Capital structure decisions in multibusiness firms: the Italian evidence, 1980-2000

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Abstract

Most of the studies on capital structure have not considered the role of an important strategic decision: product diversification of a firm into related and unrelated businesses. This topic was only recently examined in the literature. The aim of the present study was to analyze the financing strategies of multibusiness firms, exploring the relationship between diversification, related as well as unrelated, and capital structure. For this purpose, a panel-data analysis was carried out for a sample of Italian manufacturing firms during the period 1980–2000.

The empirical analysis showed structural differences in capital-structure determinants for multibusiness firms. Corporate diversification structure was found to significantly influence the speed at which firms optimize their leverage ratios. Moreover, a direct, statistically significant effect was found between diversification and capital structure, implying that their relationship differed according to whether the diversification was related or unrelated. Related diversification was shown to negatively influence capital structure, which supported the transaction-cost hypothesis, while unrelated diversification positively influenced capital structure, supporting the coinsurance-effect hypothesis.

Key words: *Capital structure, product diversification, relatedness, financing decisions, source of finance.*

1. Introduction

Diversification and capital structure are two concepts that have long been controversial, since they impact many other aspects of business and financial management. Diversification has been a central topic in strategic management studies since the work of Ansoff (1958). The costs and benefits derived from the various diversification strategies have been examined mainly for their impact on a firm's value (Rumelt 1974). Studies on the interaction between diversification and capital structure became of interest due to their related strategic implications regarding corporate governance. Indeed, starting with the study of Jensen and Meckling (1976), financial choices have been evaluated because of the close interaction between capital structure and management choices[1]. In the 1980s, other researchers, motivated by the connection between investment and financial choices, highlighted the link between capital structure and diversification (Oviatt 1984, Titman 1984, Jensen 1986, Barton and Gordon 1987, Williamson 1988, Titman and Wessels 1988, Gertner *et al* 1988, Barton and Gordon 1988).

Many authors suggested that diversified firms need to carry greater leverage to maximize firm value (Kaplan and Weisbach 1992, Li and Li 1996, Singh et al 2003); in particular, "a combination of diversification with low leverage leads to overinvestment" (Li and Li 1996). To reduce this kind of agency problem, it has been observed empirically that relatively more debt is carried by diversified firms than by non-diversified firms (Riahi-Belkaoui and Bannister 1994, Li and Li 1996). However, based on the findings of Comment and Jarrell (1995), this observation seems not to be robust with respect to the kinds of variables used to operationalize the concept of diversification.

Research carried out on the relation between diversification and capital structure has led to several interesting contributions (Markides and Williamson 1996, Kochhar 1996, Kochhar and Hitt 1998) aimed at improving the theoretical approach by formalizing clear-cut research proposals (Lowe et al 1994, Taylor and Lowe 1995, Markides and Williamson 1996, Kochhar 1996, Kochhar and Hitt 1998). Nevertheless, there is room for further improvement in the formulation of this theoretical approach.

In this paper, the role of diversification, related and unrelated, in the capital-structure choices of Italian firms is analyzed. The study was carried out in the context of research on capital-structure determinants (*how does diversification influence capital structure*?), which has attempted to explain the effects of diversification strategy on financial choices. The present research extends prior analyses of financial policy and diversification by examining

[1] Barton and Gordon (1987) pointed out that corporate strategies complement traditional finance paradigms and enrich the understanding of a firm's capital-structure decisions.

the relationship between capital structure and diversification over a long period (21 years). It focuses, for the first time, on Italy and employs a structured methodology; the sample was sorted into different groups to which a common determinist approach was applied, followed by a cluster analysis.

Our study is structured as follows. The second section points out the theoretical perspectives applied to the analysis; these were based on the role of diversification strategy, related and unrelated, as a determinant of capital-structure choices. The third section describes the specificity of the empirical model and the applied variables. In the fourth section, the sample and the descriptive statistics are presented. The fifth section details the empirical results, while the sixth highlights the main findings of the study and offers several suggestions for management and for future research.

2. Theoretical perspectives

As described in the still relevant survey of Harris and Raviv (1991), explanations of capital-structure choices are mainly based on two widely acknowledged competitive models: the trade-off theory (Kraus and Litzeberger 1973) and the pecking-order theory (Myers 1984 and Myers and Majluf 1984). According to the trade-off theory, there is an optimal capital structure. Firms maximize their value when the benefits from debt (tax shield, the disciplinary role of debt, and the fact that debt suffers less than outside equity from informational costs) equal the marginal cost of the debt (bankruptcy costs and agency costs between shareholders and bondholders). A firm has to set a target debt level and then gradually move toward it. The pecking-order theory is a consequence of the transaction costs and information asymmetries that exist between insiders and outsiders of the firm. It states that there is no well-defined target debt ratio; instead, managers adapt their financing policy to minimize associated costs. Specifically, internal financing is preferred over external financing, and debt over equity.

Many researchers have attempted to determine which theory, trade-off or pecking order, is better able to approximate and explain firms' financing behaviors. The goal of several studies has been to understand capital-structure decisions in the light of firm-specific features, industry affiliation, and institutional environments. However, only a few studies have related corporate diversification features to different capital-structure decisions (Taylor and Lowe 1995, Markides and Williamson 1996, Kochhar and Hitt 1998, Singh et al 2003, Alonso 2003).

A literature review suggests that sorting diversification phenomena into related and unrelated ones can enhance our understanding of their link to capital structure[2]. Thus, previous studies (Singh et al 2003, Low and Chen 2004) that did not take into account these two components are potentially biased.

The effect of diversification on capital-structure choice has been explained mostly through the *coinsurance* effect (Lewellen 1971, Kim and McConnell 1977, Bromiley 1990, Bergh 1997), the *transaction cost* theory (Williamson 1988, Balakrishnan and Fox 1993, Kochhar and Hitt 1998), and by applying the *agency cost* theory (Jensen 1986, Kochhar 1996).

The ***coinsurance effect*** deals with the reduction of operating risk due to the imperfect correlation between the different cash flows of a firm running diverse businesses (Lewellen, 1971; Kim and McConnell, 1977). It is more relevant for firms that develop unrelated diversification strategies because the lack of correlation between businesses is greater: these firms should be able to assume more debt (Kim and McConnell 1977 and Bergh 1997)[3]. The ***transaction cost*** approach deals with the governance of contractual relations in transactions between two parties (Williamson 1988). In particular, by matching corporate finance theory and strategy theory, this approach examines a firm's financial decisions in terms of its specific assets, considering debt and equity as alternative governance structures (Markides and Williamson 1996). Firms diversify their activities in response to the presence of an excess of unutilized assets (Penrose 1959), and the kind of diversification strategy depends on the characteristics of these resources (Chatterjee and Wernerfelt 1991, Mahoney and Pandian 1992)[4]. Therefore, the transaction cost approach considers debt as a rule-based governance structure and equity as a discretionary governance device; it supports the use of debt to

[2] *Related diversification* is based on operational synergies related to: (1) *resource sharing* in the value chains among businesses, and (2) the *transfer of skills*, which involves the transfer of knowledge from one value chain to the other. Thus, *related diversification* is based on the sharing and transfer of skills connected to tangible (plant and equipment, sales forces, distribution channels) and intangible (brand names, innovative capabilities, know-how) resources. Conversely, *unrelated diversification* is associated with the *financial synergies hypothesis*, which states that firms diversify to benefit from the economies of an internal capital market and an internal labor market, to obtain tax benefits, and to reduce business risk (coinsurance argument). Financial resources, which are more mobile and less rare and thus likely to create less value than other types of resources (Hoskisson and Hitt, 1990), are associated with unrelated diversification. For details on the definitions of *related* and *unrelated* diversification, the reader is referred to Ansoff (1958), Lewellen (1971), and Rumelt (1974).

[3] Consistent with this argument, several studies (Kim and McConnell 1977, Bergh 1997 and Alonso 2003) have found that the coinsurance effect is one of the most important value-increasing sources associated with unrelated diversification. Firms that follow unrelated diversification can issue more debt and benefit from the fiscal advantages related to debt financing (Bergh 1997). The tax liability of the diversified firm may be less than the cumulated tax liabilities of the different (single) business units.

