right) \right]^2 \quad (6)$$

Most of existing empirical studies (both survey and econometric) highlight the importance of the corporate debt adjustment toward the average industry debt level. The common view is that, contrary to smaller companies, the larger ones are more likely to adjust their debt level towards a target debt ratio. The adjustment costs, as well as the financial distress costs, are more important for smaller firms. On the other hand, differences in the adjustment speed across countries would testify about debtholders–shareholders conflicts, but also about the presence of financial distress costs. The more important the conflicts between debtholders and shareholders are, the lower the corporate propensity to move towards their target debt ratios will be. A contrasting effect is exerted by the financial distress costs: the more sensitive the firm is to these costs, the higher the tendency to move towards the target debt ratios will be. Of course, the simultaneous presence of both forces (debtholder-shareholder conflicts and high financial distress costs) leads to an offsetting effect: the corporate financing pattern is similar to that of a corporate not faced with these conflicts (Titman & Tsyplakov, 2006). In order to test this hypothesis, two variables are constructed: one accounting for the MNCs within home-country industry average debt level, and another one for the cross-country industry average debt level. This late is supposed to verify to what extent the internationalization process lead to a cross-country industry convergence of MNCs debt ratio. Certainly, the underlying hypothesis made here is that these target debt ratios are those that maximize the corporate market value.

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<sup>12</sup> From a statistical point of view, the risk assigned to a variable is quantified by its variance or standard deviation. The risk proxy proposed here can be assimilated to a variance measure of the analyzed variable. Considering for the variable used here, the ratio net income/turnover, it allows quantifying the sensitivity of the return to the variation of the activity, but also to the cost repartition between fixed and variables (Colasse, 2003).

The market timing approach postulates are also tested. To this end, the “*external finance weighted-average*” variable, as proposed by Baker & Wurgler (2002), is constructed:

$$efwa_{it-1} = \sum_{s=0}^{t-1} \frac{e_s + d_s}{\sum_{r=0}^{t-1} e_r + d_r} (MB)_s \quad (7)$$

where:  $e_{s,r}$  and  $d_{s,r}$  stand for respectively net equity issues and net debt issues. The zero value for time index corresponds to the first year of available data. The *net equity* and *net debt issues* are usually reported in the cash-flow statement. Nevertheless, the lack of cash-flow statement data for almost all considered enterprises constrains us to build, as most of the authors in the field, these two variables from balance sheet data. Hence, the *net equity issues* are calculated as the change in book equity minus the change in retained earnings, divided by assets. Similarly, the *net debt issues* are calculated as the change in the total debt divided by assets. Because changes in the equity, as well as in debt, may be both positive and/or negative, we set the minimum value of weight at zero<sup>13</sup>.

The *external finance weighted-average* variable retraces the cumulative history of the market-to-book ratio. The more important the external funds raised when the market-to-book ratio is high are, the higher value of this indicator is. When statistically significant, this variable documents the long-run effect of market timing strategies on the capital structure. Hence, it is different for the market-to-book variable used as proxy for the investment (growth) opportunities, which controls for the current cross-sectional variation in the market-to-book ratio level. The external finance weighted-average is thus supposed to account for the influence of past, within-firm variation in market-to-book. (Baker & Wurgler, 2002)

## 5. Descriptive statistics

The MNCs retained in the present study are very large publicly quoted companies, having non-financial activities and a revenue superior to three billions USD. In this panel, most Japanese companies are found in the higher revenue segment (above 10 billion USD)<sup>14</sup>, while British and US originating companies show a higher relative presence in the lower income segment. This explains the larger average corporate size of Japanese MNCs and the smaller average corporate size of UK and US originating MNCs (Figure 1). These results, however, are only relevant to the considered company set, and might change if companies having lower revenue would be included.

The internationalization degree of the analyzed MNCs is different across countries (Figure 2). In terms of country-average foreign sales ratio (computed as foreign sales per total sales), the American and Japanese MNCs present the lowest values, which could be explained by the relatively large home country market size. The UK MNCs are presenting the largest extent of international activity.

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<sup>13</sup> This choice is justified by the fact that a necessary condition when computing a weighted average is that of a positive weight.

<sup>14</sup> Contrary to the other countries analyzed, the availability of balance sheet data for Japanese MNCs with revenue inferior to 10 billions USD is very limited. From 14 Japanese MNCs reported by the database in this revenue segment, only two were retained, the other twelve being excluded due to data incompleteness.

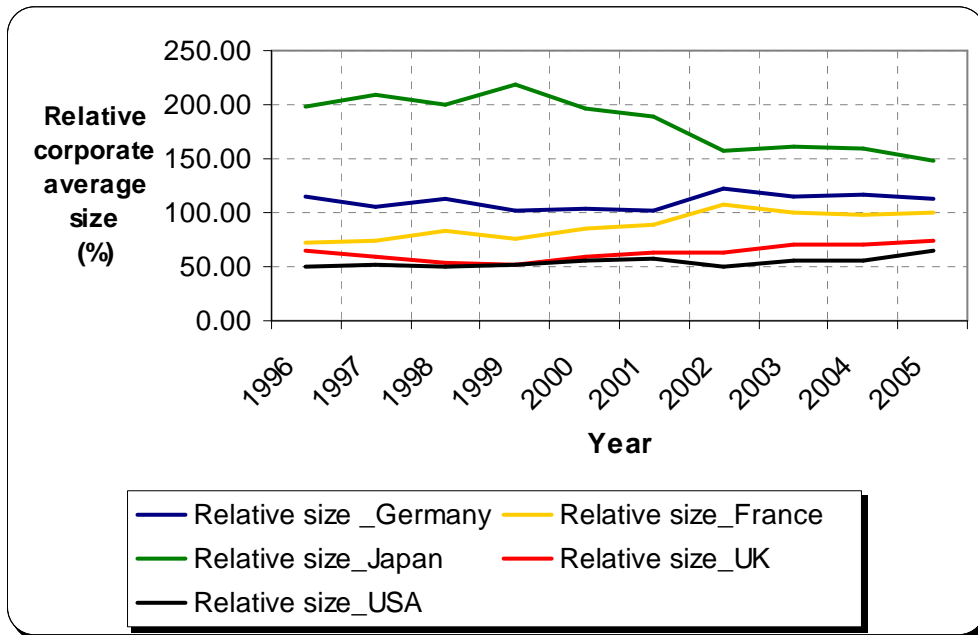


Figure 1: Country corporate average size relative to overall corporate average size evolution (1996-2005)

