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Diversification: Value-Creating or Value-Destroying Strategy? Evidence from Using Panel Data

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Abstract: This paper provides evidence on how the diversification strategy impact on the firm value. Furthermore the paper studies the effect of the levels and types of diversification on the firm value. To achieve this aim, we propose a value model that incorporates the level and type of diversification. The estimation of the model by using the Generalized Method of Moments provides interesting results. Consistent with the value-destroying expectations, we find a reduction in the value of the diversified companies in the eurozone countries, however there is a non linear relationship between the diversification and value, giving rise to an optimal level of diversification. Moreover our results support that related diversification is more value-creating than non-related diversification. Additionally we test the effect of diversification of market valuation by focusing on the discount that diversified firms trade at, then a value destroying is achieved for the diversified companies in our sample, and we also have evidence on the hypothesis that relatedness moderates the value loss from diversification.

Keywords: Corporate diversification, relatedness, firm value, excess value
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1. Introduction

The diversification strategy is a considerable and interesting topic of study in the literature of the firm value, but there is significant divergence on whether or not diversification can be conducted to make long-run competitive advantage (Markides and Williamson, 1994). Nowadays there is a debate in the finance literature whether or not corporate diversification is a value maximization strategy for shareholders. The firm's choice to diversify is undertaken when the benefits of diversification overcome its costs, aid the firm stay focused when the opposite occurs. On the one hand, some theoretical arguments points to diversification as a value-increasing strategy for the firm. For instance, Fluck and Lynch (1999) argue that diversification permits marginally profitable projects, which cannot get financed as stand alone units, to be financed. Matsusaka (2001) shows that the firm chooses to diversify when the gains from searching for a better organizational fit outweigh the costs of reduced specialization. On the other hand, the evidence obtained in the corporate finance literature, such as the point that multi-segment firms trade at a discount, in relation to a portfolio of single-segment firms, have led researches to believe that diversification destroys value (Lang and Stulz, 1994; Berger and Ofek, 1995; Rajan, Servaes, and Zingales, 2000; Whited, 2001; Lamont and Polk, 2001-2002). As such findings are not conclusive there is an open door to the investigation about the diversification strategy.

Consequently the economic literature has focus on the impact of different levels and types of diversification on firm value. To examine this impact is crutial to distinguish between related and unrelated diversification. The firms who follow the related diversification try to exploit economies of scope through the sharing of physical and human resources across similar lines of business while unrelated diversification pursues search for achieve economic advantage by being able to distribute capital and other financial resources in an internal market more efficiently (Helfat and Eisenhard, 2004). As a result is not clear the evidence regarding which type of diversification is better, diversification into related business is frequently argued to provide better value and then must be preferred by the firm (Bettis, 1981; Markides and Williamson, 1994). Furthermore the research conducted to explain the effects of different levels and types of diversification on firm value has driven to a curvilinear relationship between diversification and the value of a firm. The curvilinear model posits that some diversification is better than none (Palich, Cardinal and Miller, 2000).

In this setting, the aim of this paper is to learn how diversification activity impacts on firm valuation and how this impact is moderated by relatedness by estimating with the Generalized Method of Moments in a sample of eurozone companies. Our paper provides evidence on the diversification impact on firm value as follows. First, we offer evidence on the impact of the diversification strategy on the firm value by regressing value over two different measures of diversification (Total Entropy and Revenue-based in Herfindahl index) and a set of control variables that have been traditionally considered as value determinants (i.e. the investment level, debt ratio, dividends, profitability, intangible assets and firm size). Second we take into account the possible non-linear relationship between the diversification strategy and firm value. As Markides (1992) and Grant, Jammine and Thomas (1988), we attempt to explain the curvilinear relation by including in our basic model the square of the diversification index. Our findings show that there is an optimal level of diversification, that is a firm value first increases and, after a certain breakpoint, the decreases the level of diversification rises. Third, to investigate how the relatedness moderate the impact of diversification on firm value, we have interacted diversification with a dummy variable that captures the relatedness nature of the diversification.

Our main results support the notion that related diversifiers are more valuable than unrelated diversifiers. Second, results corroborate the existence of a non-linear relationship between diversification and value, suggesting that an optimal level of diversification exists and, consequently, that diversification creates value until reaching this level, being value-destroying beyond. Third, we find that related diversification is more value-creating than non-related diversification, and that non-related diversification turns a value-destroying strategy at lower levels that related diversification.

Finally, we propose an additional test of the effect of diversification on firm valuation by focusing on excess value. To achieve this aim, we follow Berger and Ofek (1995) and construct the excess value variable. Our results strongly confirm that multi-segment firms are less valuable than single-segment firms, which leads to multi-segment firms to trade at a discount. As our last extension, we investigate the moderating role of relatedness in the relationship between diversification and excess value. The results obtained support the notion that relatedness mitigates the value loss from diversification.

The remainder of the paper is organised as follows. The second section presents the theoretical framework the hypothesis of our paper and the model to test them. Section 3 describes the data and estimation method used in our analysis. The results are discussed in section 4 and the last section highlights our conclusions.

2. Theory, Hypotheses and Empirical Models

In this section, we first summarize the main arguments and contributions of previous research to the debate about the benefits and costs of diversification, which are the foundation of our hypotheses concerning the effect of diversification on firm value. We then specify the models that allow us to test these hypotheses. Second, we discuss the arguments behind the diversification discount hypothesis to propose additional hypotheses about corporate diversification and the value discount. The models that allow us to examine the existence of a discount or a premium of the diversification strategy are also specified.

2.1. Corporate Diversification and Firm Value

There are many and contradictory theoretical arguments in the literature to explain the relationship between the diversification strategy and firm performance, suggesting that diversification may have both value enhancing and value reducing effects. The key question is whether the act of corporate diversification destroys value or, on the contrary it creates value.

In the past, the industrial organization economics employed years of research relying on the conjecture that diversification and performance are linearly and positively related (see, for instance, Gort, 1962). This assumption mainly derives from market power theory and internal market efficiency arguments (Grant, 1998; Scherer, 1980). In the beginning, the literature on diversification was based on the premise that diversified firms can employ market power advantages, which are largely inaccessible to their more focused counterparts (Scherer, 1980). Additionally, due to internal market efficiencies, multi-segment firms can benefit from the advantage to access easily to external funds to finance growth, and can also transfer capital between businesses within its portfolio (Meyer, Milgrom and Roberts, 1992). As a result, diversification is a source of different efficiencies that are difficult to achieve by single business firms (Scharfstein and Stein, 2000). Overall, these arguments indicate that diversification is positively associated with performance.