[4] An excess of highly specific assets is more likely to lead to related diversification because these assets can only be transferred across similar businesses. Conversely, an unrelated diversification strategy should be based on the presence of an excess of non-specific assets.

finance non-specific assets and the use of equity to finance specific ones (Williamsom 1988)[5]. As a consequence, in the presence of highly specific assets (related-diversified firms), equity is the preferred financial instrument because assets cannot be without difficulty re-employed and have a limited liquidation value. In contrast, when a firm's assets are not specific (unrelated-diversified firms) and retain their value in the event of liquidation, debt is the preferred financing tool. ***Agency cost theory***, based on the existence of conflicts of interest between shareholders and managers (Jensen and Meckling, 1976)[6], provides a further theoretical scheme that supports the influence on capital structure of diversification strategy (Kochhar 1996 and Kochhar and Hitt 1998). Jensen (1986) pointed out the disciplining role of debt on managerial behavior, in that it reduces managerial discretion regarding free-cash flow. Thus, the Jensen perspective supports the positive role of debt in reducing the ability of a manager to realize detrimental diversification strategies, especially unrelated ones. The effect of diversification on the debt/equity choice can be interpreted according to two different assumptions. In the first, stakeholders, and in particular shareholders, are assumed to have the capability to monitor and influence the strategic decisions of managers, such that a higher diversification level, especially unrelated, is associated with opportunistic decisions. Consequently, shareholders will promote the use of debt as a device to discipline managerial behavior[7]. In the second, the manager is assumed to have wide discretionary powers, such that a decision to diversify is not followed by an increase in debt because the manager will avoid limiting his or her autonomy. The consequences are that diversified firms will not use debt in their capital structures.

In addition to an analysis of the different use of debt in specialized or diversified firms and, more specifically, in firms adopting related or unrelated diversification, the present study attempts to verify the changing role of capital-structure determinants for these different categories of firms. Accordingly, it tests whether in reaching capital-structure decisions based on different degrees and directions of diversification firms establish hierarchical preferences

[5] Debt financing requires a firm to make interest and principal payments according to a schedule stipulated in the contract; in the event of default, debtholders may exercise their pre-emptive claims against the firm's assets (Shleifer and Vishny 1992). At the same time, the shareholders bear a residual-claimant status with regard to earnings and to assets liquidation; their relations with the firms last for the lifetime of the business.

[6] Managers, acting as agents, may make non-profitable investments, which are inconsistent with the objective of value creation for shareholders (the principal); while shareholders are strictly interested in the maximization of shareholder value, managers consider the firm as an instrument to increase their wage, self-esteem, private benefits, and, generally, their human capital value. In paying attention to all these benefits, of which just one is based on shareholder value, managers may exhibit opportunistic behaviors.

[7] Debt reduces agency costs of free-cash flow and disciplines managerial behavior, thereby preventing opportunistic behaviors. Due to this threat, debt prevents managers from making value-decreasing decisions in the firm (Jensen 1986).

(pecking-order theory) or, alternatively, seek to move toward a target optimal-leverage ratio (trade-off theory).

3. Methodology and variables

Capital-structure decisions are typically studied with respect to different firm-specific features, industry affiliations, and institutional environments. In this empirical analysis, different financial behaviors, in terms of capital-structure choice, were taken into account according to their degree and direction, related or unrelated, of diversification. To this end, two distinct models were developed. **Model A** analyzed the differences in capital-structure determinants for groups of firms, based on an unbalanced panel-data approach. Specifically, *model A1* compared the differences in the determinants of capital-structure choices, as described by Singh et al. (2003), for specialized firms that focused on only one business and for diversified firms operating in multiple business segments. In *model A2*, a cluster analysis approach was applied to determine whether structural differences were present within the sample. Instead of using a deterministic approach, as in Lowe et al. (1994), we chose an inductive approach to identify potential structural differences, with respect to diversification strategy, arising within the sample. Firms in the sample were classified as specialized, related-diversified, or unrelated-diversified, depending upon the results of a *k*-mean cluster analysis. Model A, applied to different groups of firms through models A1 and A2, had the following form:

$$Leverage = f(\text{profitability, non-debt tax-shield, ownership concentration, tangibility, size, growth opportunities})$$

Model B introduced diversification measures to test *directly* the link between diversification, related as well as unrelated, and debt/equity choice. This approach permitted us to directly identify the sign and magnitude of the relationship between diversification and capital structure, differentiating between the roles of related and unrelated diversification. Model B had the following form:

$$Leverage = f(\text{diversification, profitability, non-debt tax-shield, ownership concentration, tangibility, size, growth opportunities})$$

Previous work (Kremp *et al*. 1999, De Miguel and Pindado 2001 and Ozkan 2001) emphasized the dynamic adjustment process involved in achieving a target debt-to-equity ratio, that must be considered by analyzing capital-structure determinants.

According to the trade-off theory, given an equilibrium level of leverage ratio, a firm will strive to reach this target. In the presence of a deviation from the equilibrium level, firms will rebalance their capital structures toward the target level. In a static framework, this adjustment occurs instantaneously. With respect to transaction costs, the adjustment process will be incomplete in a given year. Specifically, the dynamic version of the trade-off theory implies that adjustment costs will prevent firms from constantly adjusting their leverage ratio[8]. Moreover, the trade-off theory states that if firms follow a target optimal level of debt, deviations from the equilibrium level are expected to be temporary and therefore the speed of adjustment will be relatively high. Conversely, if firms do not attribute great importance to their target leverage ratios (or if the transaction costs are high), then an adjustment of capital structure toward the optimal level, for example in response to a shock, will be slow or even non-existent in a given year. In fact, the pecking-order theory suggests that firms are unlikely to quickly rebalance following a shock since there is no equilibrium leverage ratio to be targeted in the first place[9].

In the presence of transaction costs, firms do not automatically adjust their debt level; instead, they follow a target adjustment model (Shyam-Sunder and Myers 1999, de Miguel and Pindado 2001, Gaud et al 2005, Drobetz and Wanzenried 2006), according to the following:

$$D_{it} - D_{it-1} = \alpha (D^{*}_{it} - D_{it-1}), \text{ with } 0<\alpha<1 \quad (1)$$

where $D_{it} - D_{it-1}$ is the difference between the debt level of firm *i* at time *t* in the current vs. the previous period, and D^{*}_{it} is the target debt level of firm *i* at time *t.* The target-adjustment coefficient α measures the relevance of the transaction costs and is assumed to be a sample-wide constant. If $\alpha = 0$, then $D_{it} = D_{it-1}$ and the transaction costs are so high that no firm will adjust its debt level and the debt level will remain the same as in the previous year. However, if $\alpha = 1$, then $D_{it} = D^{*}_{it}$ and a firm automatically adjusts its debt level to the target. When α is between 0 and 1, firms adjust their debt level such that it is inversely proportional to the adjustment (transactional) costs. As the value of α approaches 1, adjustment of the current capital structure toward either the target or an optimal capital structure becomes more rapid.

[8] Firms must trade off these adjustment costs with the costs of being away from the equilibrium level, with the latter defined as the costs for operating with a less-than-optimal capital structure. Firms will rebalance their capital structure only when the costs of deviating from the equilibrium level exceed the adjustment costs.

[9] Recently, two other theories were also advanced to suggest that firms are unlikely to quickly adjust their capital structure toward the equilibrium levels in the face of leverage shocks. The market timing theory of Baker and Wurgler (2002) suggested that firms issue equity when they are overvalued; as a result, capital structures (or, more precisely, market-value debt ratio) represent a cumulative outcome of market timing. The inertia theory of Welch (2004) predicted that managers do not respond to stock changes; so most variations in market-value debt ratios are explained by movements of historical returns.