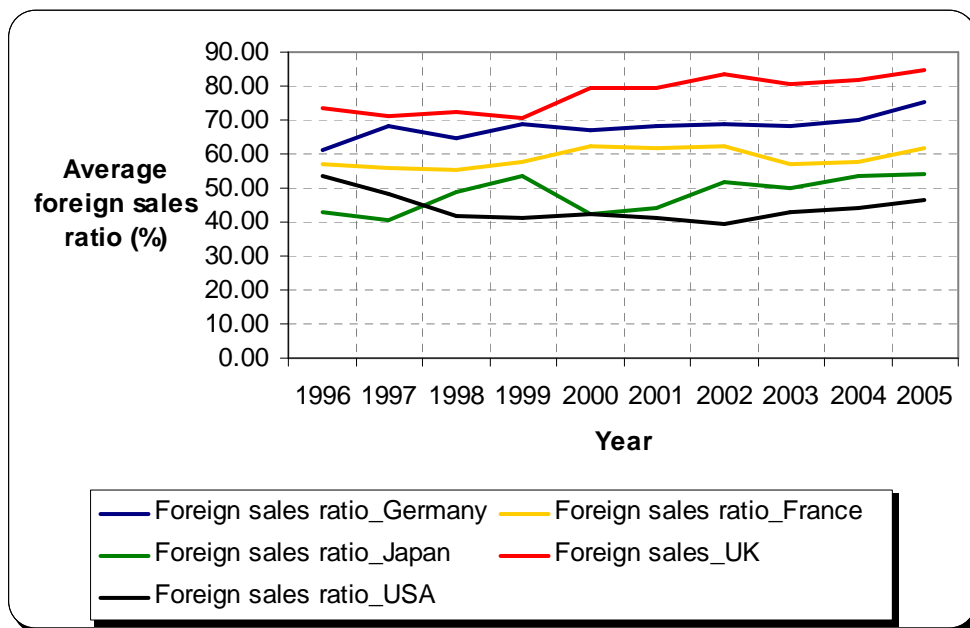


Figure 2: Country average foreign sales ratio evolution (1996-2005)

The analysis of the evolution of debt financing dependence (estimated here by the debt-to-equity ratio) of MNCs suggests different patterns across countries (Figure 3). These results are contradicting the conclusion of Rajan & Zingales (1995), which notes no difference in the capital structure of corporations in function of their *market-* or *bank-oriented* system in the origin country<sup>15</sup>.

<sup>15</sup> Certainly, the comparison with Rajan & Zingales' conclusion is relative if we consider the respective different panel analyzed over different periods.

Surprisingly, the American multinational corporations are found, together with French, German and Japan MNCs, at the upper top of the plot, contrary to the UK multinationals. The relative lower debt financing dependence of UK MNCs suggests a preference for the larger use of shareholders equity. At the opposite, we find the French MNCs, whose assets are mostly financed by debt, even more than the German MNCs. Seemingly, the traditional distinction made in modern finance literature between the *market-oriented* system (which is associated with Anglo-Saxon countries) and the *bank-oriented* system (whose representative economies are Germany and Japan) is only partially confirmed by their respective multinational corporations. The exception here is made by US originating MNCs, whose debt dependence is even higher than that of German MNCs. This apparently contradictory result is explained by the detractors of shareholder value creation who posit that debt must finance as much as possible the corporate assets. Beyond the debt tax shield, the debt cost is lower than equity funds cost. Thus, the return on the shareholders investment is higher when using more debts instead of equity funds (Batsch, 2002)<sup>16</sup>. Indeed, more debts lead to higher financial risk and, thus, to higher shareholder yield requirement.<sup>17</sup> However, the observed US MNCs relatively higher leverage is contrasting with that of British MNCs, while both are associated with the *market-oriented financial system*. Differences in MNCs operating risk between these two countries could provide an explanation<sup>18</sup>. Nevertheless, the operating risk pattern of both countries MNCs is very similar. However, institutional differences between UK and USA could be at work here. The *debtor-oriented* (France, US) bankruptcy system is generally opposing the *creditor-oriented* system (UK) (Pochet, 2002). The debtors are thus temporarily protected and aiming to maintain the business as a going concern under the first, while the second system is harsh on defaulting firms.

Japanese corporations are usually assumed as highly dependent on bank lending, contrary to US corporations which are rather relying on corporate bonds. The availability of data concerning the debentures and convertible bonds of Japanese MNCs allows us to highlight the increasing part of these debt components in the total long-term interest bearing debts. Thus, from a level situated around 30% in the late 1990's, the part of the corporate bond in the debt of Japanese MNCs increased in a such a manner that starting from 2001 it is superior to 50%, reaching 75% by 2005<sup>19</sup>. Hence, the pattern of Japanese corporations with regard to their debt financing choices suggests a relative takeoff of convertible debts. (at least for the studied multinationals).

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<sup>16</sup> This point of view might correspond to an accounting approach: the leverage operates a transfer of the revenue from debtholders to shareholders as long as the operating profitability exceeds the stakeholders' profitability. More debt thus enhances more revenue for corporate shareholders.

<sup>17</sup> Higher debt may lead to higher debt costs, thus diminishing the revenues and increasing debt risk for shareholders. For example, the US corporate bond market value was 3 trillion USD by 1998, about several times the size of U.S. equity markets (Saunders & Allen, 2002).

<sup>18</sup> It is generally agreed that lower operating risk allows corporations to support relative higher leverage.

<sup>19</sup> Although from a microeconomic point of view the options bank- versus bond- debt financing decisions does not exert any effect on the leverage ratio, from a macroeconomic perspective the consequences on the country systemic risks are not similar relative to the dominant debt instruments used. Since the macroeconomic implications for a monetary policy are not the purpose of the present paper, further details can be found in Ramaswamy (2004).

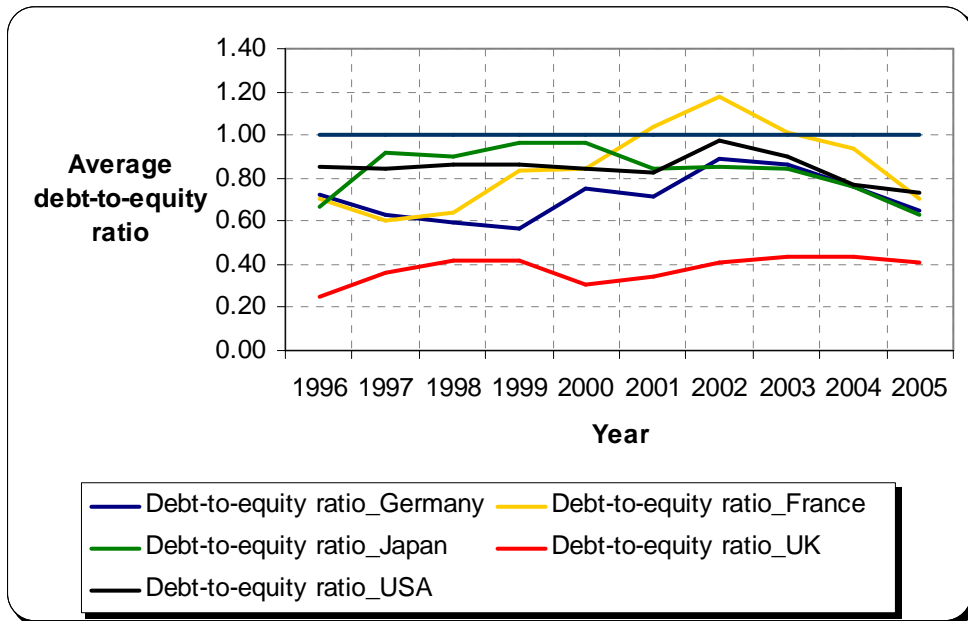


Figure 3: Country average debt-to-equity ratio evolution (1996-2005)

The MNCs international activity may be financed directly on the host country capital market or/and by intra-company debt. The local financing is however preferred, since it assures an exchange risk hedging. On the other hand, when the access to the local capital market is difficult or due to fiscal optimization reasons, the MNCs internal channel may be substituting the traditional market one.