To go further on the question as to why a firm diversifies, we should take into account that the benefits of diversification could arise from many sources. In fact, gains from this strategy may come from managerial economies of scale, as proposed by Chandler (1997), and from increased debt capacity, as argued by Lewellen (1971). For instance, a risk reduction may bode well for debt capacity and cost of capital, in part because it allows the firm to further exploit the tax advantages from increased borrowing. Additionally the increment of the market power is determined by the predatory pricing, future higher prices, and sustained losses that can be founded through cross-subsidization whereby the firm taps additional revenues from one product to support another (Tirole, 1995). Weston (1970) and Williamson (1975) argue that managers have in their hands monitoring and information advantages over external capital markets. Thus multi-segment firm has much greater flexibility in capital formation since it can access external sources as well as internally generated resources. Then, the diversification itself creates internal capital markets that permit a more competent allocation of resources across businesses. Hence, multi-segment firms can generate efficiencies that are unavailable to the single-business firm. In addition multi-segment firms gain considerable financial interests from using internal market for capital and resources (Rumelt, 1982). The finance research also relies on the tax and financial benefits associated with diversification (Berger and Ofek, 1994; Madj and Myers, 1987; Servaes, 1996). Finally, one should not forget that the conventional theory posits that one of the positive effects of diversification is the reduction of the firm's risk in the way to be involved in more businesses in its portfolio (Grant, 1998; Sobel, 1984). This risk reduction is also helpful for debt capacity and cost of capital, because it permits the firm to exploit the tax advantages available from increasing borrowing (Sheifler and Vishny, 1992). In short, all the abovementioned arguments support diversification as a value-creating strategy.

Contrary to these arguments, there is also a belief that diversification destroys value because it, for instance, creates inefficient internal capital markets during the course of overinvestment in low performing-business (Stulz, 1990); or due to internal power efforts that generate influence costs (Rajan, Servaes, and Zingales, 2000, Meyer, Milgrom and Roberts 1992). Moreover, managers of divisions that have a future perspective in the firm are encouraged to persuade the top management of the firm to conduct resources in their direction (Meyer, Milgrom and Roberts, 1992). Jensen (1996) argues that managers of a multi-segment firm may be prone to invest any free cash flow to support organizational inefficiencies. Markides (1992) mentions other costs of diversification, such as control and effort losses (increment of shirking), coordination costs and other diseconomies related to organization, and discrepancy for ideas between businesses. What is unquestionable is that managers of the multi-segment firm enjoy greater opportunities to undertake projects, and so greater resources to do so if diversification relaxes constrains imposed by imperfect external capital markets. This might lead them to over-invest resources (Stulz, 1990;

and Matsusaka and Nanda, 1997). The difficulty in designing optimal incentive compensation for managers of diversified firms also generates costs of multi-segment operations (Aron, 1988; and Rotenberg and Saloner, 1994). Informational asymmetries between central management and divisional managers will also lead to higher costs of operating in multiple segments, as shown by Harris, Kriebel, and Raviv (1982). Finally, although diversification translates into lower financial risk, it may increase business risk given the different nature and characteristics of business to be managed. In short, all these arguments suggest that the marginal cost of diversification increases rapidly as diversification rises and, consequently, that diversification is negatively associated with performance.

This controversy in the literature about diversification being a value-creating strategy or, on the contrary, a value-destroying strategy, leads us to pose the two following alternative hypotheses about the effect of diversification on firm value:

Hypothesis 1a: Consistent with the market power theory and internal market efficiency arguments, there is a positive relationship between diversification and firm value.

Hypothesis 1b: Consistent with the inefficient investment arguments there is a negative relationship between diversification and firm value.

To test this hypothesis, we propose the following basic model:

$$VALUE_{it} = \alpha_0 + \alpha_1 DIVER_{it} + \alpha_2 INV_{it} + \alpha_3 DEBT_{it} + \alpha_4 DIV_{it} + \alpha_5 INTANG_{it} \quad (1)$$
$$+ \alpha_6 CF_{it} + \alpha_7 SIZE_{it} + \varepsilon_{it}$$

where $VALUE_{it}$, $DIVER_{it}$, INV_{it}, $DEBT_{it}$, DIV_{it}, $INTANG_{it}$, CF_{it} and $SIZE_{it}$ denote value, diversification, investment, debt, dividends, intangible assets, cash flow and size, respectively[1]. The value variable ($VALUE_{it}$) is measured as the difference between the market of equity in t and the book value of equity in t-1, scaled by the replacement value of total assets. We propose two alternative measures of diversification ($DIVER_{it}$) that have been traditionally used in closely related research. The first one is a measure of Total Entropy[2], calculated as $TE = \sum_{i=1}^{N} S_i \ln(1/S_i)$. The second one

[1] The subscript *i* refers to the company and *t* refers to the time period. ε_{it} is the random disturbance.
[2] S_i is the share of a firm's total sales in 4- digit SIC industry i and N is the number of 4-digit SIC industries in which the firm operates. Total Entropy equals zero for a single business firm and it rises with the extent of diversity (see Jacquemin and Berry, 1979, and Palepu, 1985 for more details).

is a modified version of the Revenue-based Herfindahl index[3], calculated as $RH = 1 - \frac{\sum_{i=1}^{N}(Si)^2}{\left(\sum_{i=1}^{N} Si\right)^2}$. The debt ratio ($DEBT_{it}$) is defined as the market value of long term debt to the market value of equity plus the market value of long term debt plus the book value of short term debt. Dividends (DIV_{it}) are computed as the total amount of dividends paid based on the current year's net income scaled by the replacement value of total assets. The intangible assets variable ($INTANG_{it}$) is computed as the firm's intangible assets scaled by the replacement value of total assets. The cash flow variable (CF_{it}) is measured as earnings before interests and taxes plus the book depreciation expense plus provisions, scaled by the replacement value of total assets. Size (SI_{it}) is measured as the logarithm of the replacement value of total assets. The investment variable (INV_{it}) and the replacement value of total assets are calculated as in Miguel and Pindado (2001).

This basic model controls for other firm characteristics besides diversification that have been traditionally considered as determinants of firm value in the literature.

First, the effect of financial decisions on corporate market valuation has long been matter of interest in financial research. Regarding investment, the value-maximization hypothesis predicts that managers invest up the point where the marginal rate of return on investment funds just equals the market required rate of return. Therefore, unexpected increases in capital expenditures should be accompanied by increases in the market value of the firm, and vice versa (Mcconell and Muscarella, 1985). However, the size-maximization hypothesis leads us to expect the contrary, since if managers are prone to overinvest, then unexpected increment in the capital expenditures should have a negative impact on market valuation and vice versa (Mcconell and Muscarella, 1985). The evidence in Del Brio, Miguel and Pindado (2003) indicates that investment positively or negatively affects market valuation depending on the firm's free cash flow and investment opportunity set. Morgado and Pindado (2003) find that there is a quadratic relationship between value and investment: positive for investment levels lower than the optimum and negative for investment levels higher than the optimum. Given that investment is a control variable in our value-diversification model, a linear relationship is specified and we expect a positive effect of investment on value relying on the general value-maximization rule.

[3] The Revenue-based Herfindahl index, RH, is calculated across n business segments as the sum of the squares of each segment i's sales, S_i, as a proportion of total sales. Thus, the closer RH is to zero, the more the firm's sales are concentrated within a few of its segments (see Berger and Ofek, 1995 for more details).

With respect to debt, capital structure theories offer different arguments that have been widely used to justify the relevance of this financial decision for firm value. Despite the well-known costs of debt financing, such as agency costs of debt (Jensen and Meckling, 1976; Myers, 1977) and financial insolvency costs (Pindado and Rodrigues, 2005), there are many others benefits of this source external funds. Without the intention of being exhaustive, it is worth mentioning the tax advantages of debt (Modigliani and Miller, 1963), the use of debt as an anti-takeover device (Jensen and Meckling, 1976), the advantages of debt in restricting managerial discretion (Jensen, 1986), the effect of debt on investors' information about the firm and on their ability to oversee management (Harris and Raviv, 1991) and the choice of debt level as a signal of firm quality (Leland and Pyle, 1977; Ross, 1977). These all lead us to expect a positive effect of debt on firm value.