A common approach to measure the unobservable target debt level is to estimate it. Here, we follow the approach originally suggested by De Miguel and Pindado (2001). Therefore, in equation (1) the (unobserved) target level ratio D^*_{it} is estimated from the following equation:

$$D^*_{it} = \beta_0 + \sum_{j=1}^{n} \beta_j x_{itj} + u_{it} \quad (2)$$

where *x* is a set of *j* capital structure determinants of firm *i* at time *t*, and *u* is the error term. Developing equation (1), the actual debt level is:

$$D_{it} = \alpha D^*_{it} + (1 - \alpha) D_{it-1} \quad (3)$$

Incorporating equation (2) into equation (3) and rearranging yields the estimable model:

$$D_{it} = (1 - \alpha) D_{it-1} + \alpha \beta_0 + \alpha \sum_{j=1}^{n} \beta_j x_{itj} + u_{it} \quad (4)$$

Equation (4) can be viewed as a "linear model." The parameters α and β are estimated jointly, but the value of β can be retrieved by dividing it by α.

Table 1 explains the direction of the sign of the target-adjustment model in order to better interpret the resulting coefficients of the regressions. If the coefficient $(1 - \alpha)$ is close to 1, the adjustment process is slow; if it is close to 0, then adjustment occurs rapidly.

Table 1 – Interpretation of the coefficients of the target-adjustment model.

$(1 - \alpha) = 1$ or equivalent to: $\alpha = 0$	$(1 - \alpha) = 0$ or equivalent to: $\alpha = 1$
- Firms do not adjust. - Debt stays at the previous year's value. - There are high (transaction) adjustment costs. - The costs associated with being in disequilibrium are low - The pecking-order theory is supported.	- Firms automatically adjust. - Debt is instantaneously adjusted to the previous year's value. - There are low (transaction) adjustment costs. - The costs associated with being in disequilibrium are high. - The trade-off theory is supported.

Therefore, to take into account the existence of a dynamic adjustment process with respect to the target debt-to-equity ratio, and to analyze the determinants of capital structure, the lag value of the dependent variable is added as an explanatory variable. The effect of one period of lagged leverage is useful in understanding whether firms have optimal capital structure, and if so, the degree of divergence (convergence) from (to) the target.

Panel-data estimation was used in the present study because it is appropriate for analyzing the dynamic nature of capital-structure decisions. Moreover, consistent with Bond and Meghir (1994), our approach controlled for the time dummy variable (taking into account the effect of macroeconomic variables on corporate capital structure) and for unobservable firm-specific fixed effects. Due to the fact that variables may correlate with the error term, and the simultaneity bias between the leverage measure and the explanatory variables can increase (especially if the lagged dependent variable is used), seriously affecting the estimation results, it may be preferable to use instrumental variables. The panel-data methodology and estimation by the Generalized Method of Moments (GMM) together allow studies of the dynamic nature of capital-structure decisions at the firm level, thereby eliminating unobservable heterogeneity and controlling for the endogeneity problem. Therefore, for models A and B the GMM approach was used to estimate Equation 4. Specifically, as suggested by Arellano and Bond (1991), this equation was estimated in first differences, using lag effects as instruments[10]. As in similar work (Gaud et al 2005), the two-step GMM estimator was applied, which allowed for heteroskedasticity across firms[11]. This approach is correct if there is no second-order serial correlation between error terms of the first-differenced equation. The statistics m_1 and m_2 were used to test for the lack of serial correlation (for completeness, we also tested for a lack of first-order serial correlation through the m_1 test). Concerning the instruments, the Sargan statistic, which tests for the presence of over-identifying restrictions and for the validity of instrumental variables, is reported, as are two Wald statistics. Wald 1 is a test of the joint significance of the time dummy variables, and Wald 2 a test of the joint significance of the reported determinants.

Firm leverage, measured as the ratio of total financial debt to total financial debt plus equity (Rajan and Zingales 1995), was used as the dependent variable. For the sample comprising the listed firms, two types of leverage, book value and market value, were used based, respectively, on the book value of equity and on the market value of equity.

The sample was sorted into groups by applying a cluster analysis and identifying the degree of diversification and relatedness. This was done by using the number of business segments to define product diversification, taking into account the amount of sales in each business segment and identifying the degree of relatedness for each segment. In Italy,

[10] Since the lagged dependent variables correlate with the error term, parameters estimated by conventional panel-data methodologies, such as the fixed effects model, lack desirable properties, including consistency and absence of bias. Such biases can be avoided by using the GMM after taking the first-order difference. For details, see Baltagi (2001).

[11] The coefficients from the one-step GMM and the two-step GMM are very close. We preferred to use the latter for inferences on model specification (while, typically, the former is applied for inferences on coefficients).

diversification is assessed through the Ateco 2004 code (elaborated by Istat, the Italian National Institute of Statistics), which is similar to the Standard Industrial Codes (S.I.C. code). Specifically, entropy indicators were employed as the main measures in the empirical analysis to operationalize diversification, as they allowed the objectivity of the product-count measures to be combined with the ability to apply the relatedness concept categorically, weighting the businesses by the relative size of their sales (Jacquemin and Berry 1979, Palepu 1985). Entropy measures consider simultaneously the number of businesses in which a firm operates, the distribution of a firm's total sales across industry segments, and the different degrees of relatedness among the various industries. We used the total diversification index (DT) to measure the entire level of diversification of a firm. The DT measure can be decomposed into related and unrelated components of diversification[12]. The related diversification index (DR) and the unrelated diversification index (DU) take into account the roles of all business units in which the firm is involved, without over-emphasizing only those business segments with higher proportions of sales. In model B, the direct effect of DT, DR, and DU on capital structure was investigated. The empirical models analyzed the entire sample and then only the listed companies.

Theoretical and empirical studies[13] have shown that profitability, non-debt tax-shields, ownership, tangibility, size, and growth opportunities affect capital structure. These variables were also included in this empirical study to underline the relationship between diversification strategies and capital structure. In addition, the role of these determinants with respect to diversification status was compared in the sorted sample.

Profitability – The relationship between the capital structure and profitability of a firm is theoretically and empirically controversial. In the pecking-order theory, each investment is financed with internal funds, primarily retained earnings, then with new issues of debt and, finally, with new issues of equity (Myers 1984). It follows that a more profitable firm is more likely to substitute debt for internal funds. Therefore, according to the pecking-order theory, a negative relationship among debt levels and profitability is expected. However, according to the trade-off theory, more-profitable firms prefer debt in order to benefit from the tax shield;

[12] The entropy measure of total level of diversification (DT) is calculated as $\Sigma P_j * \ln(1/P_j)$, where P refers to the proportion of sales in business segment j and ln(1/pj) is the weight for that segment. Therefore, this indicator considers the number of segments in which a firm operates and the relative importance of each segment for firm sales. DR is the related diversification index resulting from businesses in a 4-digit segment within a 2-digit industry group (based on Ateco 2004 Code), while DU is the unrelated diversification index resulting from businesses in different 2-digit industry groups.

[13] The work of Harris and Raviv (1991) is still valid in summarizing many of the empirical studies on the capital-structure determinant of US firms, while Rajan and Zingales (1995) showed the main determinants in an international context.

thus, a positive correlation with leverage is expected. Empirical evidence from previous studies supported both theories (Harris and Ravid 1991, Rajan and Zingales 1995). Our empirical model included profitability defined as earnings before interest and taxes (EBIT) relative to total operating assets.

Non-debt tax shields (NDTS) - DeAngelo and Masulis (1980) argued that firms able to reduce taxes by methods other than deducting interest will employ less debt in their capital structure. Accordingly, if a firm has a large amount of NDTS, such as depreciation, the probability of negative taxable income is higher and it is less likely that the amount of debt will be increased for tax reasons. Consistent with this argument, debt level should be inversely related to the level of the NDTS. The NDTS considered in this study were the depreciation of physical and intangible assets, both divided by total assets.

Ownership concentration – The governance of a firm, including its financial decision-making body, is strictly influenced by ownership structure. Generally, the Italian model of corporate governance is quite different from the one proposed by Berle and Means, as there is not a wide separation between ownership and control. Instead, the ownership of most Italian companies, even large ones, is tightly held. In a comprehensive study, La Porta et al. (1999) found that ownership in publicly traded Italian companies is highly concentrated within single families, and controlling families participate in the top levels of management. Ownership is even more concentrated among non-listed companies. The disadvantage of tight concentration of ownership is that it acts as an additional factor influencing financial decisions and may serve as a constraint on a firm's expansion, since growth often requires a significant amount of outside financing, which reduces family control[14]. Individuals holding a majority of the controlling power (high level of equity share) are not inclined to loosen their grip on their companies. The models presented here contain a variable that takes into account a firm's ownership structure and considers the percentage of shares held by the primary shareholder. Although ownership is believed to have an impact on capital structure, there is no clear prediction about the relationship between ownership structure and leverage.