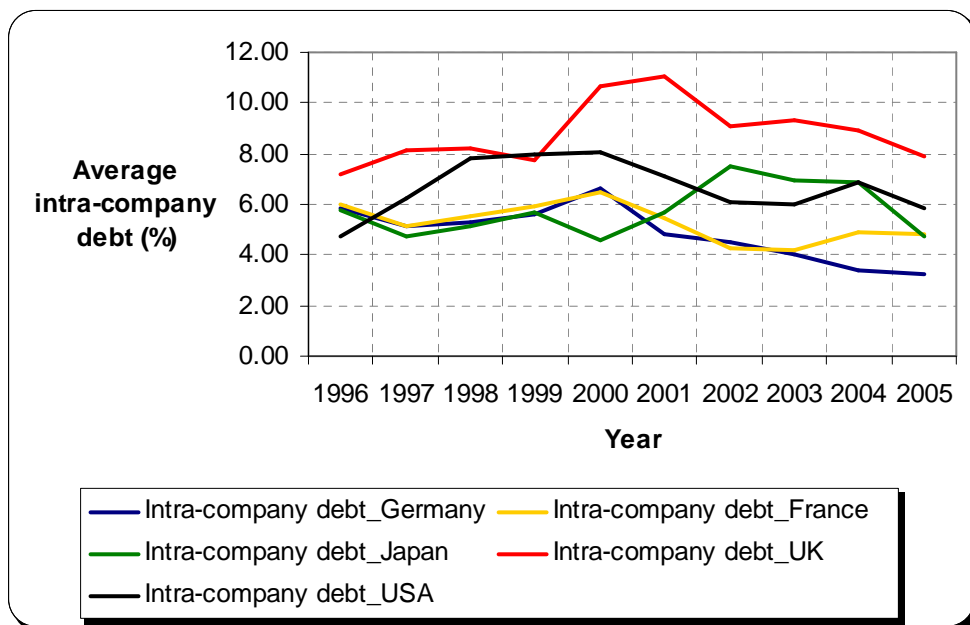


Figure 4: Country average intra-company debt evolution (1996-2005)

The data provided by the annual financial accounts does not allow an exhaustive analysis of the financial channel internal to MNCs<sup>20</sup>. Nevertheless, the availability of data concerning the

<sup>20</sup> In order to avoid the double accounting book, the consolidated balance sheet does not report the inter-affiliates debts. Thus, only the credits given by parents companies to affiliates are reported. The parent-affiliates credit

debt provided by parent companies to affiliates gives an idea on the MNCs preference for the internal financing channel in the studied countries. When analyzing the intra-company debt pattern, the gap between French MNCs and German MNCs financial pattern seems to disappear. The same is true for UK and USA multinationals (Figure 4). Relative to their average size, the UK and US MNCs parent companies are financing their affiliates by debts to a larger extent than the MNCs originating in the *bank-oriented* countries (France, Germany and Japan). The availability of financial resources in their respective home markets could provide an explanation for this pattern.

The descriptive analysis of the MNCs leverage partially supports the traditional distinction made between *market-* and *bank-* oriented countries. The financing choices pattern of UK MNCs is thus different from that of French, German and Japanese MNCs. Contrary to the intuition, the US MNCs financial structure is somewhat more similar to that of corporations originating in *bank-oriented* countries, than to the structure of UK MNCs. In order to verify if these discrepancies and similarities are persisting when considering the financing choice determinants, the leverage ratio is estimated for MNCs originating in each of the five countries.

## 6. Results

Dynamic panel estimations were run for each of the five countries data sets: France, Germany, Japan, United Kingdom and United States. The leverage ratio variation is herein explained by the tangibility ratio, the profitability, the risk, the industry average debt level, the growth opportunities (approximated by the market-to-book ratio), and the external finance weighted average market to book. In order to document both the adjustment towards the home-country industry average debt ratio and towards the cross-country industry average debt ratio, two equations were estimated:

$$leverage_{it} = f(\text{tangibility, profitability, risk, home - country industry average debt, MB, efwamb}) \quad (9)$$

$$leverage_{it} = f(\text{tangibility, profitability, risk, cross - country industry average debt, MB, efwamb}) \quad (10)$$

The estimations results are reported in Tables 7 and 9. The respective marginal effects are reported in tables 8 and 10.

Both endogenous and exogenous variables are scaled. Hence, country average of each variable is equal to one. The short-term adjustment of the leverage ratio to the right hand variables is estimated using the one-step GMM estimator.

The size proxy, as well as the foreign sales ratio, is excluded from the right hand variable set in the reported results. The estimations run proved that the size does not provide an explanation of the cross sectional differences in the short-term debt ratio adjustment. This result is not surprising, considering the corporate size criterion used in the construction of the present database, and its consequent homogeneity.

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ratio is hence calculated as:  $lt\_assc_t = \frac{\text{parent\_affiliates debt}_t}{\text{total assets}_t} * 100$ . Despite the fact that the intra-

company financing could provide a good proxy for the agency costs of debt, the parent-affiliate debt may not be considered in the estimation of the leverage ratio.

The foreign sales ratio was also excluded for reasons relying, amongst other, on the internationalization process pattern. The MNCs geographical diversification leads this late period to a decreasing part of tangible assets in the total assets. A negative and significant 5% level negative correlation between foreign sales ratio and the tangibility ratio can be observed for most of the analyzed industries. However, no statistically significant correlation has been found between the foreign sales ratio and the debt ratio adjustment. On the other hand, since the internationalization process of MNCs leads to both a lower tangibility ratio and an increasing role of other kinds of debt collateral, no statistically significant relation should be documented between leverage and tangibility ratio.

There is a consensus in the existing literature that the informational asymmetry between lenders and corporations is generally reduced by the pledge of collateral. The larger is the part of tangible assets in the total assets, the larger the collateral is and the smaller the creditor expected loss is, in case of insolvency. The tangibility ratio accounts for the leverage of French MNCs. This could be explained by more important informational asymmetry between lenders and corporations originating in France than for the other countries. As illustrated by the Figure 5, the tangibility ratio of French MNCs is amongst the lowest. At the same time, the tangibility ratio is statistically significant for one of the most leveraged MNCs.