The influence of the third financial decision on a firm's market valuation has also received attention in the literature. It is well known that firms can allocate cash to stockholders in at least two ways: directly by paying a dividend or indirectly by repurchasing stock (Brealey and Myers, 2003). There is some controversy about which one translates into higher valuation. For instance, some authors argue that paying dividends may be seen as a signal that a firm has limited growth options in its current business (Grullon, Michaley, and Swaminathan, 2002). However, the most generally accepted argument is that dividends signal that a firm is exploiting its current market opportunities successfully (Miller and Rock, 1985). Additionally, dividend payments give shareholders an opportunity to invest their capital according to their own preferences instead of being forced to agree with the managers' preferences (Shefrin and Statman, 1984). A different perspective is provided by Jensen (1986), who points to dividend payments as an alternative to debt as a way of eliminating a firm's free cash flow and, consequently, as a potential deterrent to managers' consumption of perquisites. Similarly, Rozeff (1982) and Easterbrook (1984) emphasize the role of dividends in alleviating the agency problem between shareholders and managers too, but highlighting that dividend payments increase the probability of the firm needing to issue new securities and, as a consequence, dividend increase the scrutiny of the firm by its potential investors[4]. Finally, the existence of clientele effects also supports the presence and preference for dividends (Allen and Michaely, 2002). In short, all these arguments suggest that dividends positively influence value.

[4] Note that in both cases dividend payments provide a weaker mechanism than debt payments for limiting the cash available to managers because dividend payments are not subject to the same legal obligation as debt service (Byrd and Pritsch. 1998).

A firm's intangible assets are also among the traditional determinants of value because of its important role in the firm's strategy, management and organization. There seems to be no disagreement about the key contribution of intangible assets to value creation. This idea is based on arguments that stems, for instance, from competence-based literature (Hamel and Prahalad, 1994; Hamel and Heene, 1994; Sanchez Heene and Thomas, 1996) the resource-based competition literature (Mahoney and Pandian, 1992; Wernefelt, 1984; Montgomery, 1995), and the evolutionary theory (Nelson and Winter, 1982; Dosi and Teece, 1993; Winter, 1995). Additionally, it is unquestionable that the intangible assets variable proxies for future growth opportunities (Miguel, Pindado and de la Torre, 2004). Consequently, we clearly expect a positive effect of intangible assets on firm value.

According to Rappaport (1986), profitability can be considered as a very important value driver. An improvement of profitability can derive from achieving relevant economies of scale, searching for cost-reducing linkages with suppliers and channels, eliminating overheads that do not add value to the product and eliminating costs that do not contribute to buyer needs. Servaes (1996) also finds that profitability affects positively firm value, and he does not find any systematic difference in this result between single-segment and multi-segment firms. We measure a firm's profitability by means of its cash flow, expecting a positive relationship with value, such as in Del Brio, Miguel and Pindado (2003).

Finally, as usual in value models, size has also been included as control variable expecting a positive effect on corporate valuation.

2.1.1. The Inverted U Model of Diversification

Based upon the existence of both costs and benefits of diversification, the notion of an optimal level of diversification emerges. In fact, the transaction cost theory suggests that a firm's optimal level of diversification stems from balancing the economic gains from diversification against the bureaucratic costs of a multi-business firm (Jones and Hill, 1988).

Consistent with the existence of an optimal level of diversification, Markides (1992) argues that as a firm increases in diversity, it moves further and further away from its core business, and the benefits of diversification at the margin decline. As a result, Markides (1992) infers that beyond a certain point the marginal benefits from diversification are best explained as a decreasing function. According to this deduction, Grant, Jammine and Thomas (1988) show that profitability increases with product diversity until certain point, and that it begins to decrease beyond such point. Also in the same line, the "Intermediate Model" proposed by Palich, Cardinal and Miller (2000) suggests that diversification has positive revenues, but the returns fall beyond some point where the optimal is reached. As the markets turn out to be more distant to the firm's core competences, the firm bit by bit losses its ability to leverage and, consequently, its competitive advantage and increases in profitability begin to reduce.

According to these arguments about the existence of an optimal level of diversification, our second hypothesis predicts an inverted U model to describe the relationship between diversification and firm value:

Hypothesis 2: Firm value first increases and, after a certain breakpoint, then decreases as the level of diversification rises.

To test this hypothesis about the quadratic relationship between the diversification level and firm value, we extend the basic model in (1) by adding the square of the diversification measure:

$$VALUE_{it} = \alpha_0 + \alpha_1 DIVER_{it} + \alpha_2 DIVER^2_{it} + \alpha_3 INV_{it} + \alpha_4 DEBT_{it} + \quad (2)$$

$$\alpha_5 DIV_{it} + \alpha_6 INTANG_{it} + \alpha_7 CF_{it} + \alpha_8 SIZE_{it} + \varepsilon_{it}$$

2.1.2. The Effect of Relatedness on Firm Value

The resource-based theory offers widely accepted arguments about diversification being the result of a firm's excess capacity in valuable resources and capabilities that are transferable across industries but subject to markets imperfections. Thus, within this context, economies of scope arise, and a firm's diversification strategy becomes the most efficient form of organizing economy activity (Penrose, 1959; Panzar and Willing, 1981). In contrast, diversification can become suboptimal if the resources used by the firm are of little use into unrelated industries where the firm diversified (Rumelt, 1974).

In fact, Panzar and Willing (1981) suggest that when the costs of producing separate outputs exceed the costs of join production, firms can achieve economies of scope. These synergies can potentially result when a firm shares input factors of production across multiple products or lines of business, giving rise to the hypothesis that product and resource-related diversification generates greater economic value than single-business focus and unrelated diversified strategies (Bettis, 1981; Rumelt, 1974, 1982).

The evidence from a substantial body of empirical research does not conclusively find the related strategy superior to the unrelated one, and it remains an unexplained enigma. On one hand, there are numerous studies that find support for the superiority of related over unrelated diversification (Bettis, 1981; Markides and Williamson, 1994; Rumelt, 1974, 1982). On the other hand, there are many studies finding no significant relationship between diversification strategy and performance after controlling for relatedness (Christensen and Montgomery, 1981; Grant, Jammine, and Thomas, 1988; Hill, 1983; Hill, Hitt, and Hoskisson, 1992; Montgomery, 1985).

On the one hand, unrelated strategies may present some exclusive advantages of their own mainly derived from financial synergies. In this line, the portfolio theory proposes that industry specific risk can be reduced only via extra industry diversification (Kim, Hwang, and Burgers, 1989). It is worth highlighting that the lower risk that results from portfolio effects and reduced probabilities of bankruptcy (coinsurance) can also lead to increased debt capacity (Seth, 1990). Given that interest expenses are tax deductible, these firms may enjoy it even in the absence of operational synergies (Amit and Livnat, 1988). On the other hand, there are many ways in which unrelatedness might reduce value. It could be that managers have limited expertise and cannot effectively manage diverse businesses, or that unrelated segments have conflicting operational styles or corporate cultures. These explanations predict that diversity is negatively correlated with value.