Tangibility - The agency costs of debt due to the possibility of moral hazards on the part of borrowers increases when firms cannot collateralize their debt (Jensen and Meckling, 1976). Hence, lenders will require more-favorable terms and firms may choose equity instead. To mitigate this problem, a large percentage of a firm's assets can be used as collateral. Tangible assets provide better collateral for loans and thus are associated with higher leverage

[14] This concentration, a by-product of the relative lack of protection of minority shareholders by Italian securities law, has been suggested to also restrict growth.

(Titman and Wessels 1988, Rajan and Zingales 1995). Asset tangibility is measured as the ratio of property, plants, and equipment to total book assets.

Size - In previous studies, the size of a firm was found to be an important determinant of leverage (Harris and Raviv 1991, Rajan and Zingales 1995). Large firms tend to have more collateralizable assets and more-stable cash flows. Thus, typically, a company's size is inversely related to the probability of default, which suggests that large firms are expected to carry more debt. Diamond (1993) also argued that large established firms have better reputations in the debt markets and thus can assume more debt. The size of a firm is measured by the log of its total assets.

Growth opportunities - Firms with high growth opportunities will retain financial flexibility through a low leverage in order to be able to exercise those opportunities in subsequent years (Myers 1977). A firm with outstanding debt may forgo such opportunities because investment effectively transfers wealth from stockholders to debtholders (Jensen and Meckling 1976). Therefore, leverage is expected to be negatively related to growth opportunities. Growth opportunities are expressed by the growth rate of annual sales and, for the listed companies, by the market-to-book ratio (market value of the firm divided by the book value of the firm), which reflects the market's expectation of both the value of the investment opportunities and growth of the firm.

In the empirical analysis presented herein, dummies were used to control for industry affiliation to take into account structural, exogenous, industry-specific features in capital-structure choices. In particular, the data set contained information regarding the ATECO04 industry classification of each firm, based on the classification's first two digits[15]. A dummy group, equal to 1 if a firm was part of a business group, was included to take into account the fact that belonging to a business group can mitigate problems of information asymmetry; financial needs can be solved by the internal capital market created through a business-group affiliation and, in any case, belonging to a group supports those firms seeking external credit (Deloof e Jegers 1999). As reported in the Aida database, almost 68% of the firms in the sample were part of a group.

4. Data and descriptives

The sample consisted of an unbalanced panel made up of 357 Italian firms (93 listed) evaluated in the period from 1980 to 2000 (21 years). Firms belonging to the financial-

[15] A focused firm has a value equal to 1 in only one industry-sector dummy, as it belongs only to this industry. A diversified firm, with a threshold of 3% of sales in that industry, can have a value equal to 1 in two or more industry-sector dummies.

services industry and regulated utilities were excluded. The data were provided by Mediobanca - Ricerche & Studi. Compared with previous studies, our sample focused on a smaller number of firms but the analysis was based on a longer period. Data for a firm included in the sample were available for at least six consecutive years between 1980 and 2000. The entire sample comprised 2750 observations, and the listed sample 826 observations. Diversified firms, i.e., those operating in two or more business segments, accounted for nearly 54% of the entire sample and about 67% of the listed sample.

Previous empirical evidence regarding the effect of diversification on capital-structure determinants is quite limited[16]. Rumelt (1974) observed that firms (249 firm-observations for the years 1949, 1959, and 1969) employing a strategy of unrelated diversification have the highest debt level. Barton and Gordon (1988), in the USA (279 firm-observations from 1974 to 1982), and Lowe et al. (1994), in Australia (176 firm-observations in 1994), obtained similar results. Kochran and Hitt (1998) focused on 187 firm-observations from 1982 to 1986 and showed that equity financing is preferred for related diversification, while unrelated diversification is associated with debt financing. Anderson et al. (2000) found that multi-business firms have higher debt ratios than firms that operate in a single segment. In contrast, Alonso (2003) analyzed 480 Spanish manufacturing firms during the period from 1991 to 1994 but did not find a significant relationship between leverage and diversification.

Table 2 – Descriptive statistics for the whole sample and the listed sample.

	Whole sample			**Listed firms sample**		
Variables	*Mean*	*Median*	*Standard deviation*	*Mean*	*Median*	*Standard deviation*
DT (total diversification)	0.39	0.21	0.47	0.47	0.39	0.45
DR (related diversification)	0.18	0.05	0.30	0.21	0.07	0.30
DU (unrelated diversification)	0.21	0.03	0.37	0.25	0.06	0.36
Leverage (book value)	0.453	0.460	0.235	0.413	0.421	0.199
Leverage (market value)				0.330	0.296	0.212
ROA	0.070	0.061	0.078	0.057	0.053	0.066
Non-Debt Tax Shield	0.043	0.032	0.064	0.040	0.034	0.068
Ownership concentration	0.667	0.637	0.264	0.505	0.510	0.188
Tangibility	0.336	0.322	0.154	0.397	0.383	0.155
Size	19.87	19.89	1.52	19.92	19.99	1.46
Growth opportunities: sales growth	0.122	0.081	0.366			
Growth op.: market-to-book (MtB)				1.440	1.247	0.740
No. observations	**2750**			**826**		

[16] In some studies, this was also controversial. While some authors, such as Alonso (2004), found a negative and statistically significant influence of diversification on capital structure, others, such as Singh et al. (2003), found that, on average, product diversity is unrelated to debt ratios.

Table 2 shows the main descriptive statistics for the variables used in the analysis, sorted by the entire sample and the listed sample. Some variables, such as leverage, were symmetrically distributed while others, such as diversification measures, were quite asymmetrically distributed. Moreover, accounting performance (ROA) of the listed firms was compared to the entire sample. The standard deviation of the variables was generally higher for the entire sample than for the listed firms.

Tables 3 and 4 compare, respectively, the main descriptives, sorting the samples by the number of business segments, in order to define diversity, and by the groups of firms resulting from the cluster analysis. Table 3 compares the results for firms that are specialized (focused on just one industry) with those from firms that are diversified (operating in two or more industries).

Table 3 – Comparison across focused firms, specialising in one industry, and diversified firms, operating in two or more industries.

	Whole sample			**Listed Firms sample**		
	Focused (1 segment)	**Diversified** (more than 1 segment)	*t-test*	**Focused** (1 segment)	**Diversified** (more than 1 segment)	*t-test*
Variables	Mean	Mean		Mean	Mean	
Leverage (book value)	0.434	0.47	-3.74***	0.355	0.445	-4.33***
Leverage (market value)				0.288	0.353	-4.81***
ROA	0.084	0.061	5.32***	0.077	0.046	6.22***
Non-Debt Tax Shield	0.043	0.039	1.04*	0.042	0.038	1.12*
Ownership concentration	0.686	0.651	1.92**	0.496	0.508	-0.63
Tangibility	0.364	0.312	1.88***	0.412	0.387	1.73**
Size	19.84	19.90	-0.97*	19.89	19.94	-0.09
Growth op.: sales growth	0.110	0.133	-0.258			
Growth op.: MtB				1.625	1.339	4.46***
# Observations	**1284**	**1466**		**341**	**485**	

t test: two sample assuming with equal variance P(T<=t) one tail.

Some interesting differences resulted from a comparison of capital-structure determinants in specialized firms vs. diversified firms. The *t* test for the difference between the means showed significant relevance with a tolerance at 10%. Product-diversified firms carried more debt than specialized ones, with a higher debt capacity and a lower cost of distress (coinsurance effect). According to the agency cost theory, debt has a disciplinary effect in that it provides an incentive to select only value-increasing investments. This approach is particularly relevant for diversified firms. Furthermore, the performance of diversified firms, in terms of ROA, was lower and growth opportunities, in terms of market-to-book ratio were fewer compared to specialized firms. Diversified firms also had less ownership concentration and tangibility but were larger. The differences in sales growth was

not relevant, while for the sample comprising listed firms the differences between focused and diversified firms, in terms of ownership and size, were not significant.