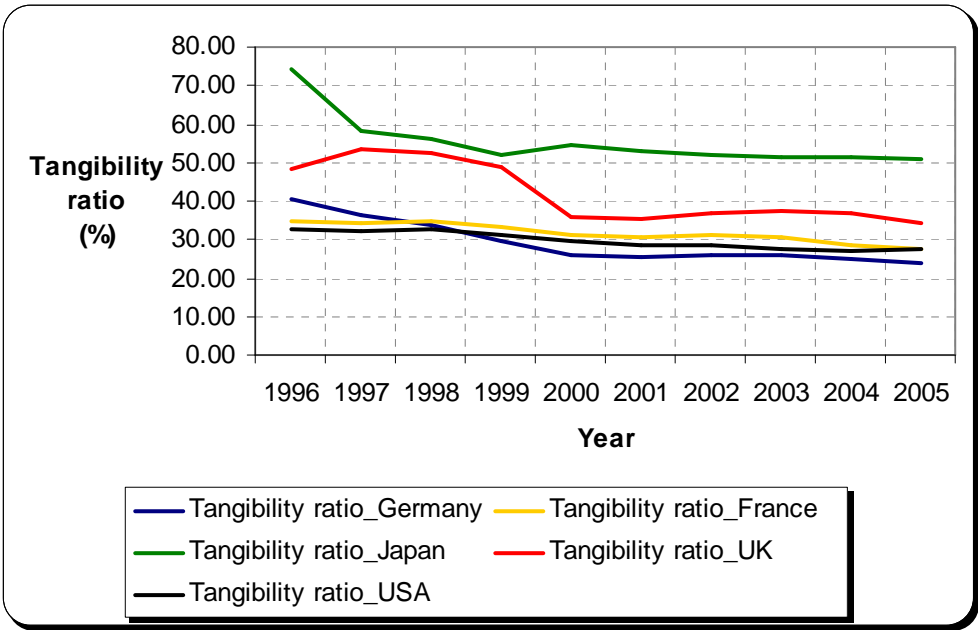


Figure 5: Country average tangibility ratio evolution (1996-2005)

The increasing importance of unsecured bonds in corporate debt financing seems to operate a relative rupture between the asset tangibility and leverage ratio<sup>21</sup>. Moreover, the widespread of credit ratings, mostly based on the current assets and liabilities in the balance sheet, combined with the larger interest for operational flexibility, encourage corporations to reduce the part of fixed assets in their total assets. Despite all, the estimated results attest that the tangibility still counts in the leverage ratio of most indebted corporations, i.e. corporations

<sup>21</sup> The collateral attached to a bond issue represents, along with the credit rating and the government bond yield, one of factors influencing the yield spread. From the point of view of the pledge of collateral, the distinction can be made between secured and unsecured bonds. The widespread view is that most corporate bonds are unsecured bonds. They are not assets that protect the borrower in the event of default. The lack of data on corporate debentures of the analyzed MNCs does not allow us to confirm or infirm this point of view. Hence, one might suppose that there should be no (direct) connection between corporate assets tangibility and debt level.

that are mostly concerned with bankruptcy costs. Hence, one might suppose that beyond a certain debt level, the tangible assets become relevant for the debt ratio adjustment.

Operating on a worldwide basis, the MNCs are benefiting of a larger availability of financial resources. The sensitivity to the cost of various financial resources is therefore stronger for MNCs. It is further increased by the high profitability of the analyzed MNCs, which allows them to be selective in their financing choices. Only the MNCs originating in France, Japan and UK seem to prefer internal resources, when available, to the external finance, as suggested by the estimation results for the profitability variable. The observed negative correlation between leverage and profitability is thus supporting the *pecking order theory* (Myers & Majluf, 1984). However, the small elasticities observed for France and UK show that profitability has little influence on leverage (when compared to the influence held by industry debt level or market-to-book ratio).

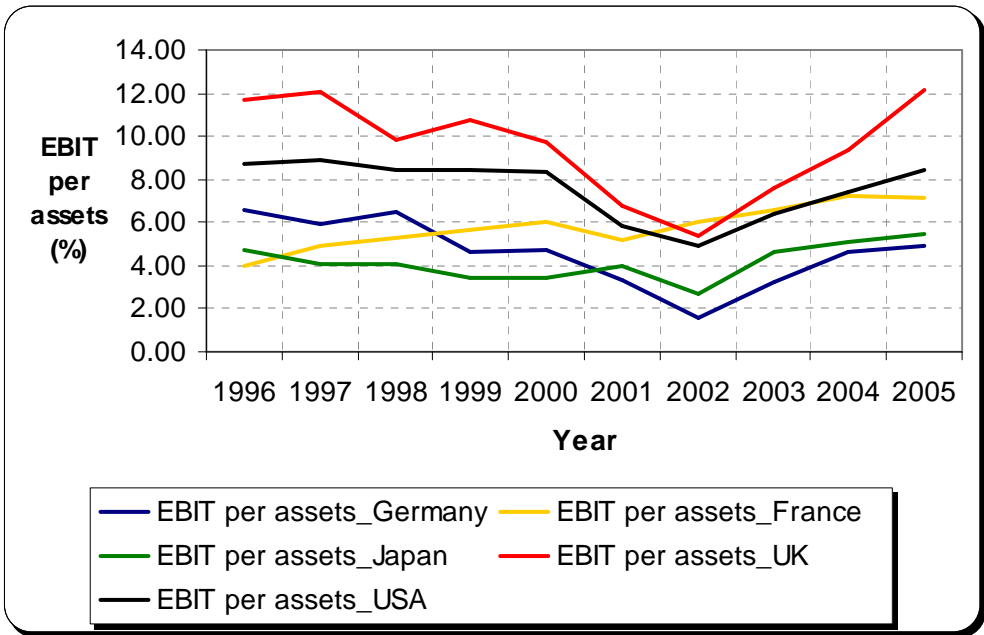


Figure 6: Country average EBIT/Assets ratio evolution (1996-2005)

The risk seems to have little influence on MNCs leverage adjustment. It is statistically significant only in the model accounting for the international adjustment of debt ratio towards the average industrial level across countries (model 2). In the case of Japanese MNCs, the traditional approach is confirmed: higher income volatility leads to a higher probability of default. Contrary to this result, the British MNCs support the counter-intuitive approach: the increasing of income volatility does not lead to a lower support from creditors, which pursue providing debt to firms in order to avoid the bankruptcy. “*Too big to fail*” - side arguments do not support these results, since Japanese MNCs considered here are relatively larger than the British ones. Neither does the institutional aspect regarding the insolvency code in these countries. The positive correlation between operating risk and leverage for the British MNCs confirms the hypothesis of hedging-purposes debt financing in host countries.

Discrepancies amongst countries are accentuated when taking into account the debt ratio adjustment speed towards the industry debt level. However, the leverage ratio of MNCs originating in all analyzed countries is converging toward their respective sectorial target<sup>22</sup>.

<sup>22</sup> The target debt ratio is here supposed to change in time.

This result is consistent with the view assuming that larger corporations, as opposed to smaller ones, are more susceptible to adjust their debt towards a target level. The documented differences in the adjustment speed across countries, as suggested by the marginal effects, seem to invalidate the Titman & Tsyplakov (2006) intuition: the adjustment speed of the supposed shareholder-maximizing MNCs (which are the Anglo-Saxon originating ones) is very large, contrasting with that of the French and German MNCs. The relative lower adjustment costs, but also lower intensity of debtholders-shareholders conflicts of interest in Japanese, British and American MNCs could explain this result. In the other country set, associated with the *bank-oriented* system, the discrepancies are more prominent. The adjustment speed opposes the French and German MNCs to the Japanese MNCs. Therefore, the debt adjustment of the Japanese MNCs is rather similar to that of the Anglo-Saxon MNCs. However, the adjustment process is not noted for all countries in an international sectorial perspective (model 2). Only the Japanese and British MNCs seem to adjust their debt level towards a cross-country industry level. The Japanese MNCs seem to rather adjust towards the cross-country industry debt ratio, than towards that of their domestic counterparts. On the other hand, the adjustment speed of Japanese MNCs is larger than that of UK MNCs.