Relatedness might mitigate the value loss from diversification. The related diversifiers are involved in multiple industries with businesses that allow them to approach common corporate resources (Lubatkin and O´Neill, 1987; Nayyar, 1992), which yields advantages to the firm, such as scope economies (Seth, 1990). For instance, Markides and Williamson (1994) analyze the labours across units and obtain evidence of enough efficiency as asset amortization in that the firm is able to use an asset already capitalized in other activities or multiple operations with the same cost. Relatedness can also benefit the firm through learning curve efficiencies, intra-firm product/process technology diffusion, and restricted access to factors of production that are necessary for operations steaming for a specific industry (Barney, 1997). Additionally, relatedness reduces business risk in that businesses in the portfolio are of similar nature and share common characteristics, which make them easier to be managed.

According to this line of reasoning, our third hypothesis predicts the superiority of relatedness:

Hypothesis 3: Related diversification affects value more positively (or less negatively) than unrelated diversification.

To test Hypothesis 3 and capture the effect of relatedness on firm value, we extend the model in (2) by interacting diversification measures with a dummy variable that allows us to control for related and unrelated diversification. The resultant model would be as follows:

$$VALUE_{it} = \alpha_0 + (\alpha_1 + \theta_1 \text{dummy}_{it}) DIVER_{it+} + (\alpha_2 + \theta_2 \text{dummy}_{it}) DIVER^2_{it} \qquad (3)$$

$$+ \alpha_3 INV_{it} + \alpha_4 DEBT_{it} + \alpha_5 DIV_{it} + \alpha_6 INTANG_{it} + \alpha_7 CF_{it} + \alpha_8 SIZE_{it} + \varepsilon_{i\,t}$$

where dummy_{it} is a dummy variable that takes the value of 1 for unrelated diversification, and 0 for related diversification. This way, the coefficient of the diversification variable ($DIVER_{it}$) is α_1 under relatedness, since dummy_{it} takes value zero, and it is ($\alpha_1 + \theta_1$) under unrelatedness, since dummy_{it} takes value one. Similarly. the coefficient of the square of the diversification variable ($DIVER^2_{it}$) is α_2 under relatedness, and it is ($\alpha_2 + \theta_2$) under unrelatedness. In these cases, whenever the dummy variable takes value one, the statistical significance of the coefficient must be checked by performing a linear restriction test.

2.2. Corporate Diversification and the Value Discount

Recent research indicates that multi-segment firms trade at a discount relative to a portfolio of single-segment firms (Berger and Ofek, 1995; Lamont, 1997; Shin and Stulz, 1998; Scharfstein, 1998; Rajan, Servaes and Zingales, 2000). This argument has led many scholars to assume that diversification destroys value (Lang and Stulz, 1994; Berger and Ofek, 1995; Lamont and Polk, 2001). For instance, the agency theory argues that managers can pursue their own interests at expense of shareholders by means of the diversification strategy (Jensen, 1986). In this way, diversification permits managers to reduce their personal risk (Amihud and Lev, 1981), as well as increase their compensation, power and prestige (Jensen and Murphy, 1980).

Based on this line of reasoning, Berger and Ofek (1995) and Shin and Stulz (1998) provide empirical evidence supporting that multi-segment firms invest inefficiently and, consequently, trade at a discount in relation to similar constructed portfolios of single-segment firms. Particularly, Berger and Ofek (1995) explain the value destruction by means of over-investment and cross-subsidization of multi-segment firms. Shin and Stulz

(1998) find that divisional resources do not appear to be directed to segments with the most favourable investment opportunities. From another perspective, Ferris and Sarin (1997) argue that investors prefer focused firms since it is more convenient for them to achieve the desired level of risk diversification with pure-play firms. Consequently, diversified firms would trade at a discount because of lower transparency and lower liquidity. These studies provide empirical evidence on the value destroying effect of corporate diversification and, consequently, on the existence of a diversification discount.

However, as discussed in Section 2.1, diversification may also be a value-creating strategy. For instance, the coinsurance effect gives multi-segment firms greater debt capacity than single-line business of similar size (Lewellen, 1971). One way in which increased debt capacity creates value is by increasing interest tax shields, thus multi-segment firms are predicted to have higher leverage and lower tax payments than their business would show if operated separately. Jensen's (1986) assertion that managers of firms with unused borrowing power and large free cash flows are more likely to undertake value-decreasing investments has a similar implication. This kind of reasoning has recently brought into question the existence of the diversification as a value destroying strategy. For instance, Campa and Kedia (2002) and Villalonga (2004) show that, controlling for a firm propensity to diversify, a small diversification premium exists. Theoretically, Maksimovic and Phillips (2002) and Gomes and Livdan (2004) show that, under some circumstances, diversification can be a value creating strategy even if, overall, multi-segment firms have a lower value than multi-segment firms.

Taking all this into account, we propose an additional analysis of the effect of diversification on market valuation, by focusing on the premium or discount that diversified firms trade at. Consequently, we pose the two following alternative hypotheses:

Hypothesis 4a: Consistent with the diversification premium, diversified firms are more valuable than non-diversified firms.

Hypothesis 4b: Consistent with the diversification discount, diversified firms are less valuable than non-diversified firms.

To test this hypothesis, we propose the following model:

$$EV_{it} = \beta_0 + \beta_1 DIVER_{it} + \beta_2 INV_{it} + \beta_3 DEBT_{it} + \beta_4 DIV_{it} + \beta_5 INTANG_{it} \quad (4)$$

$$+ \beta_6 CF_{it} + \beta_7 SIZE_{it} + \varepsilon_{it}$$

where EV_{it} denotes excess value, which is intended to capture the comparison between the market value of diversified firm *i* and the market value of a portfolio of focused firms operating in a similar industry. We follow Berger and Ofek (1995) and we measure excess value as the logarithm of the market to imputed value ratio, where imputed value is calculated as follows[5]:

$$IV = \sum_{i=1}^{n} AI_i \times \left[IND_i \left(V/AI \right)_{med} \right]$$

Where AI is the accounting item of interest (sales) for segment *i,* V is the actual firm value, and $IND(V/A)_{med}$ is the multiple of firm value to the accounting item of interest (sales) for the median single segment firm in the segment *i's* industry, and n is the total number of segments for the firm.

According to the construction of this variable, a positive coefficient of the diversification variable would support Hypothesis 4.a, and would be thus consistent with the predictions of Hypothesis 1.a. Similarly, Hypothesis 4.b would hold under a negative coefficient of the diversification variable, which would at the same time support the predictions of Hypothesis 1.b.

Besides diversification, we have selected the same set of control variables than in the basic model in (1). Let us know briefly explain the expected relationships between these variables and excess value.

The investment level is supposed to be higher for the segments of diversified companies, because diversification can create internal capital markets, which may increase investment efficiency (Stein, 1997). This argument would be supported by a positive effect of investment on the excess value of diversified firms. On the contrary, agency costs may be a source a potential investment distortions in diversified firms. Top management in a diversified firm enjoys greater opportunities to undertake projects, and also more resources to do so if diversification relaxes constrains imposed by imperfect external capital markets so that overinvestment may arise (Stulz, 1990; and Matsusaka and Nanda, 1997). This argument would hold if a negative effect of investment on excess value is found.