In addition to the deterministic analysis, e.g., in Table 3 and in previous studies (Singh et al 2003), an inductive approach was applied to identify structural differences between the firms in the sample with respect to diversification strategies. Therefore, a *k*-means cluster analysis was carried out with the goal of verifying whether there were differences between groups of firms in terms of diversification strategies (according to the DT, DR, and DU). The number of clusters *k* leading to the greatest separation (distance) was not known *a priori* but was computed from the data. The cluster analysis examined two, three, four, and five clusters and, based on the results, the magnitude of the *F* values from the analysis of variance (ANOVA) was used to assess the distinctness of our *k* clusters. The goals were to minimize variability within the clusters and to maximize variability between clusters. Based on the maximum magnitude of the *F* values, three clusters were identified that presented different diversification features. Firms in cluster 1 were low in diversification measures. Firms in cluster 2 had a high level of total diversification, with a high degree of related diversification and a low degree of unrelated diversification. Firms in cluster 3 had a high level of total diversification, with a low degree of related diversification and a high degree of unrelated diversification. According to these results, and by looking at the descriptives of these three clusters, it was possible to describe and classify these groups of firms as "specialized" (cluster 1), "related-diversified" (cluster 2), and "unrelated-diversified" (cluster 3). Table 4 shows the descriptive statistics for the three groups of firms as outcomes of the cluster analysis applied to the sample.

Table 4 - Comparison across the three groups of firms resulting from the cluster analysis.

Whole sample (mean values)	*Specialised firms*	*Related diversified firms*	*Unrelated diversified firms*	*Spec vs rel.div. t-test*	*Spec vs unrel.div. t-test*	*Rel.div. vs unrel.div. t-test*
DT (total diversification)	0.18	0.41	0.56	-1.9***	-2.36***	-0.51
DR (related diversification)	0.04	0.26	0.13	-2.2***	0.42	2.8***
DU (unrelated diversification)	0.08	0.14	0.33	-0.58	-2.31***	-2.79***
Leverage	0.45	0.43	0.48	0.65	-3.05***	-3.89***
ROA	0.083	0.052	0.065	3.37***	3.82***	4.28***
Non-Debt Tax Shield	0.044	0.043	0.036	0.15	1.75**	1.49***
Ownership concentration	0.686	0.674	0.625	0.28	1.36**	1.66**
Tangibility	0.347	0.312	0.335	1.59**	1.27**	-0.24
Size	19.83	19.87	19.95	-0.36	-1.09*	-0.96*
Growth op.: sales growth	0.121	0.118	0.129	0.25	-0.30	-0.24
No. observations (total **2750**)	**1284**	**705**	**761**			

Listed firms sample (mean values)	*Specialised firms*	*Related diversified firms*	*Unrelated diversified firms*	*Spec vs rel.div. t-statistic*	*Spec vs unrel.div. t-statistic*	*Rel.div. vs unrel.div. t-statistic*
DT (total diversification)	0.27	0.44	0.57	-1.94***	-2.09***	-1.11*
DR (related diversification)	0.09	0.38	0.16	-1.61***	-1.11*	-1.50***
DU (unrelated diversification)	0.12	0.16	0.55	-0.47	-2.34***	-2.13***
Leverage (book value)	0.43	0.31	0.47	3.43***	-3.19***	-3.82***
Leverage (market value)	0.30	0.25	0.43	3.92***	-4.10***	-4.22***
ROA	0.068	0.041	0.057	4.87***	4.73***	-4.16***
Non-Debt Tax Shield	0.041	0.042	0.038	-0.34	1.49***	1.75***
Ownership concentration	0.498	0.54	0.48	-1.64*	0.18	1.23*
Tangibility	0.423	0.368	0.391	0.47	1.72**	-1.15*
Size	19.90	19.90	19.95	-0.03	-0.14	-0.36
Growth op.: MtB	1.627	1.422	1.258	3.74***	4.43***	3.92***
No. observations (total **826**)	**311**	**232**	**283**			

t test: two sample assuming with equal variance P(T<=t) one tail.

The cluster analysis showed relevant differences among the three groups of firms. While Table 3 highlights that diversified firms had more debt, Table 4 shows that the debt depended on the type of diversification. For the entire sample and the listed-firm sample, related diversified firms made much less use of debt than was the case for either unrelated-diversified or specialized firms (as predicted by the transaction cost theory). By contrast, unrelated-diversified firms carried more debt than either related-diversified or specialized firms, due to the low probability of distress and the low cost of debt (coinsurance effect). Specialized firms fell in between. Moreover, the accounting performance and growth opportunities of related diversified firms were worse than those of the other two types of firms. Specialized firms had the highest mean performance and market-to-book ratio. According to the performance variables, unrelated-diversified firms fell in between. These differences were significant ($p < 0.01$).

Therefore, it can be concluded that unrelated-product-diversified firms carry more debt than specialized firms, while related-product-diversified firms use less debt than the other two groups of firms. Thus, it is important to differentiate among the financial policies adopted by product-diversified firms with respect to the degree of relatedness of the business segments in which they operate.

5. Empirical Results

This section presents the results obtained by estimating the models with the GMM technique. The key identifying assumption, that there is no serial correlation in the error terms, was verified by testing for the absence of a second-order serial correlation in the first residuals. The Sargan statistic as well as the m_1 and, especially, the m_2 tests suggested that the dynamic feature of our model for the sample of Italian firms was valid, well-specified, and consistent[17]. As the model was estimated in first differences and lagged variables were used as explanatory variables, the sample was reduced from 2750 observations (826 for the listed sample) to 2412 observations (745 for the listed sample).

Tables 5 and 6 show the GMM results of models A1 and A2, for the determinants of capital-structure choices. The results for groups of firms are compared according to the degree and direction of diversification, defining diversity by the number of business segments (Table 5) or by the cluster analysis approach (Table 6). Table 5 compiles the results on the capital-structure determinants of specialized and diversified firms. In Table 6, the regression results pertain to specialized, related-diversified, and unrelated-diversified firms.

[17] Specifically, the Sargan statistic confirms the absence of correlation between the instruments and the error term in both models, and the hypothesis of serial correlation in the residuals is always rejected.

*Table 5 – Model A1: determinants of capital structure choice for **focused firms** (one business segment) and **diversified firms** (two or more business segments).*

	Whole sample - leverage		**Listed sample – lev. book value**		**Listed sample – lev. Mkt value**	
Variables	**Focused**	**Diversified**	**Focused**	**Diversified**	**Focused**	**Diversified**
Constant	0.322***	0.359***	0.280***	0.311***	0.183***	0.238***
Leverage $_{t-1}$	0.418***	0.353***	0.335**	0.294***	0.303***	0.265***
ROA	-0.377***	-0.324***	-0.486*	-0.462**	-0.597*	-0.483**
Non-Debt Tax-Shield	- 0.112***	-0.139**	-0.156***	-0.171**	-0.185***	-0.224**
Ownership concentration	-0.025*	0.064**	-0.032*	0.044*	-0.202**	0.099**
Tangibility	0.087*	-0.016	0.426***	-0.019	0.716***	0.053
Size	0.050***	0.035***	0.039*	0.027**	0.068**	0.051**
Growth opp.: sales growth	0.039	0.022				
Growth opp.: MtB			-0.196*	-0.145***	-0.271***	-0.208***
m1	-4.55 ***	-4.77 ***	-2.97***	-3.28***	-3.34***	-3.75***
m2	-2.21*	-2.75**	-2.15*	-2.86**	2.42*	3.23***
Sargan test	94.9***	97.5***	48.6***	54.8***	57.4***	65.9***
Wald test-1	856.5***	952.7***	523.2***	666.4***	489.9***	601.3***
Wald test-2	124.3***	212.1***	95.8***	164.1***	115.5***	205.4***

Notes: (*), (**) and (***) indicates that coefficients are significant at 10, 5 and 1 percent level, respectively. The tests m1 and m2 are first and second order autocorrelation of residuals, respectively, under the null of no serial correlation. Sargan test is test of the overidentifying restrictions, under the null of instruments' validity. Wald tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively, under the null of no relationship. For the m1 and m2 test of first and second order autocorrelation, as for the Sargan test and Wald tests (*), (**) and (***) indicate a p-value larger than 0.10, 0.05 and 0.01 respectively.