The growth opportunities estimated by the market-to-book ratio are statistically significant only for the French, German and US MNCs. Nevertheless, an opposite sign characterizes the debt ratio adjustment to the market-to-book ratio changes: contrary to German MNCs, the French and the American MNCs are thus mostly relying on debt in their growth financing. The negative sign obtained for the German MNCs might let us think to the disciplinary role of debt for the companies facing low growth opportunities. (Jensen, 1986; Stulz, 1990) Moreover, the disciplinary role is more susceptible to account for companies with lower tangibility ratio, which is the case of German MNCs. Despite the supposed close relationship between banks and German corporations, and hence lower informational asymmetry and access to long-term debt financing, the equity finance is preferred in the German MNCs growth. On the other hand, the positive sign, which characterizes the debt pattern relative to the growth opportunities of French and American MNCs, might be explained by the existence of conflicts of interest between shareholders and managers. Firms with growth opportunities and facing manager-shareholders conflicts finance their growth mostly by equity. (Jung & *al.*, 1996) However, the market-to-book ratio is no longer statistically significant for these MNCs in the model 2 (which is estimating the debt ratio adjustment toward the cross-country industry level). The market-to-book ratio is statistically significant and positively correlated with the debt ratio adjustment only for the US MNCs.

The market-timing hypothesis is validated by the German, British and American MNCs, while it seems to have no long run effect for the capital structure of the French and Japanese MNCs (in both models). The German and British MNCs long-run external finance market timing leads to an increase in the leverage ratio over the analyzed period, while in the case of US MNCs this leads to a diminishing debt ratio. In the case of the US MNCs, the market timing has a long-run effect on the corporate debt, which is stronger and has an opposite effect relative to the short-term market timing (as suggested in the models by the current level of the market-to-book ratio). Contrary to the US MNCs, the German MNCs market-timing pattern suggests a long-term debt reduction in the short-run, with a debt increasing shape in the long-run. The Baker & Wurgler theoretical postulates do not provide an explanation for this result. In their opinion, the equity market timing should lead to a negative relation between the historical market-to-book ratios and leverage, and not to a positive one. A negative sign would rather testify about market-to-book ratio changes around debt issuance (retirement). The market-to-book ratio changes around the debt issuance (retirement) are

opposed to what the market timing implies. (Hovakimian, 2006) Hence, a positive rather than negative correlation is observed between leverage and market-to-book ratio. However, there is no evidence that the French and Japanese MNCs are in any way or another adopting market-timing strategies, in both short- and/or long-run, in their financing choices.

## CONCLUSIONS

This paper presents an empirical analysis of MNCs capital structure over the period 1996-2005. Companies with current revenues superior to three billion USD, originating in five different countries (US, UK, Japan, France and Germany), were considered. MNCs from the financial sector were excluded from this analysis. Contrary to the existing empirical literature, the present study provides a cross-country study of MNCs capital decisions pattern. This task appears to be very complex, just like the theoretical field of capital structure and like MNCs' activity as a whole. However, some interesting results can be retained.

A first outcome is that the traditional separation between the *bank-oriented* system (usually associated with Germany and Japan) and the *market-oriented* system (associated to UK and USA) is somewhat less obvious when coping with MNCs financing choices: over the analyzed period, American MNCs leverage ratio is larger than that of the other countries. The MNCs are very large corporations, whose debts are increasingly represented by bonds rather than bank credits<sup>23</sup>. Hence, considering the diversification of the corporate debt instruments, the opposition *bank-* versus *market-oriented* systems might seem inappropriate<sup>24</sup>. Nevertheless, the use of this distinction is made with regard to the traditional supposed weight of debt and equity in the capital structure of firms originating in the countries labeled *bank-* or *market-oriented*, and the subsequent agency relations. Differences in the financing determinants are observed across countries falling into one group or another, while common patterns associate countries previously identified as belonging to different groups.

Contrary to previous empirical studies, we find no direct evidence of an effect of the internationalization process (approximated by the foreign sales ratio) on the debt ratio adjustment. The negative correlation between the foreign sales ratio and the collateral, explained by the high flexibility exigencies faced by MNCs, allows us to identify an indirect mechanism for the internationalization influence on MNCs' capital structure. On the other hand, the important evolution of credit market instruments leads to a diminishing importance of tangible assets in lending contracts. Correspondingly, we find very weak evidence of an influence of tangible assets over the MNCs' capital structure.

The MNCs' options when financing cross-border activities range from corporate internal financing channel to local (debt/equity) financing in the host countries. *Natural hedging* purposes, aiming at reducing the operating risk, might explain the debt financing in the MNCs host-country. We find evidence supporting this hypothesis only for the British MNCs.

However, when issuing common stocks, corporations are generally expected to be concerned with several inherent problems: the earning per shares dilution problem; the extent in which stock is undervalued or overvalued by the market; the trend position of price when issuing stocks; the maintain of a target debt-to-equity ratio or the equity funds used by firms in

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<sup>23</sup> This is the third decade when we are facing major changes in the evolution of credit markets. The recent financial developments are marked by the extension of earlier innovations in credit markets: rapid growth of structured credit products, changes in default swaps and new collateralized debt and loan obligations.

<sup>24</sup> On the other side, the increasing banks involvement in no-bank financial activities (insurance, asset management, among others) makes the separation between bank-specific and financial activities more difficult.

similar sector. The dynamic panel estimations confirm the importance of the industry debt level in MNCs financing decisions for all analyzed countries.

The solution provided by the issuance of convertible debts might be an inexpensive way to issue “delayed” common stock. These “*back-door*” equities (Stein, 1992) avoid the issuance of undervalued equity, the short-term equity dilution, attract investors unsure about the riskiness of the firm, and might be less expensive than straight debt. The availability of data concerning the debentures and convertible bonds of Japanese MNCs permits us to highlight the fast growing pattern of these debt components in the total long-term interest bearing debts.

The preference for internal financing resources, when available, instead of external financing is observed for MNCs originating in France, Japan and UK. When it comes to financing their short-term growth opportunities (market-to-book ratio), however, American MNCs seem to prefer the credit market, just like French MNCs, and contrary to German corporations. However, in the long-run, over the studied period, the market-timing operations of American MNCs lead to lower debt ratio, contrary to the German and British MNCs.

To the extent in which there is no uniform sectorial distribution over the country-datasets, the observed *unusual* differences/similarities in the financing patterns could be explained by a different weight of various industrial businesses. A cross-sector empirical analysis could highlight industrial business specific patterns.