Prior research suggests that firm diversification may be financed through increased leverage (Kochhar and Hitt, 1998). Thus, we include this in the excess value model because one of the benefits that multi-segment firms enjoy is the greater debt capacity as a result of the coinsurance effect. Weston (1970) and Chandler (1977) suggest that multi-segment firms have the ability to leverage economies of scale because they provide more

[5] See Berger and Ofek (1995) for more details in the construction of this variable.

efficient operations and more profitable lines of business than single-segment firms. These arguments and prior empirical results lead us to expect a positive effect of leverage on the excess value of diversified firms.

Regarding dividends, agency-based arguments suggest that if a firm is less likely to pay out earnings in the form of dividends, it might use the cash to make diversify (Jensen, 1986). Accordingly, lower dividends would translate into higher levels of diversification which, in turn, would affect excess value positively or negatively depending on whether there is a premium or a discount (Hypothesis 4.a and 4.b, respectively).

Previous studies reveal a positive relationship between R&D and advertising on various measures of firm value. This argument is consistent with the notion that the market positively assesses a firm's intangible assets (Chan, Lakonishok, and Sougiannis, 2001; Lev and Sougiannis, 1996). Therefore, a positive effect of the variable of intangible assets on excess value is expected.

Our expectations on the cash flow variable rely on the same arguments than the ones used for the basic value model in (1). In fact, Servaes (1996) uses a firm's profitability as a factor to explain the value-destruction in multi-segment firms. He argues that firms with low profitability are likely to trade at a discount as compared to firms with higher levels of profitability. This leads us to expect a positive effect of cash flow on a firm's excess value.

Finally, a positive coefficient for size would support well-know arguments pointing to size as a value-creating factor via, for instance, scale economies and market power.

2.2.1. The Effect of Relatedness on the Value Discount

As already discussed in previous sections, many arguments in the literature suggest that focused firms are more valuable in the market than non-focused ones. In fact, it seems that diversity has an independent effect in reducing value, as Rajan, Servaes and Zingales (2000) find. Also Berger and Ofek (1995) argue that industry diversification, on average, reduces value.

However, Comment and Jarrell (1995) provide evidence documenting the gains achieved by the refocusing firms. That is, relatedness may contribute to mitigate the value loss from diversification, as extensive empirical evidence indicates (see, for instance, Lubatkin and O´Neill, 1987; Seth, 1990; Nayyar, 1992; Markides and Williamson, 1994; Barney, 1997).

This arguments and previous findings lead us to question the role played by relatedness in the premium or discount multi-segment firms trade at. In effect, if diversification is a value-creating strategy and, consequently, diversified firms trade at a premium, the choice of relatedness would translate into a higher market valuation; i.e., into a higher excess value Note that this kind of result would be consistent with Hypothesis 4.a. In contrast, consistent with Hypothesis 4.b, diversification will destroy value and diversified firms will trade at a discount. Within this context, relatedness would mitigate this value destruction and the diversification discount would be lower.

Relying on this expectations, we pose our last hypothesis about the moderating role of relatedness on the relationship between diversification and excess value:

Hypothesis 5: Related diversification affects excess value more positively (or less negatively) than unrelated diversification.

To test Hypothesis 5 and capture the effect of relatedness on excess value, we extend the model in (4) by interacting diversification measures with a dummy variable, already defined in Section 2.1.2, that allows us to control for related and unrelated diversification. The resultant model would be as follows:

$$EV_{it} = \beta_0 + (\beta_1 + \theta_1 \text{ dummy}_{it}) DIVER_{it} + \beta_2 INV_{it} + \beta_3 DEBT_{it} + \beta_4 DIV_{it} + \quad (5)$$

$$\beta_5 INTANG_{it} + \beta_6 CF_{it} + \beta_7 SIZE_{it} + \varepsilon_{it}$$

Note that the coefficient of the diversification variable ($DIVER_{it}$) is β_1 under relatedness, since $dummy_{it}$ takes value zero, and it is ($\beta_1 + \theta_1$) under unrelatedness, since $dummy_{it}$ takes value one. In this case, when the dummy variable takes value one, a linear restriction test will be performed to check the statistical significance of the coefficient.

3. Data and Variables

3.1 Data

To test the hypotheses posed in the previous section, we use data from several eurozone countries. We have thus used an international database, Worldscope, as our source of information. Additionally, some additional data such as the growth of capital goods prices, the rate of interest of short term debt, and the rate of interest of long term debt, have been extracted from the Main Economic Indicators published by the Organization for Economic Cooperation and Development (OECD).

For each country we constructed an unbalanced panel of non-financial companies[6] whose information was available for a least six consecutive years from 1990 to 2003. This strong requirement is a necessary condition since we lost one-year data in the construction of some variables (the investment variable, for instance), we lost another year-data because of the estimation of the model in first differences, and four consecutive year information is required in order to test for second-order serial correlation, as Arellano and Bond (1991) point out. We need to test for the second-order serial correlation because our estimation method, the Generalized Method of Moments (GMM) is based on this assumption.

Two of the twelve eurozone countries[7] have been excluded from our analysis for different reasons. As occurs in La Porta, Lopez-de-Silanes, Sheifer, and Vishny (2000), Luxembourg has been removed from our sample because there are just a few firms listed in Luxembourg's stock exchange, and The Netherlands because we have no data enough to the construction of some variables in this country. The structure of the samples by number of companies and number of observations per country is provided in Table 1. As shown in Table 2, the resultant unbalanced panel comprises 845 companies and 6700 observations. Using an unbalanced panel for a long period (13 years) is the best way to solve the survival bias caused because some firms could be delisted and, consequently, be dropped from database. Finally, Table 3 provides summary statistics (mean, standard deviation, minimum and maximum) of the variables used in the study.

3.2 Estimation method

Our models have been estimated by using the panel data methodology. Two issues have been considered to make this choice. First, unlike cross-sectional analysis, panel data allow us to control for individual heterogeneity. This point is crucial in our study because the dividend decision is very closely related to the specificity of each company.

[6] We restrict our analysis to non-financial companies because financial companies have their own specificity.

[7] The eurozone currently comprises twelve countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, and Spain.

Therefore, to eliminate the risk of obtaining biased results, we have controlled for such heterogeneity by modelling it as an individual effect, η_i, which is then eliminated by taking first differences of the variables. Consequently, the error term in our models, ε_{it}, has been splitted into four components. First, the above mentioned individual or firm-specific effect, η_i. Second, d_t measures the time-specific effect by the corresponding time dummy variables, so that we can control for the effects of macroeconomic variables on the diversification decision. Third, since our models are estimated using data of several countries, we have also included country dummy variables (c_i). Finally, v_{it} is the random disturbance.

The second issue we can deal with by using the panel data methodology is the endogeneity problem. Particularly, the literature concerning the diversification discount examines whether such a discount is the result of endogenous choices of the firm. Lang and Stulz (1994), for example, find that diversified firms trade at a discount even before diversifying. Focusing on firms that diversify through acquisitions, Graham, Lemmon, and Wolf (2002) find that the diversification discount can be explained by the lower values of the firms that are acquired. Campa and Kedia (1999) suggest that the discount is considerably reduced with proper controls for the endogeneity of the diversification decision.