*Table 6 – Model A2: determinants of capital structure choice according to the three groups highlighted by the **cluster analysis**.*

	Whole sample - leverage			**Listed sample – lev. book value**			**Listed sample – lev. Mkt value**		
Variables	***Specialised firms***	***Related diversified firms***	***Unrelated diversified firms***	***Specialised firms***	***Related diversified firms***	***Unrelated diversified firms***	***Specialised firms***	***Related diversified firms***	***Unrelated diversified firms***
Constant	0.347***	0.332***	0.394***	0.335**	0.273***	0.374***	0.228***	0.173***	0.343***
Leverage $_{t-1}$	0.386***	0.436***	0.295***	0.324***	0.368***	0.244***	0.280***	0.345***	0.226***
ROA	-0.324***	-0.407***	0.066***	-0.462***	-0.437***	0.087***	-0.683***	-0.497***	0.095***
Non-Debt Tax-Shield	-0.15***	-0.14***	-0.27***	-0.143***	-0.138***	-0.295***	-0.25**	-0.21***	-0.310***
Ownership concentration	-0.084*	0.015	0.024*	-0.044**	0.021	0.041*	-0.053**	0.025	0.068**
Tangibility	0.056**	0.014*	-0.032	0.037**	0.016*	-0.057	0.044***	-0.426	-0.089
Size	0.055**	0.040*	0.022*	0.038**	0.031*	0.025	0.040**	0.034**	0.027
Growth op.: sales growth	0.029	0.018	0.019						
Growth opp.: MtB				-0.182***	-0.245***	-0.087***	-0.258***	-0.323***	-0.120***
m1	-4.59***	-3.95***	-3.89***	-2.75***	-2.44***	-2.56***	-3.87***	-2.89***	-3.45***
m2	-2.61**	-2.11*	-2.27*	-2.06*	-1.37	-1.93*	-2.52*	-1.80	-2.24*
Sargan test	107.2***	68.4***	72.3***	42.2***	35.7***	37.2***	45.2***	36.5***	37.9***
Wald test-1	955.3***	807.7***	792.1***	511.3***	464.2***	479.5***	623.2***	517.5***	546.3***
Wald test-2	163.2***	85.5***	94.8***	88.5***	75.6***	82.3***	105.4***	94.3***	121.1***

Notes: (*), (**) and (***) indicates that coefficients are significant at 10, 5 and 1 percent level, respectively. The tests m1 and m2 are first and second order autocorrelation of residuals, respectively, under the null of no serial correlation. Sargan test is test of the overidentifying restrictions, under the null of instruments' validity. Wald tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively, under the null of no relationship. For the m1 and m2 test of first and second order autocorrelation, as for the Sargan test and Wald tests (*), (**) and (***) indicate a p-value larger than 0.10, 0.05 and 0.01 respectively.

An interesting conclusion is that the previous year's leverage has a positive influence on the current leverage, since the leverage$_{t-1}$ coefficient was positive and significant at the 1% level.

The size of the coefficient of lagged leverage, (1 - α), interpreted according to Table 1, was in the range 0.29–0.41 based on Table 5 and 0.24–0.43 based on Table 6. In the latter, leverage was measured using book values but was lower when measured using market values (0.26–0.30 and 0.22–0.34 for, respectively, Table 5 and Table 6). Therefore, the parameter α, which measures a firm's speed of adjustment of the current leverage ratio toward a target leverage ratio, was 0.59–0.71 for Table 5 and 0.57–0.76 for Table 6. In the latter, leverage was measured using book values but was higher when measured using market values (0.70–0.84 and 0.66–0.78 for, respectively, Table 5 and Table 6). The significant results obtained for the coefficient α indicated that firms bear quite low transaction costs when they decide to adjust the debt level of the previous year to the target level in the current period. This was particularly true for the listed firms, which, compared with the coefficients for the entire sample, had relatively smaller transaction costs and thus adjusted faster toward the equilibrium level. These firms have generally better access to external capital markets and experience fewer asymmetric information costs due to a higher amount of publicly available information.

Diversification structure significantly influenced the speed at which firms adjusted their leverage ratios toward the optimal ones. In particular, as seen in Table 5, diversified firms adjusted more quickly to the leverage ratios. Table 6 shows the financial behavior of firms with different diversification strategies. It shows that the speed of this adjustment was significantly different among the three groups of firms. Specifically, firms that had adopted a related diversification strategy and specialized firms moved more slowly toward their target capital structure, while firms with an unrelated diversification strategy quickly adjusted their capital structure to the equilibrium level. In the latter case, the role of the internal capital market was relevant in providing support in adjusting toward the target debt level. According to the transaction cost theory, unrelated-diversified firms—by mainly using general-purpose assets, which have a high liquidation value in case of bankruptcy—have a higher capacity to meet scheduled interest payments and can easily manage more debt. Therefore, easier access to the credit market together with the existence of an internal capital market allows unrelated-diversified firms to strictly move toward a target leverage ratio. Conversely, specialized firms and related-diversified firms—both of which mainly use special-purpose assets, which have a low liquidation value—face higher transaction costs and adjust relatively slowly to their target leverage ratio. These firms face contingent problems in their access to the credit market and are more vulnerable to situations that must be dealt with by management over time. For them,

the source of financing is a function of managerial preferences, which lends support to the hierarchical nature of financial decision-making.

Therefore, whereas our results generally supported the trade-off theory, we also found that while unrelated-diversified firms quickly move toward an optimal leverage ratio, related-diversified firms do so more slowly. Firms that adopt a related diversification strategy are subject to greater transaction costs and thus have to maintain financial flexibility to adjust to the target debt ratio. Conversely, firms that have diversified into unrelated businesses are subject to lower transaction costs and, in general, are able to quickly adjust to their leverage target; they are thus less exposed to contingencies in the capital market.

As previous research has shown, capital structure depends on several firm-specific characteristics, and diversification features seems to reveal differences in their effects.

The data in table 5 and 6, generally, show that the choice of leverage is a negative function of NDTS and growth opportunities (only for the listed sample), and a positive function of tangibility (only for focused firms) and size. The intensity of these effects differed for each group of firms. Furthermore, the results indicated that the effect of ownership and profitability corresponded to relevant differences in the sign of the coefficients.

Table 5 shows that, compared to focused firms, the capital structure of diversified firms was less sensitive to profitability, with a less-negative link between ROA and leverage. Focused firms preferred to use internal resources to avoid external financing. In general, the negative link supported the pecking-order theory, due to asymmetric information in the market; that is, profitable firms are less likely to resort to debt as their financing strategy. It can be inferred that firms with the capacity to generate internal funds use those funds before falling back on debt. Focused firms are more often subject to asymmetric information, as evidenced by the stronger negative link between ROA and leverage.

The results in Table 6 show that differentiating between related and unrelated diversification is justified, as also evidenced by the determinants of the capital-structure choice. Since firms adopting an unrelated diversification strategy more quickly adjust to their equilibrium level, their actions support the trade-off theory. Related-diversified firms and specialized firms more slowly adjust toward their target capital structure; thus, their behavior can be considered as more consistent with the pecking-order theory. A comparison of the three groups of firms established that there are relevant differences in the sign (profitability and ownership) and in the intensity (non-debt tax shield, tangibility, size and growth opportunity) of the coefficients of capital-structure determinants.

A detailed look at diversified firms according to the degree of correlation among businesses (Table 6) reveals that the link between profitability and leverage was different for unrelated-diversified firms compared to related-diversified or specialized firms. The positive link between profitability and leverage indicated that more-profitable unrelated-diversified firms preferred debt as a source of finance. According to the trade-off model, expected bankruptcy costs decline when profitability increases, the deductibility of interest payments induces more-profitable firms to use debt, and a higher leverage ratio helps to control for agency problems by forcing managers to pay out more of a firm's excess cash. Conversely, a negative link between profitability and leverage was exhibited by specialized and related-diversified firms[18]. According to the pecking-order theory, these two types of firms prefer to raise capital, first from retained earnings, second from debt, and third from issuing new equity. This preference is due to the costs associated with external-financing issues in the presence of asymmetric information. Therefore, the market seems to raise doubts about the soundness of strategies based on diversification into related business, and such firms have to finance this choice through internal resources. By contrast, for tax reasons and because of the reduced risk, unrelated-diversified firms have ready access to the credit market.