**Table 1. Traditional capital structure theories – variables and expected signs**

Variable\Theory	Pecking Order Theory	Trade-off Theory	Market timing
<b>Size</b>	-     ↑size → ↑ available info → ↑ debt ( <i>shareholders exigencies</i> )	+     ↑size → ↓bankruptcy risk	
<b>Profitability</b>	-     informational asymmetry	+     debt tax shield	
<b>Tangibility</b>	-     ↓tangible assets → ↑informational asymmetry → ↑debt (instead of equity)	+     ↑tangible assets → ↓bankruptcy costs  -     ↓tangible assets → ↑agency problems → ↑disciplinary role of debt	
<b>Growth opportunities (transient effects)</b>	...     ↑growth opportunities → ↑external fin. need → ↑short term debt (less subject to informational asymmetry)	-     ↓ growth opportunities → ↑disciplinary role of debt & ↑ growth opportunities → ↑ equity financing	-     ↑growth opportunities → ↑market-to-book ratio → ↑equity issue → ↓leverage (short-run effect)
<b>Industry target debt ratio</b>		+     tradeoff transaction costs (and wealth transfer) <i>versus</i> added firm- (shareholder) value	
<b>Business risk</b>	-     ↑volatility → ↑accumulated cash in good periods ↔ internal financing → ↓leverage	-     ↓ volatility ↔ ↓ bankruptcy risk → ↑debt capacity	
<b>Market timing (long run effects)</b>			-     Equity market timing → ↑equity issue → ↓leverage (long-run effect) +     Debt timing → ↑leverage → (long-run effect)

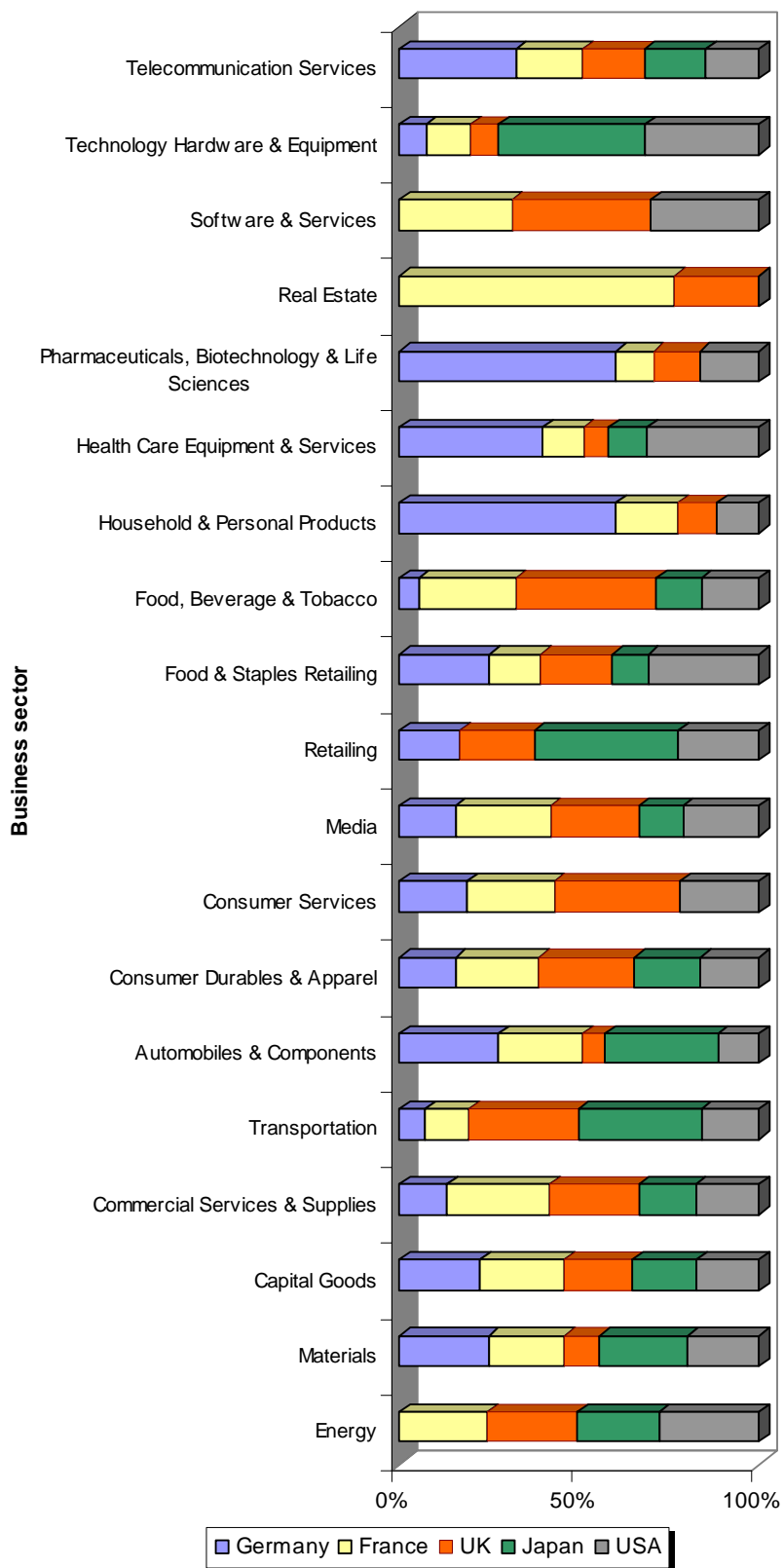


Figure 7: Business sector repartition (from within-country business sector frequencies)

**Table 2. Covariate summary statistics : France**

		<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Debt ratio	Mean	14.08	13.44	13.87	15.95	16.94	18.38	18.26	18.04	18.60	16.60
	Std. Dev.	7.96	8.76	10.31	11.96	11.54	11.83	12.01	11.46	12.27	10.46
Tangibility	Mean	24.03	24.02	24.57	24.79	24.19	24.39	24.19	23.84	24.16	22.99
	Std. Dev.	15.13	15.52	14.59	14.94	14.29	14.50	14.19	14.24	13.51	13.23
Profitability	Mean	2.09	2.98	3.03	3.30	3.38	1.89	2.00	2.11	3.36	3.70
	Std. Dev.	3.25	3.63	2.35	3.05	2.51	4.23	5.00	5.03	4.48	3.82
Risk ratio	Mean	10.51	23.39	8.42	10.00	8.73	34.76	65.56	38.02	30.05	25.05
	Std. Dev.	20.64	74.11	15.96	13.84	20.72	93.23	263.51	113.87	68.86	44.49
Growth opportunities	Mean	2.15	2.12	2.99	3.33	5.80	2.52	2.18	2.11	3.23	2.31
	Std. Dev.	1.59	1.19	2.39	3.43	21.02	2.63	2.05	2.83	4.79	5.52
Market timing	Mean			0.98	1.56	3.27	3.30	3.11	2.92	3.09	2.43
	Std. Dev.			1.44	4.98	5.20	19.94	20.23	20.12	20.43	20.91
Foreign sales ratio	Mean	52.59	54.71	54.74	57.45	61.90	60.91	62.20	60.10	64.13	59.96
	Std. Dev.	19.70	20.07	21.84	20.05	19.50	19.61	18.73	21.60	20.10	22.72

**Table 3. Covariate summary statistics : Germany**

		<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Debt ratio	Mean	12.08	12.65	10.85	10.58	13.84	13.52	14.48	14.49	13.33	13.47
	Std. Dev.	12.26	12.41	11.12	10.65	13.64	11.69	11.63	10.66	10.36	10.62
Tangibility	Mean	29.38	31.68	29.79	29.59	28.77	28.91	28.73	29.45	28.34	26.96
	Std. Dev.	14.63	17.28	16.47	16.88	16.02	15.71	15.53	16.25	15.95	15.45
Profitability ratio	Mean	3.88	4.46	3.80	3.84	4.14	2.91	2.24	2.85	3.32	4.23
	Std. Dev.	4.70	4.45	4.28	3.49	3.61	4.55	7.57	5.10	5.78	4.38
Risk ratio	Mean	12.86	12.24	18.92	6.42	12.13	16.76	78.09	20.31	24.62	16.19
	Std. Dev.	41.77	48.51	97.73	14.01	23.82	37.63	293.03	46.33	65.49	25.64
Growth opportunities	Mean	7.92	2.66	4.43	2.94	2.63	2.44	1.92	2.46	2.27	2.05
	Std. Dev.	36.94	2.73	11.54	3.65	2.26	3.01	1.99	2.36	2.04	1.40
Market timing	Mean			1.64	8.56	9.69	10.61	11.20	11.83	11.42	11.49
	Std. Dev.			2.75	42.75	43.73	43.80	43.88	43.90	44.51	44.69
Foreign sales ratio	Mean	48.55	53.12	51.64	53.29	56.01	55.40	56.01	56.65	58.25	61.46
	Std. Dev.	26.91	26.18	24.96	25.61	24.90	25.09	24.68	23.85	24.56	22.41

**Table 4. Covariate summary statistics : Japan**

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Debt ratio	Mean	20.69	22.70	22.23	24.26	24.15	22.19	21.64	21.62	20.96	18.65
	Std. Dev.	11.79	15.46	15.01	15.31	15.90	15.41	15.09	15.24	15.20	12.87
Tangibility	Mean	82.39	64.93	65.78	61.79	61.25	60.64	60.46	60.37	59.73	59.30
	Std. Dev.	27.75	34.28	33.87	35.00	34.15	34.36	34.11	34.22	34.65	34.80
Profitability	Mean	1.62	1.30	1.10	0.69	0.55	1.00	-0.22	1.11	1.83	1.95
	Std. Dev.	1.64	1.68	1.86	2.22	2.39	2.76	3.17	2.83	2.61	5.73
Risk ratio	Mean	2.54	2.50	3.78	7.30	8.50	8.49	12.40	8.03	7.84	27.83
	Std. Dev.	4.17	4.73	6.23	21.26	23.03	25.60	23.21	21.76	19.85	129.53
Growth opportunities	Mean	2.06	1.78	1.65	2.06	2.51	1.54	1.48	1.40	2.17	1.74
	Std. Dev.	1.23	0.91	0.79	1.32	3.28	1.07	0.75	0.62	1.02	0.77
Market timing	Mean			0.06	0.90	1.61	-1.33	-2.75	-3.00	-2.76	-2.06
	Std. Dev.			0.32	1.61	3.06	11.81	13.99	20.07	19.80	20.80
Foreign sales ratio	Mean	35.45	29.55	33.22	35.14	32.37	31.52	35.03	33.18	35.42	35.90
	Std. Dev.	17.20	14.93	16.73	14.15	15.52	16.35	15.61	14.76	15.15	15.67

**Table 5. Covariate summary statistics : UK**

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Debt ratio	Mean	14.37	17.28	17.62	18.73	20.04	20.03	22.17	22.35	21.47	20.46
	Std. Dev.	17.37	19.41	15.45	15.02	16.46	14.72	18.65	17.21	16.31	13.42
Tangibility	Mean	31.00	39.45	39.24	38.29	33.36	32.81	31.78	31.55	30.41	28.41
	Std. Dev.	19.93	25.57	25.36	25.18	23.72	23.61	22.77	22.80	22.47	21.63
Profitability	Mean	6.46	8.20	6.80	4.45	4.86	3.66	-0.09	2.32	5.89	6.68
	Std. Dev.	7.35	6.86	7.69	21.77	9.14	7.33	25.56	13.85	5.91	5.93
Risk ratio	Mean	92.30	117.62	62.60	517.04	110.47	194.90	719.12	284.21	57.67	58.57
	Std. Dev.	373.80	725.94	156.03	4475.58	422.35	746.03	4348.83	2151.32	134.89	129.15
Growth opportunities	Mean	8.23	5.03	13.68	5.09	5.02	2.87	1.58	2.50	3.78	4.74
	Std. Dev.	42.53	13.10	120.27	24.39	13.41	4.19	5.51	17.50	23.20	14.89
Market timing	Mean			1.60	-3.53	-3.06	-0.07	0.44	0.23	-0.03	-0.10
	Std. Dev.			6.04	66.24	65.29	66.53	65.35	65.47	65.14	65.19
Foreign sales ratio	Mean	53.26	54.64	55.69	57.92	58.81	56.58	54.23	57.73	58.01	58.53
	Std. Dev.	42.01	44.00	43.56	42.01	38.92	32.20	30.20	28.79	29.03	30.18

**Table 6. Covariate summary statistics : USA**

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Debt ratio	Mean	23.13	22.86	24.33	24.61	24.35	24.80	24.90	23.91	22.14	21.22
	Std. Dev.	17.74	17.58	17.83	18.23	17.91	16.63	16.54	15.99	16.29	17.18
Tangibility	Mean	34.74	33.03	32.60	31.86	30.98	30.97	30.37	29.42	28.23	27.67
	Std. Dev.	24.05	22.71	22.50	22.35	21.54	21.21	21.35	21.29	21.04	20.62
Profitability	Mean	5.22	5.00	4.17	5.05	5.44	3.65	1.87	3.61	4.93	5.49
	Std. Dev.	8.62	16.57	16.56	10.88	7.45	8.95	11.62	7.88	6.80	9.39
Risk ratio	Mean	2709.80	146.93	1220.46	159.66	100.52	283.27	617.98	156.14	115.10	121.09
	Std. Dev.	53674.96	1920.44	26649.49	1319.52	484.37	3636.16	4889.20	1135.21	765.53	818.95
Growth opportunities	Mean	4.24	4.70	14.43	6.08	4.19	3.31	2.39	3.04	3.36	3.62
	Std. Dev.	9.52	14.03	207.84	25.85	7.39	5.89	9.92	8.70	9.41	8.40
Market timing	Mean			0.24	0.48	0.71	0.93	1.16	1.32	1.50	1.66
	Std. Dev.			0.27	0.45	0.67	0.79	0.90	0.97	1.07	1.15
Foreign sales ratio	Mean	38.79	34.55	33.40	32.93	32.22	32.90	33.61	35.80	37.05	38.52
	Std. Dev.	16.61	19.20	19.86	19.27	19.82	19.65	20.38	21.47	22.26	22.07

**Table 7. Empirical analysis results (home country industry debt level) (Model 1)**

	France	Germany	Japan	UK	USA
Debt ratio <sub>i,t(t-1)</sub>	<b>0.572***</b> (0.088)	<b>0.537***</b> (0.077)	<b>0.813***</b> (0.058)	<b>0.418***</b> (0.091)	<b>0.866***</b> (0.000)
Collateral	<b>0.222**</b> (0.098)	0.269 (0.224)	-0.026 (0.030)	-0.179 (0.218)	-0.018 (0.066)
Profitability	<b>-0.057***</b> (0.017)	-0.021 (0.048)	<b>-0.348**</b> (0.143)	<b>-0.051*</b> (0.011)	-0.032 (0.025)
Risk	-0.005 (0.003)	-0.010 (0.019)	-0.006 (0.005)	0.018 (0.011)	-0.004 (0.004)
Industry debt level	<b>0.245**</b> (0.126)	<b>0.358**</b> (0.157)	<b>0.237**</b> (0.099)	<b>0.852***</b> (0.211)	<b>0.163*</b> (0.093)
Market-to-book ratio	<b>0.077*</b> (0.043)	<b>-0.129***</b> (0.043)	-0.060 (0.135)	-0.021 (0.015)	<b>0.014**</b> (0.007)
Market timing	0.004 (0.008)	<b>0.021*</b> (0.012)	-0.023 (0.028)	<b>0.003*</b> (0.001)	<b>-0.064**</b> (0.025)
Number of observations	443	357	546	712	3929
Number of instruments	58	56	56	58	56
Hansen/Sargan p-value	0.476	0.380	0.383	0.157	0.274
Arellano & Bond AR(1)/AR(2) test p-value	0.001/0.524	0.002/0.604	0.004/0.938	0.026/0.114	0.000/0.070

Note: STATA estimations results.

The dependent variable is the debt ratio. The inference results are those obtained with system GMM, i.e. the Arellano & Bover (1995) and Blundell & Bond (1998) one-step system GMM estimator. The endogenous variables are the risk and the profitability.

\*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10% level, respectively.

Robust standard errors are reported in parenthesis.

The underlying hypothesis of the Arellano & Bond dynamic panel-data estimator is that there is no second-order autocorrelation in the first-differenced idiosyncratic errors. Hence, an autocorrelation Arellano & Bond test is reported. The Hansen/Sargan test of overidentifying restrictions (instruments) for the model allows us to test the validity of instruments used. A Sargan test p-value superior to 10% does not allow us to reject the null hypothesis, which posits the validity of instruments.

**Table 8. Marginal effects (Model 1)**

	France	Germany	Japan	UK	USA
Collateral	<b>0.520***</b> (0.242)	0.582 (0.427)	-0.141 (0.165)	-0.309 (0.366)	-0.139 (0.513)
Profitability	<b>-0.133***</b> (0.045)	-0.046 (0.100)	<b>-1.872**</b> (0.980)	<b>-0.089*</b> (0.056)	-0.239 (0.196)
Risk	-0.011 (0.008)	-0.023 (0.039)	-0.036 (0.031)	0.031 (0.021)	-0.036 (0.031)
Industry debt level	<b>0.575**</b> (0.239)	<b>0.773**</b> (0.364)	<b>1.277***</b> (0.394)	<b>1.464***</b> (0.254)	<b>1.220**</b> (0.597)
Market-to-book ratio	<b>0.181*</b> (0.105)	<b>-0.279***</b> (0.095)	-0.324 (0.743)	-0.036 (0.026)	<b>0.106*</b> (0.060)
Market timing	0.009 (0.021)	<b>0.045*</b> (0.028)	-0.124 (0.150)	<b>0.005*</b> (0.003)	<b>-0.484**</b> (0.217)
No. of observations	443	357	546	712	3929

**Table 9. Empirical analysis results (cross-country industry debt level) (Model 2)**

	France	Germany	Japan	UK	USA
Debt ratio <sub>i,t(t-1)</sub>	<b>0.676***</b> (0.074)	<b>0.621***</b> (0.056)	<b>0.874***</b> (0.034)	<b>0.553***</b> (0.094)	<b>0.872***</b> (0.000)
Collateral	<b>0.217*</b> (0.130)	0.304 (0.308)	-0.001 (0.021)	-0.083 (0.234)	-0.001 (0.079)
Profitability	<b>-0.044**</b> (0.017)	-0.044 (0.042)	<b>-0.415***</b> (0.146)	-0.032 (0.035)	-0.034 (0.026)
Risk	-0.001 (0.002)	-0.007 (0.014)	<b>-0.009**</b> (0.004)	<b>0.024**</b> (0.011)	-0.005 (0.004)
Cross-country industry debt level	0.009 (0.006)	0.003 (0.018)	0.141 (0.091)	<b>0.031**</b> (0.013)	0.006 (0.093)
Market-to-book ratio	0.019 (0.025)	0.005 (0.028)	-0.258 (0.280)	-0.029 (0.021)	<b>0.014**</b> (0.007)
Market timing	0.006 (0.008)	<b>0.035***</b> (0.009)	-0.009 (0.029)	<b>0.003*</b> (0.002)	<b>-0.074**</b> (0.033)
Number of observations	433	317	476	698	3862
Number of instruments	58	58	58	58	56
Hansen/Sargan test p-value	0.315	0.323	0.272	0.570	0.275
Arellano & Bond AR(1)/AR(2) test p-value	0.000/0.975	0.000/0.672	0.033/0.761	0.065/0.125	0.000/0.080

Note: STATA estimations results.

The dependent variable is the debt ratio. The inference results are those obtained with system GMM, i.e. the Arellano & Bover (1995) and Blundell & Bond (1998) one-step system GMM estimator. The endogenous variables are the risk and the profitability.

\*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10% level, respectively.

Robust standard errors are reported in parenthesis.

The underlying hypothesis of the Arellano & Bond dynamic panel-data estimator is that there is no second-order autocorrelation in the first-differenced idiosyncratic errors. Hence, an autocorrelation Arellano & Bond test is reported. The Hansen/Sargan test of overidentifying restrictions (instruments) for the model allows us to test the validity of instruments used. A Sargan test p-value superior to 10% does not allow us to reject the null hypothesis, which posits the validity of instruments.

**Table 10. Marginal effects (Model 2)**

	France	Germany	Japan	UK	USA
Collateral	<b>0.672*</b> (0.382)	0.805 (0.843)	-0.010 (0.167)	-0.186 (0.520)	-0.008 (0.623)
Profitability	<b>-0.136**</b> (0.057)	-0.116 (0.101)	<b>-3.303***</b> (1.197)	-0.072 (0.082)	-0.270 (0.212)
Risk	-0.002 (0.008)	-0.018 (0.036)	<b>-0.078*</b> (0.044)	<b>0.054***</b> (0.029)	-0.041 (0.033)
Cross-country industry debt level	0.029 (0.018)	0.009 (0.047)	<b>1.120*</b> (0.587)	<b>0.071***</b> (0.023)	0.051 (0.041)
Market-to-book ratio	0.061 (0.077)	0.013 (0.073)	-2.055 (2.266)	-0.066 (0.047)	<b>0.113**</b> (0.062)
Market timing	0.021 (0.027)	<b>0.092***</b> (0.025)	-0.078 (0.231)	<b>0.008*</b> (0.004)	<b>-0.583**</b> (0.277)
No. of observations	433	317	476	712	3862

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