As a consequence, endogeneity may be a problem in our models that have to be controlled for. That is why our models have been estimated by using instruments. To be exact, we have used all the right-hand-side variables in the models lagged from t-2 to t-6 as instruments.

Finally, we have checked for the potential misspecification of the models. First, we use the Hansen J statistic of over-identifying restrictions in order to test the absence of correlation between the instruments and the error term. Tables 4 and 5 shows that the instruments used are valid. Second, we use the m_2 statistic, developed by Arellano and Bond (1991), in order to test for lack of second-order serial correlation in the first-difference residual. Tables 4 and 5 show that there is no a problem of second-order serial correlation in our models (see m_2). Note that although there is first-order serial correlation (see m_1), this is caused by the first-difference transformation of the model and, consequently, it does not represent a specification problem of the models. Third, our results in Tables 4 and 5 provide good results for the following three Wald tests: z_1 is a test of the joint significance of the reported coefficients; z_2 is a test of the joint significance of the time dummies; and z_3 is a test of the joint significance of the country dummies.

5. Results

In this section we first present the results of our basic model, which includes besides diversification a set of control variables that have been traditionally considered as determinants of a firm's value. We then comment on the evidence obtained from the estimation of the value model extended by incorporating the square of the diversification variable. This extended model allows us to test the existence of potential non-linerities in the relationship between diversification and firm value. Third, we test the implications of relatedness for the effect of diversification on firm value. Finally, we present the results of an additional analysis of the effect of diversification on market valuation by focusing on the premium or discount that diversified firms trade at. With this purpose, two models are estimated. The first one is a model of excess value over diversification and the same set of control variables considered in our basic value model. The second one is an extended model of excess value that accounts for the moderating role of relatedness.

5.1 Results of the value model

The results of the GMM estimation of our basic value model in (1) are provided in Columns I and II of Table 4 for the total entropy measure (TE) and the Revenue-based Herfindahl index (RH), respectively. The estimated coefficient of diversification is negative using both measures, which supports Hypothesis 1.b about the negative effect of a firm's level of diversification on market valuation. That is, a firm's diversification strategy destroys value, which is consistent with arguments pointing out that diversification: i) creates inefficient internal capital markets during the course of overinvestment in low performing-business (Stulz, 1990); ii) generates influence costs (Rajan, Servaes, and Zingales, 2000); iii) encourages managers to invest free cash flows to support organizational inefficiencies (Jensen, 1986); iv) generates control and effort losses, coordination costs and other diseconomies related to organization, and discrepancy for ideas between businesses (Markides, 1992), among others.

Let us now comment on the results obtained for the control variables, which remain identical when using the two alternative measures of diversification. As expected, and consistent with the value-maximization hypothesis, a firm's investment creates value. This result is in the line of Del Brio, Miguel y Pindado (2003), who find value increments when investment rises. Contrary to what was expected, the coefficient of debt is negative, suggesting that the costs of debt financing (mainly agency and financial distress costs) more than offset its potential benefits (particularly aligning the interests of owners and managers and signalling the market).

Additionally, this result would be consistent with Myers (1977), who predicts the value-reducing effect of debt financing for firms with investment opportunities. Servaes (1996) also finds a negative effect of leverage on firm value. Consistent with the disciplinary (Rozeff, 1982; Easterbrook; 1984; Jensen, 1986) and signalling (Miller and Rock, 1985; Fama and French, 1998) roles of dividends, the coefficient of this variable is positive. The fact that dividends represent a source of value creation for shareholders supports recent empirical evidence, such as the one provided by Morgado and Pindado (2003) and Allen and Michaely (2002). The positive coefficient of intangible assets support that these assets contributes to value creation (Mahoney and Pandian, 1992; Wernerfelt, 1984; and Montgomery, 1995), and corroborates previous evidence such as the one in Markides (1992) and Williamson (1996). As expected, the effect of cash flow on value is positive, which supports that the profitability effects is consistent with the results of Servaes (1996) and Del Brio, Miguel and Pindado (2003). Contrary to what was expected, size negatively affects value. However this result is not so striking if we take into account that the negative relation found may be explained by the construction of the value and size variables.

Despite finding evidence on diversification being a value-destroying strategy, there are previous evidence that casts doubts on the existence of a linear relationship between diversification and value. As we discussed in Section 2.1.1, according to Markides (1992) and the Intermediate Model proposed by Palich, Cardinal and Miller (2000), a quadratic specification better describes the functional form of this relation. The results of the estimation of the quadratic model in (2) are presented in Columns III and IV of Table 4 for TE and RH measures of diversification, respectively. The coefficient of the diversification variable is positive and the coefficient of its square is negative when using both alternatives. Moreover, both coefficients are statistically significant, which indicates that the relationship between diversification and firm value is quadratic rather than linear. Like in Rumelt (1982), who find a pattern of declining profitability with the increment of diversity, we find a nonlinear relationship between diversification and firm value. This result corroborates previous evidence provide by, for instance, Grant, Jammine and Thomas (1988), Markides (1992), and Williamson (1996).

The finding of a quadratic functional form for the relationship between diversification and value implies that there is a breakpoint which can be optimally derived by differentiating value in (2) with respect to diversification. Letting this partial derivative equal zero, this breakpoint is $DIV^* = -(\alpha_1/2\alpha_2)$. Since α_1 and α_2 present opposite signs, then DIV* is a maximum; that is, an optimal level of diversification. This finding strongly supports Hypothesis 2. Specifically, we find that the optimal level of diversification is 0.7354 in the model with the Total Entropy measure, which implies that, other things equal, increases in firm's diversification level creates value until this optimum is reached, and then diversification turns into value-destroying strategy. The optimal level of diversification found in the model with the Revenue-based Herfindahl index is 0.3975. This result supports the same trend in the relationship. Note that the difference between these two optimal levels of diversification stems from the differences between the two measures of diversification used: Total Entropy and the Revenue-based Herfindahl index. The important point is that in both cases the tendency of value, first increasing and beyond a certain point decreasing with diversification, is supported. In short, our results are consistent with the existence of an optimal level of diversification and, consequently, with the inverted U model that stems from the Intermediate proposed by Model by Palich, Cardinal, and Miller (2000). Our evidence is also in accordance with diversification having both value-enhancing and value-reducing effects (Berger and Ofek, 1995).

As can be seen in Columns III and IV of Table 4, the estimated coefficients of the control variables remain identical in sign as in the basic model, thus corroborating the above commented relations.

Finally, we propose a third extension of the value model that is intended to control for the moderating role of relatedness in the relationship between diversification and firm value. With this purpose, we estimated the model in (3) in which diversification variables are interacted with a dummy variable that allows us to control for related and unrelated diversification. The estimated results of this extended model are presented in Columns V and VI of Table for TE and RH measures of diversification, respectively. Let us comment on the results obtain for the TE measure first. As shown in Column V, the coefficient of related diversification is positive (α_1= 0.2209) and its square is negative (α_2= –0.1736). These results corroborate our previous finding about the existence of a quadratic relationship between diversification and value, and support that an optimal level of diversification exist. The optimally derived breakpoint is 0.6362, suggesting that related diversification creates value until reaching this level, being value-destroying beyond.