The variable NDTS was negatively related to leverage and this effect was particularly relevant for diversified firms (Table 5). This result corroborates the role of the tax factor, in which NDTS is a substitute for debt in reducing firms' tax burdens.

The relation between NDTS and leverage was always negative and it was particularly strong for unrelated-diversified firms (Table 6). When NDTS exist, then firms are not likely to fully use debt tax shields (substitution effect). In other words, firms with large NDTS have less incentive to use debt tax shield to benefit interest deductibility, and thus may issue less debt. This evidence, according to the trade-off theory, indirectly supports the role of the tax benefit. Therefore, compared to the other two groups of firms, for unrelated-diversified firms the NDTS was particularly important, whereas for related-diversified firms it was of less relevance.

Table 5 also shows a negative link between ownership and leverage for specialized firms, while this relationship was positive for diversified firms. For the former, leverage and ownership substituted for instruments of corporate governance, while for the latter leverage and ownership were probably complementary instruments of corporate governance.

According to Table 6, ownership exerted a negative influence on leverage for specialized firms and a positive one for unrelated-diversified firms; for related-diversified

[18] In addition, the leverage ratio of related-diversified firms showed a high sensitivity to profitability.

firms, this variable was not statistically significant. In particular, when diversified firms were sorted according to the degree of correlation among businesses, then ownership concentration did not significantly influence capital-structure decisions for related-diversified firms while, vice versa, it positively affected debt use in unrelated-diversified firms. For the latter type of firm, leverage and ownership exerted a controlling effect on management with respect to value-destroying decisions; for specialized firms debt and ownership were substitute instruments for management control.

Specialized firms were also sensitive to the level of tangibility (Table 5), since higher levels of tangible assets grant these firms cheaper access to debt[19]. Tangibility was not relevant for diversified firms. This result suggests that specialized firms use tangible assets as collateral when negotiating borrowing.

Tangible assets had a relevant impact on the borrowing decisions of specialized firms and related-diversified firms (Table 6). These assets are less subject to information asymmetries and usually retain a high value in case of liquidation. More-tangible assets alleviate bondholder-shareholder conflicts, since creditors have a guarantee of repayment, even during liquidation. Therefore, tangible assets constitute good collateral for loans. Our findings confirmed that asset tangibility is an important criterion in banks' credit policy, especially for specialized firms. Unrelated-diversified firms are able to borrow by relying on cash-flow stability and reduced business risks; when cash flows are more stable and firms are less exposed to the risk of bankruptcy, the relevance of tangibility to borrowing disappears.

Size was also positively related to leverage. According to Table 5, it was particularly relevant in granting better access to credit for specialized firms; the effect of the coefficient was economically stronger for such firms than for diversified firms. A firm of larger size generally has better access to the credit market, as it is less subject to asymmetric information.

For specialized and related-diversified firms, size had a relevant role in leverage. Relatively large firms tend to be less prone to bankruptcy, since they have easier access to the market, and therefore are granted better borrowing conditions. For unrelated-diversified firms, which are inherently larger, size did not significantly affect debt choice.

Firms with a high market-to-book ratio, as a proxy of growth opportunities, tended to have lower leverage. Specifically, diversified firms with high growth opportunities, more than specialized firms, showed a negative relationship between leverage and growth opportunities (MtB). This can be explained by the observation that higher-growth diversified firms prefer to reduce debt to take advantage of profitable investments in the future. Sales growth, as proxy

[19] From the viewpoint of transaction-cost economics, tangible assets usually have less asset specificity, which increases their use as collateral for debt to reduce lenders' risks (Williamson 1988).

of growth opportunities, was not statistically significant variable for the entire sample, most likely because sales growth measures previous growth experience while the market-to-book ratio is a more appropriate measure of future growth opportunities.

While firms with less growth opportunities should use debt because it has a disciplinary role, those with high growth perspectives should use less debt in their capital structure. As predicted by the trade-off theory, the costs from issuing debt are higher for firms with substantial growth opportunities. Firms with more investment opportunities have less leverage because they have stronger incentives to avoid the underinvestment and asset substitution that can arise from stockholder-bondholder agency conflicts. This is particularly true for specialized firms and related-diversified firms; these firms, by investing in assets that may generate higher growth opportunities in the future, face difficulties in borrowing against such assets. Moreover, they prefer to maintain a low leverage in order to insure future capability to take advantage of growth opportunities; that is, they particularly valuable financial flexibility. By contrast, unrelated-diversified firms can rely on their internal capital markets to provide the financial resources needed to exploit future growth opportunities. In our study, the capital structure of related-diversified firms was more sensitive to growth opportunities than was the case for the other two groups. For the former, growth was financed using internally generated retained earnings, thereby signaling that related-diversified firms do not engage in underinvestment and asset substitution. The lowest sensitivity to growth opportunities was exhibited by unrelated-diversified firms, which have a greater possibility to use debt to finance growth.

Therefore, the behavior of unrelated-diversified firms supported the trade-off theory. In addition to the rapid speed of adjustment, this conclusion is justified by the positive link between profitability and leverage for these firms, compared to the negative link for the other two groups of firms. According to the coinsurance effect, diversified firms in unrelated business are less financially constrained and less sensitive to changes in profitability. Instead, the tax benefit related to the use of debt by more-profitable firms is particularly relevant for unrelated-diversified firms, especially compared to related-diversified firms. Specialized firms and firms adopting a strategy of related diversification prefer to preserve their financial flexibility; they use less debt to be able to exploit future growth opportunities. Unrelated-diversified firms rely on the internal capital market to take advantage of growth opportunities and they use debt for tax reasons. The role of tangibility as collateral, especially in the presence of asymmetric information, is absent for unrelated-diversified firms but relevant for specialized and related-diversified firms. Moreover, size is of importance for specialized and

related-diversified firms. By contrast, unrelated-diversified firms, which are generally larger than specialized or related-diversified firms, have access to credit based on factors unrelated to size, such as risk diversification. Due to the reduced variance in the future cash supplies of an unrelated-diversified firm, its creditors rely on the combined fortunes of the firm's total operating units. Its cash flows are less than perfectly correlated, and tangibility and size become less important factors (coinsurance effect).

The implications of our findings are very relevant in that they explain earlier contradictory results on capital-structure determinants according to the different corporate-strategy features, together with other firm-specific characteristics as well as industrial and institutional factors. The degree of product specialization/diversification and the direction of diversification (related or unrelated) translate into different corporate financial behaviors. Diversification is clearly a determining factor in capital-structure decisions and thus deserves more attention in future investigations.

Table 7 reports the results for model B based directly on diversification measures. In model B, measures of diversification were used to capture the direction and magnitude of the effect on capital structure. Here we took into account, as highlighted by Robins and Wiersema (2003), the fact that DR is sensitive to the number of business segments of a firm by including both DR and DT in the regression (and doing the same considering DU and DT).

Table 7 – Model B: The direct effect of diversification as capital structure determinants.

Variables	**Whole sample - leverage**		**Listed sample – lev. book value**		**Listed sample – lev. Mkt value**	
Constant	0.362***	0.379***	0,314***	0.289***	0.253***	0.246***
Leverage $_{t-1}$	0.346***	0.348***	0.294***	0.291***	0.262***	0.274***
DT (total diversification)	-0.043***	-0.064***	-0.0449**	-0.109***	-0.026	-0.098***
DR (related diversification)	-0.108***		-0.069*		-0.075**	
DU (unrelated diversification)		0.109***		0.063***		0.074***
ROA	-0.276***	-0.240***	-0.227***	-0.217***	-0.29***	-0.26***
Non-Debt Tax-Shield	-0.129***	-0.133***	-0.167***	-0.141***	-0.185***	-0.172***
Ownership concentration	0.051	0.078	-0.079*	-0.064*	-0.098*	-0.104*
Tangibility	-0.036	-0.049	0.037	0.041	0.053**	0.038**
Size	0.047***	0.051***	0.024**	0.029**	0.038**	0.035 **
Growth op.: sales growth	0.035*	0.028*				
Growth opp.: MtB			-0.225**	-0.233**	-0.257***	-0.266***
m1	-6.59***	-6.89***	-4.75***	-4.46***	-4.86***	-4.57***
m2	-3.91***	-3.98***	-2.86*	-2.92*	-3.12**	-3.22**
Sargan test	181.4***	182.3***	122.5***	123.1***	139.2***	138.9***
Wald test-1	1351.3***	1432.1***	918.1***	1044.8***	623.2***	746.3***
Wald test-2	143.2***	154.8***	240.5***	274.3***	259.4***	271.1***

Notes: (*), (**) and (***) indicates that coefficients are significant at 10, 5 and 1 percent level, respectively. The tests m1 and m2 are first and second order autocorrelation of residuals, respectively, under the null of no serial correlation. Sargan test is test of the overidentifying restrictions, under the null of instruments' validity. Wald tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively, under the null of no relationship. For the m1 and m2 test of first and second order autocorrelation, as for the Sargan test and Wald tests (*), (**) and (***) indicate a p-value larger than 0.10, 0.05 and 0.01 respectively.

The estimate of the speed of adjustment of the leverage ratio was lower than reported by researchers mainly studying listed firms and US firms. Our estimate was in the range 0.29–0.35 based on book-value leverage, and 0.26–0.27 based on the market-value leverage. This difference with previous work may be due to the fact that Italian companies operate in a relationship-based financial system and thus face relatively low transaction costs when they borrow external funds from banks. Therefore, the Italian capital structure seems to function according to the trade-off theory.

As argued by Ozkan (2001), the adjustment process is a trade-off between the adjustment (transaction) costs involved in moving towards a target ratio and the costs of being in disequilibrium. If the latter costs are greater than the former ones, then the estimated coefficient 1 - α should be close to zero and firms will try to quickly attain the target of an optimal debt level. Based on the estimated adjustment speed, convergence toward a target seems to explain much of the variation in firms' debt ratios.

The adjustment process in Italy seems to be quite rapid, perhaps due to the role of bank credit as a source of finance for the country's firms. Italian companies, which are characterized by highly concentrated ownership, are mainly family businesses. Consequently, most financial institutions require that owners guarantee the loans either personally or with the assets of other family firms in the group. Thus, in Italy, loans are not entirely external and they are often granted, at least in part, based on personal relationships and business-group participation. Moreover, Italian firms rely on banks for their borrowing needs, especially for short-term credit (renewed yearly). This allows wide financial flexibility in terms of capital-structure changes and a certain rapidity in adjustments toward the target leverage.

The results of our study are confirmed in Table 7, which shows the coefficients for the diversification variables. Compared to other empirical analyses (Alonso 2004), the empirical evidence reported here suggested that corporate diversification has a substantial influence on a firm's capital-structure decisions. DT and DR were negative and statistically significant, indicating that total diversification and related diversification lead to lower levels of debt in capital structures. Firms diversified in related segments promoted the use of equity to finance the growth of the companies[20]. The coefficient for the DU variable was positive and

[20] As a robustness test, the analysis also used pure diversification (the number of business segments) and the Rumelt measure of specialization (SR), which is interpreted in the opposite sense of total diversification, with the same negative results. The Rumelt measure of related diversification (RR) did not appear to be relevant. We also tested, without finding any statistical support, for the presence of non-linearity (a U-shaped relation) in the link between diversification and leverage, by introducing the squares of the DT and the SR indexes into the model.

statistically significant. Firms diversified in unrelated segments had significantly higher leverage ratios and the unrelated-diversification strategy tended to increase their use of debt.

Therefore, the analysis showed a differential effect of diversification strategy on debt/equity choice; specifically, the relationship between diversification and capital structure depended upon the degree of relatedness. The two types of diversification had opposite effects on debt. Unrelated-diversified firms had higher leverage than the two other types of firms, and increased their use of debt to increase unrelatedness, in contrast to the strategy of related-diversified firms. According to the transaction cost hypothesis, an increase in the degree of business relatedness is followed by a reduction in the use of debt; special purpose assets, mainly used by related-diversified firms, are better managed by less-leveraged firms. Unrelated diversification positively influences debt usage, and general-purpose assets, mainly used by unrelated-diversified firms, can provide easer access to debt due to their higher liquidation value in the market. Moreover, unrelated-diversified firms can exploit the tax benefit resulting from diversification into unrelated businesses, while benefiting from the reduced business risk Therefore, according to the coinsurance effect approach and the transaction-cost hypothesis, unrelated-diversified firms have a higher debt capacity and can assume more debt as a source of finance. Regarding control variables, our model highlights the relevance of profitability, NDTS, firm size, and growth opportunities in explaining debt ratios, in line with previous studies of capital structure (Titman and Wessels 1988, Balakrishnan and Fox 1993, Rajan and Zingales 1995). As a general outline, estimation of the dynamic panel-data regression suggested that firm size was positively associated with a firm's leverage ratio, while the positive effect of tangibility was statistically significant only for market-value leverage. Conversely, profitability and NDTS were negatively related to a firm's leverage ratio. Ownership had a statistically significant positive effect only on the listed sample. Growth was controversial: when proxied by sales growth, it was positively related to leverage; when proxied by the market-to-book ratio, it negatively affected leverage, with a stronger statistical significance.

6. Conclusion

The controversial results on capital-structure decisions suggested the need for further research, such as an examination of the utility of corporate-strategy analysis in understanding capital structure. Accordingly, the present work examined the relationship between strategy and finance by investigating the role of diversification on capital-structure choices and, in a novel approach, differentiating between related and unrelated diversification. Moreover, this

is the first analysis of the effect of product-diversification strategies on the capital-structure decisions of Italian firms.

Previously, empirical financial studies paid little attention to the role of diversification as a determinant of capital structure. The results of the present analysis indicate that the product-diversification strategies developed by firms indeed affect their capital-structure decisions. While our findings point to the importance of diversification in explaining financing choices, they also reveal that diversified firms cannot be considered as a homogeneous group.

According to the present descriptive analysis and similar to the general conclusions of earlier studies on the effect of product diversification on capital structure, firms that diversify across product lines are likely to have higher debt ratios than non-diversified firms. However, we have shown that these observations need to be sorted by the type of diversification. In differentiating between the scope of diversification and observing the difference between related and unrelated diversification, we found that related-diversified firms have a lower debt ratio than specialized firms, whereas unrelated-diversified firms have higher leverage. Furthermore, with respect to analyses of capital-structure determinants, related and unrelated diversification seems to have opposite effects on debt level and leverage determinants. Specifically, a related-diversification strategy, which is associated with lower debt ratios and is based on business synergies and resource sharing, has a negative influence on leverage. By contrast, unrelated diversity, which is associated with higher debt usage and based on financial synergies, has a positive effect on debt. Accordingly, our results suggest that a diversified firm, organized in unrelated business segments, increases its use of debt to take advantage of the tax deductions and benefits derived from the coinsurance effect.

Another important result of this analysis was the large and statistically significant lagged-leverage effect on a firm's current leverage. This finding implied that there is a target debt-to-equity ratio for Italian firms and that it was therefore correct to use a dynamic panel-data analysis. These results validated the target-adjustment model for capital-structure decisions, but highlighted a differential effect according to diversification strategy. Italian firms tend to move toward an optimal debt level such that a trade-off approach well-explains their capital-structure decisions. In particular, the capital-structure decisions of unrelated-diversified firms seem to be strictly aimed at reaching their target optimal debt level—a behavior that is consistent with the trade-off hypothesis. By contrast, the capital-structure decisions of specialized and related diversified firms support the pecking-order theory.

Therefore, while an assessment of capital-structure choices must take into account diversification strategy, it is equally important that it differentiates between related and unrelated product diversification. This conclusion implies that diversification strategy is a feature that differentiates firms with respect to their financial behaviors. An interesting direction for future empirical studies is the combined effect of international (geographical) diversification and product diversification, according to their degree of relatedness, on capital-structure decisions.

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