We find the same pattern regarding non-related diversification, which totally confirms the non-linearity of the relationship between diversity and value. Additionally, two interesting results are found. First, the coefficient of non-related diversification is positive ($\alpha_1 + \theta_1$ = 0.1168, which is statistically significant, see t_1 in Table 4) but smaller than the one obtained for related diversification. This result suggests that related diversification is more value-creating than non-related diversification supporting Hypothesis 3. This evidence is consistent with previous research pointing to the potential benefits of the relatedness (Reed and Luffman, 1986; Nayyar, 1992). Second, the breakpoint derived for the relationship between non-related diversification and value is 0.5503, which compared to the one obtained for related diversification (0.6362) suggests that non-related diversification turns a value-destroying strategy at lower levels that related diversification.

As can be seen in Column VI of Table 4, the results obtained for the model with the RH measure of diversification totally confirm the above commented findings.

All the other variables in the model show significant coefficients and of the same sign as the obtained in previous estimations.

5.2. Results of the excess value model

In this section we present the results of an additional test of the effect of diversification of market valuation by focusing on the premium or discount that diversified firms trade at.

Columns I and II of Table 5 report the results of the basic excess value model in (4) including the two measures of diversification, ET and RH, respectively. The coefficient for the diversification variable is negative in both cases. This result supports Hypothesis 4.b and is totally consistent with the results obtained for the basic value model, which supported Hypothesis 1.b. That is, consistent with Lang and Stulz (1994), Berger and Ofek (1995), Ferris and Sarin (1997), Shin and Stulz (1998) and Lamont and Polk (2001), multi-segment firms are less valuable than single-segment firms, which leads diversified firms to trade at a discount.

Regarding the control variables, the positive coefficient of investment indicates that internal capital markets may increase investment efficiency in segments of diversified companies (Stein, 1997). The negative coefficient of the debt variable is not consistent with the coinsurance effect (Weston, 1970; Chandler, 1977) that suggests that diversified firms benefit from greater advantages associated with debt financing and this translates into a higher excess value. However, in accordance to the results obtained for the value model, this result confirms that the costs of debt financing (mainly agency and financial distress costs) more than offset its potential benefits. As expected, the effect of dividends on excess value is positive, which is totally consistent with the previous finding supporting Hypothesis 4.b. That is, higher dividends translate into lower levels of diversification, which in turn translates into a higher excess value (because of the negative relationship found between diversification and excess value). Also as expected, a firm's intangibles assets and cash flow positively affects excess value, pointing to the positive assessment of the market on both characteristics. Finally size shows a positive coefficient, which supports that size translates into higher excess value of diversified firms via economies of scale and market power.

As we did with the value model, we go a step forward and account for the moderating effect of relatedness in the relationship between diversification and excess value. To achieve this aim, we interact in model (5) the diversification variable with a dummy variable that controls for related and unrelated diversification. Consistent with the results supporting Hypothesis 4.b and the existence of a diversification discount, we expect relatedness to diminish such a discount. The results of this extended model of excess value are provided in Columns III and IV of Table 5 for TE and RH measures, respectively. As shown in Column III, the negative coefficient of diversification, as measured by the total entropy, is smaller in the case of relatedness ($\beta_2 = -0.6770$) than in the case of unrelatedness ($\beta_2+\theta_1 =$ -0.7422). Therefore, despite trading at a discount, diversified firms may reduce such a discount via relatedness. The results in Column IV corroborate this finding for the model using the Revenue-based Herfindahl index. That is, our evidence supports Hypothesis 5 and is consistent with Berger and Ofek (1995) in that it indicates that relatedness moderate the value loss from diversification. In other words, the value destruction associated with multiple segment firms may be counterbalanced with gains that can be achieved by refocusing firms (Comment and Jarrell, 1995; John and Ofek, 1995).

6. Conclusions

This paper provides a test for the value-destroying strategy on multi-segment firms hypothesis by proposing a set of models to capture the effect of the diversification on the firm value. To achieve this aim, first a traditional diversification model is extended to incorporate a measure of the square of the diversification to test the curvilinear relation with the firm value. Second we incorporate the relatedness into the model to check the effect of the type of diversification on firm value. Third we calculate a new model for the valuation effect attributable to diversification with the excess value measure with a set of control variables common in the literature.

Our results show the impact of the diversification strategy on firm value in eurozone countries after controlling for traditional determinants of value such as investment, debt, dividends, cash flow, intangible assets and size. These findings seem to indicate that the diversification strategy are accomplish by a reduction on firm value. However, we find strong evidence in a curvilinear model in the relation between diversification and value, as a result our findings show that there is an optimal level of diversification, that is a firm value first increases and, after a certain breakpoint, the decreases the level of diversification rises. Additionally, our evidence provides empirical support to the idea that related diversification is more value-creating than non-related diversification, consistent with the potential benefits of the relatedness, suggesting that non-related diversification turns a value-destroying strategy at lower levels that related diversification.

Furthermore, our study contributes to understanding the implications of the diversification discount by focusing on the premium or discount that diversified firms trade at. We support the hypothesis that diversified firms are less valuable than non-diversified firms, which leads diversified firms to trade at a discount. Finally the relatedness moderate the value discount of the multi-segment firms, when accounting for the moderating effect of relatedness in the relationship between diversification and excess value.

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Table 1

Structure of the samples by countries

Country	Number of companies	Percentage of companies	Number of observations	Percentage of observations
France	250	29.59	1,999	29.84
Germany	219	25.92	1,659	24.76
Greece	70	8.28	546	8.15
Italy	64	7.57	489	7.30
Spain	57	6.75	503	7.51
Belgium	49	5.80	415	6.19
Portugal	37	4.38	302	4.51
Austria	33	3.91	269	4.01
Finland	33	3.91	263	3.92
Ireland	33	3.91	255	3.81
Total	845	100.00	6,700	100.00

Data of companies for which the information is available for at least five consecutive years between 1990 and 2003 were extracted. After removing the first-year data, only used to construct several variables, the resultant samples comprise 250 companies (1,999 observations) for France, 219 companies (1,656 observations) for Germany, 70 companies (546 observations) for the Greece, 64 companies (489 observations) for Italy, 57 companies (503 observations) for Spain, 49 companies (415 observations) for Belgium, 37 companies (301 observations) for Portugal, 33 companies (269 observations) for Austria, 33 companies (263 observations) for Finland, and 33 companies (255 observations) for Ireland.

Table 2

Structure of the panel

No. of annual observations per company	Number of companies	Percentage of companies	Number of observations	Percentage of observations
13	73	8.64	949	14.16
12	34	4.02	408	6.09
11	46	5.44	506	7.55
10	55	6.51	550	8.21
9	89	10.53	801	11.96
8	101	11.95	808	12.06
7	143	16.90	1,001	14.94
6	157	18.60	942	14.06
5	147	17.40	735	10.97
Total	845	100.00	6,700	100.00

Data of companies for which the information is available for at least five consecutive years between 1990 and 2003 were extracted. After removing the first-year data, only used to construct several variables, the resultant unbalanced panel comprises 845 companies (6,700 observations).

Table 3. Summary Statistics				
Variable	Mean	Standard deviation	Minimum	Maximum
$VALUE_{it}$	.0599866	.517568	-5.757642	7.980564
$(TE)_{it}$	.4135878	.5058243	0	1.589777
$(RH)_{it}$	.361378	.361731	0	1
$(DREL)_{it}$	.3992537	.4897816	0	1
$(INV)_{it}$	.0571822	.0759759	-1.659016	.8446862
$(DEBT)_{it}$	.0809473	.0907339	0	.6323837
$(DIV)_{it}$	.0041319	.0242479	0	.5051326
$(INTANG)_{it}$	.0556746	.0884762	0	.7148893
$(CF)_{it}$	.0414947	.0593187	-.6992269	.6550489
$(SIZE)_{it}$	12.44562	1.776632	7.4355	19.04408

$VALUE_{it}$ denotes firm's value, TE_{it} is the Total Entropy index of diversification, RH_{it} is the Revenue based in the Herfindahl index of diversification, $DREL_{it}$ is a dummy that takes value of zero if is related diversification and 1 if is un-related respectively, INV_{it} denotes investment, $DEBT_{it}$ stands for the debt ratio, DIV_{it} denotes common dividends, $INTANGK_{it}$ denotes the intangible assets, CF_{it} is the cash flow and $SIZE_{it}$ is the firm's size.

Table 4. Estimation results of the value model

	I (Total Entropy)	II (Revenue-based Herfindahl index)	III (Total Entropy)	IV (Revenue based Herfindahl index)	V (Total entropy)	VI (Revenue based Herfindahl index)
(DIVER)_{it}	-.0232425*	-.0512391*	.1584877 *	.1822384*	.2209648*	.3666409*
	(.0017607)	(.0027067)	(.010373)	(.0174626)	(.0201418)	(.0425446)
(DIVER_REL) $_{it}$					-.1041266 *	-.1730634*
					(.0130383)	(.0338445)
(DIVER) $^2_{it}$			-.1077571*	-.2292027 *	-.1736143*	-.5213262*
			(.005719)	(.0196099)	(.0122337)	.055054
(DIVER ^{2} *_REL)* $_{it}$					.0674581*	.2014141*
					(.0101074)	(.0503771)
(INV) $_{it}$	.4998477*	.5082262*	.5042227*	.5070053*	.5363985*	.5300948*
	(.0054258)	(.0053791)	(.0072438)	(.0059585)	(.0117609)	(.0085509)
(DEBT) $_{it}$	-.9423326*	-.9570146*	-.9270239*	-.8947142*	-.783214*	-.7404212*
	(.0057284)	(.0066306)	(.0100404)	(.012453)	(.0211793)	(.0182293)
(DIV) $_{it}$	.5483008*	.5716538*	.5755111 *	.5899307*	.6136523*	.5688806*
	(.0076252)	(.0080415)	(.0260762)	(.0277447)	(.0528784)	(.0427695)
(INTANG) $_{it}$	.3699832*	.3804244*	.328373*	.3764588*	.3018573*	.3352971*
	(.0070568)	(.0073354)	(.013398)	(.0121094)	(.017937)	(.0174678)
		1.343071*	1.329157*	1.370076*	1.337811*	1.360501*
	1.332786*	(.0111472)	(.0183681)	(.017483)	(.0261007)	(.0225428)
(CF) $_{it}$	(.0108919)	.3804244*				
		(.0073354)				
(SIZE) $_{it}$	-.0021572*	-.0035969*	-.0004543	-.0060881*	.0026645*	-.0024116**
	(.0008523)	(.0007721)	(.0011915)	(.0011426)	(.0012025)	(.0014049)
t_1					6.81	8.35
t_2					-10.78	-12.24
z_1	6927.38(7)	6675.85(7)	2083.31(8)	3667.88(8)	977.74(10)	1856.96(10)
z_2	1044.50(12)	1514.38(12)	4444.41(12)	3485.18(12)	747.72(12)	1082.88(12)
z_3	438.71(9)	510.56(9)	286.59(9)	211.48(9)	95.54(9)	111.75(9)
m_1	-5.02	-5.02	-5.04	-5.04	-5.06	-5.06
m_2	-1.26	-1.26	-1.24	-1.26	-1.22	-1.25
Hansen	378.54(376)	374.71(376)	374.35(428)	378.65(428)	364.69(532)	370.04(532)

The regressions are performed by using the panel described in Table 2. The remainder of the variables is defined in Table 3. The rest of the information needed to read this table is: i) Heteroskedasticity consistent asymptotic standard error in parentheses. ii) *,** and *** indicate significance at the 1%, 5% and 10% level, respectively; iii) t is the t-statistic for the linear restriction test under the null hypothesis of no significance; iv) z_1, z_2 and z_3 are Wald tests of the joint significance of the reported coefficients, of the time dummies and of the country dummies, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses; v) m_i is a serial correlation test of order i using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation; vi) Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses.

Table 5. Estimation results of the excess value model

	I (Total Entropy)	II (Revenue-based Herfindahl Index)	III (Total Entropy)	IV (Revenue-based Herfindahl index)
(DIVER)_{it}	-.7104338 *	-1.21194*	-.6770593*	-1.186205*
	(.0074952)	(.017755)	(.0117717)	(.019629)
(DIVER_REL) *it*			-.0652046*	-.1233801*
			(.0069399)	(.0109048)
(INV)it	1.066791*	1.05087*	.9742571*	.9035119*
	(.0159932)	(.0204789)	(.0229116)	(.0207397)
(DEBT)it	-3.532624*	-3.651899*	-3.366604*	-3.49308*
	(.0351897)	(.0442074)	(.0421494)	(.04869)
(DIV)it	1.552253*	1.755291*	1.259085*	1.470771*
	(.0393696)	(.0513497)	(.1757565)	(.1484978)
(INTANG)it	2.84593*	2.821092*	3.007153*	3.059568*
	(.0343366)	(.0303891)	(.0495287)	(.0393985)
(CF)it	2.372837*	2.278807*	2.494858*	2.45993*
	(.0366683)	(.0305962)	(.0577541)	(.0452019)
(SIZE)it	.0506046*	.0316198*	.0401125*	.0256504*
	(.0046474)	(.0048822)	(.0055729)	(.0013516)
t			-58.62	-62.97
z_1	9674.33(7)	9745.86(7)	3621.32(8)	3514.43(8)
z_2	719.30(12)	748.18(12)	745.82(12)	518.95(12)
z_3	248.11(9)	225.43(9)	129.35(9)	244.47(8)
m_1	-3.89	-3.68	-3.86	-3.65
m_2	-1.47	-1.69	-1.50	-1.71
Hansen	373.90(376)	376.95(376)	378.63(428)	391.96(428)

The regressions are performed by using the panel described in Table 2. The remainder of the variables is defined in Table 3. The rest of the information needed to read this table is: i) Heteroskedasticity consistent asymptotic standard error in parentheses. ii) *,** and *** indicate significance at the 1%, 5% and 10% level, respectively; iii) t is the t-statistic for the linear restriction test under the null hypothesis of no significance; iv) z_1, z_2 and z_3 are Wald tests of the joint significance of the reported coefficients, of the time dummies and of the country dummies, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses; v) m_i is a serial correlation test of order i using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation; vi) Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses.