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Tackling The Corporate Diversification – Value Puzzle Using The Real Options Approach

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Abstract

This paper analyzes the diversification-value puzzle from the Real Options (RO) approach. Our proposal conceives corporate diversification as a process which involves both the sequential replacement of prior acquired investment opportunities by assets-in-place and the generation of new valuable growth options. We argue that this conceptual framework allows to explain both documented diversification premium and discount. Using a panel sample of U.S. firms from 1998 to 2010 and controlling for the potential sample self-selection, our results suggest that diversification premiums/discounts are statistically related to growth options proxies and that the diversification strategy is more value-enhancing in those firms with a more valuable set of growth opportunities.

Key words: diversification discount, diversification premium, growth options, firm value, self-selection.

1. INTRODUCTION

Corporate diversification –one of Ansoff´s (1965) growth vectors, entailing the entry into new markets and the offer of new products simultaneously[1] - has represented a lively area of research over the last decades. As diversified firms progressively increase their importance in modern economies, the diversification-value linkage has become the great 'enigma' to be solved, not only in the academic but also in the business sphere. Premium or discount for diversifying? Scholarship efforts have been especially devoted to this question. Despite the availability of a large body of literature, we have yet to reach a controversy-free explanation. Strategy and Finance diverge in their results, drawing different and even contradictory conclusions.

On the one hand, Strategy evidence has mainly supported the existence of a U-inverted linkage between diversification and performance, placing the optimum in related diversification (Palich *et al*., 2000) as it is more likely to boost synergies. On the other hand, Finance has yielded less optimistic evidence, being the diversification discount the prevailing position (Berger and Ofek, 1995; Servaes, 1996; among others), with some outstanding exceptions (Campa and Kedia, 2002; Villalonga, 2004a). As a result, what scholarship has come to call the 'diversification puzzle' remains unsolved.

Lane *et al.* (1999) judge that such a puzzle of diversification stems from the gap between the Finance and Strategy approaches. Whereas financial scholars view firms as portfolios of investments whose performance depends primarily on market forces, Strategic Management regards firms as portfolios of resources and capabilities linked by the people who create and utilize them. However, this traditional gap between Finance and Strategy has recently

[1] Ansoff's (1965) early, synthetic and concise definition becomes a referential start point in delimiting the diversification concept. Subsequent literature (such as Rumelt, 1982; Ramanujam and Varadarajan, 1989 or Becerra, 2009) provides us with a wide range of definitions for corporate diversification.

narrowed, and the Real Options (RO) analysis is one of the forces which have contributed significantly[2]. In fact, the real options definition of a firm is closely linked to the resources and capabilities concept. For instance, in the particular case of expansion, Kogut and Kulatilaka (1994) regard the capabilities to generate platform investments as real options.

These resources and capabilities, or firm-specific characteristics, are considered by Campa and Kedia (2002) as a main variable in the explanation of the diversification discount. These characteristics affect both a firm's decision to diversify and its market value. The evaluation of the effect of diversification on firm value should take into account that some resources and capabilities lead certain firms to create more value from diversification than others. Campa and Kedia's (2002) evidence shows that controlling for this kind of endogeneity reduces the diversification discount, in some cases turning it into a premium. In this line, Morck and Yeung (2003) provide evidence that the link between diversification and value depends on a firm's intangible investments. In particular, they find that diversification increases a firm's market value in the presence of substantial investments in R&D and advertising. These intangible investments in Morck and Yeung's (2003) paper, or firm-specific characteristics in Campa and Kedia's (2002) study, are an important source of a firm's growth opportunities and flexibility options, according to the RO analysis.

In this paper, we take a further step in the integrative view challenge to explain corporate diversification from a value creation perspective. We frame our research within the RO approach. The RO analysis introduces a new insight into corporate strategies from which to enrich the analysis of diversification. Although some theoretical studies have begun to explain business diversification in real options terms, little empirical work has been done. We follow recent stream of research (such as Campa and Kedia (2002) and Villalonga (2004b)) and

[2] The potential of real options in linking the strategic and financial islands was first proposed by Myers (1984). Nowadays, it is seen by many scholars to offer great potential for addressing strategic issues.

propose that the firm's portfolio of growth options, which are firm-specific, may be one of the key pieces to fit the diversification puzzle. First, our aim is to shed light on the effect of the diversification scope on the firm's growth opportunities, more specifically on the growth options value to firm's total value (the growth options ratio, herein GOR). Secondly, we investigate whether this GOR could explain a part of the diversification discounts/premiums.

The remainder of the paper is organized in five sections. Section 1 summarizes prior literature on the diversification – value relationship. Section 2 approaches to the RO framework in which our hypotheses are developed. The following section focuses on the research design of this study. In Section 4 the main empirical findings are explained. The paper closes with a discussion of our main conclusions, intended contributions, as well as limitations and proposals for future research.

1. THE CORPORATE DIVERSIFICATION AND FIRM VALUE RELATIONSHIP: AN 'ENIGMA' TO BE SOLVED

The diversification-value linkage has captured most scholarly attention since value creation has been put at the top of the objectives which should guide firms' activity (Jensen, 2010) and even the main *raison d'être* of enterprises (Becerra, 2009). Decades of intensive research have failed to culminate in a consensus. Hence, the expression *'diversification puzzle'* has been coined to illustrate the state of the art.

1.1. Theory

Both the potential advantages and drawbacks linked to business diversification have taken up a substantial body of research, since a cost-benefit balance may be a first step in determining the value created through this strategy.

With regard to the advantages, Strategy scholars have emphasized the potential synergies and economies of scope (Penrose, 1959; Ansoff, 1965), especially in the case of related diversification (Amit and Livnat, 1988; Markides and Williamson, 1994); the growth advantages (Penrose, 1959) such as economies of growth and size, and market power; financial advantages such as the creation of internal capital markets (Campa and Kedia, 2002) and the coinsurance effect (Penrose, 1959; Berger and Ofek, 1995) which make easier for firms to borrow more as a result of the combination of businesses with imperfectly correlated earnings that contributes to reducing cash-flow volatility.

On the other side of the coin, certain costs associated with diversification can prevent this strategy from creating value for firms. Agency problems are regarded as an important motivation to diversify and are one of the main drawbacks which diversified firms have to face. Managers may decide to maximize their utility function at the expense of shareholders' wealth. Diversification satisfies the managerial utility function in two ways: by reducing firm total risk – thereby, enabling managers to preserve their jobs (Amihud and Lev, 1981) - and by increasing firm size – thus, increasing managers' compensation and professional status. As a result of agency problems, two additional problems may arise (Berger and Ofek, 1995): cross-subsidization, which channels resources from better-performing to poorer segments, and overinvestment in business segments with poor investment opportunities.

1.2. Empirical evidence

A large number of empirical studies have been carried out on the diversification-value relationship. Finance scholars joined in the earlier and qualitative debate on Strategy and contributed to providing a more quantitative approach to evaluate diversification in terms of value creation. A key contribution is owed to Berger and Ofek (1995) and their proposal of an 'excess value' measure, which is the referent methodology in the vast majority of works[3]. It is based on the comparison of a multi-segment firm with an equivalent portfolio of standalone companies operating in the same industries. In the case where the value of the diversified firm was below the total value associated with that equivalent portfolio of focused firms belonging to the same industries, diversifiers would trade at a discount, relative to undiversified firms. Otherwise, they would show a premium.

For years, conglomerate discount held the prevailing position (Berger and Ofek, 1995; Servaes, 1996; Stowe and Xing, 2006; among others), leading to consider corporate diversification as a value-destroying strategy. Using cross-sectional regressions, Berger and Ofek (1995) report a 13 – 15 percent average discount in multidivisional firms in the 1986-1991 period. Hoechle *et al.* (2012) uses a more sophisticated econometric technique such as panel regression with firm and year-fixed effects and documents a discount. All these findings have also been corroborated for the particular case of the financial industry (Laeven and Levine, 2007).

Nevertheless, fresh literature has cast doubt on prior evidence, coming up with new findings which have revolutionized this field. A set of recent works documents a non-statistically significant relationship (Villalonga, 2004b), or even a premium (Campa and Kedia, 2002; Villalonga, 2004a). A non-linear relationship has also been pointed out by some scholars (Palich *et al.*, 2000). In this regard, Palich *et al*. finds that diversification enhances performance when firms move from focused to related diversification but there is a decline in performance when firms start entering unrelated businesses.

[3] The use of Berger and Ofek`s (1995) excess value measure has become widespread in diversification literature (see Campa and Kedia, 2002; Villalonga, 2004b; Stowe and Xing, 2006; among others).

The existence of so much 'noise' regarding the impact of diversification on firms' value has revived even more interest in it. Research has focused on the nature of the controversial evidence. Several reasons have been pointed out, such as measurement difficulties, methodological problems, or the existence of moderating factors.

Certain researches argue that the difficulties in the measurement of corporate diversification might hinder researchers from reaching conclusive evidence concerning value creation through this strategy. Segment reports can be biased by managerial self-interest or strategic reasons. Villalonga (2004a) divides firms' activity into businesses –instead of segments provided by Compustat– using *Business Information Tracking Series* (BITS), which is considered to be more objective for accounting practices in managerial segment reporting and obtains a premium. Other database limitations can stem from changes in the reporting standards. In the United States, from fiscal year 1998, the SFAS no. 131 replaced the old SFAS 14. He (2009) documents a discount in a pre-1997 sample of U.S. firms whereas he finds a premium using post-1998 data.

Another possible explanation for this puzzle may stem from methodological issues. A number of works stresses the need to control for the endogenous self-selection in the diversification models (Campa and Kedia, 2002; Miller, 2004; Villalonga, 2004b; among others) since the diversification status is not assigned at random within the sample, but rather managers decide to undertake this strategy. Certain underlying characteristics which influence the decision to diversify can also drive the results. Thus, overlooking this endogeneity may misattribute the valuation effects to this strategy rather than to the prior firm characteristics. Once this endogeneity is controlled, Campa and Kedia (2002) find a premium for the 1978 –1996 period. They regard firm-specific characteristics as the main variables in the explanation of the diversification outcomes.

Finally, recent works have attempted to overcome such a discount/premium dichotomy and have come up with the idea of the existence of 'moderating factors' in the diversification-value relationship which may make some diversifiers create more value than others. As a consequence, the debate has recently centered on seeking the conditions under which diversification can result in a value-creating strategy (Erdorf *et al.*, 2011). In this vein, different moderating factors in the diversification-performance linkage have been suggested, such as relatedness between segments, industry (Santaló and Becerra, 2008), period of analysis (Kuppuswamy and Villalonga, 2010), or the diversity of growth opportunities (Rajan *et al*. 2000).

2. A REAL OPTIONS THINKING OF CORPORATE DIVERSIFICATION

Over the last decades, more and more scholars have become aware of the necessity to integrate Strategic Management and Finance in order to reduce the gap between their theoretical bases and to harmonize their analyses (Ramanujam and Varadarajan, 1989). In this scenario, the RO approach is considered to be a sound 'bridge' between Strategy and Finance (Myers, 1984), as it succeeds in taking into account both the financial quantitative concerns and the strategic qualitative analysis of strategies.

The RO analysis is based on the application of the financial options' models to valuing 'real opportunities' which emerge from previous recourse allocations (Mun, 2002). More broadly, Amram and Kulatilaka (2000) provide a definition of the RO analysis, not only as a valuation method, but also as a qualitative approach to think about future investment opportunities and manage the resource allocation process (Adner, 2007): the so-called 'RO reasoning' or 'RO logic'. The RO approach considers the decision-making process as multiple decision pathways and, thus, managers have to choose the optimal strategy based on new information becoming available to them as uncertainty unfolds. By doing so, they increase their knowledge of the investment opportunity and that pattern of incremental commitment enables them to adjust their decisions over time (Mun, 2002). This flexibility can turn uncertainty into an opportunity of which companies can take advantage to create value.

An increasing number of scholars have begun to recognize the potential of the RO thinking to explain corporate strategies. Among the pioneer studies, Kester (1984) and Myers (1984) set the framework for studying resource allocation strategies as options to invest. Over recent years, studies of corporate strategies through the real options lens have become widespread in the top journals, although the empirical research remains scarce[4]. Among the existing empirical research in this area, Folta and Miller (2002) regard partner buyouts in the biotechnology research industry as compound options. A first stake allows partners to know each other and subsequent investments would be equivalent to a set of growth options. Estrada *et al.* (2010) apply an RO thinking to the particular case of technological joint venture formation, drawing a parallel between the purchase of an American call option and the whole formation process of this strategic alliance. Other technological investments, especially those in R&D activities, have been re-examined under the RO analysis (Miller and Arikan, 2004; Oriani and Sobrero, 2008), considering them to lead to create further investment opportunities (or options).

2.1. Corporate diversification as a trade-off between the exercise and the creation of real options

[4] Reuer and Tong (2007) call for more empirical works to test de descriptive validity of real options so as to advance the theory.

In his seminal paper, Myers (1977) lays the foundations of the Real Options (RO) analysis. According to Myers, the market value of the firm can be split into two components: the present value of assets-in-place and the present value of future growth opportunities:

$$\mathbf{V = V_{AiP} + V_{GO}}$$

The first component includes the cash flows expected to be generated by the firm's current allocation of resources. Growth options refer to the cash flows emerging from the possible/future decisions of the resource allocations to be made. Thus, the essence of the RO analysis leads to consider not only tangible assets linked to the investments but also intangible assets. Thus, corporate investment outputs are not only cash flows but also new resources and capabilities. These resources and capabilities are valuable insofar as they allow the firm to take future action that was formerly beyond its scope, the potential execution of which will increase cash flow.

Adopting a RO approach, Bernardo and Chowdhry (2002) describes firm's growth as an incremental commitment process based on the progressive replacement of options to expand by assets-in-place. In other words, corporate strategies are analyzed as chains of real options (Bowman and Hurry, 1993; Luehrman, 1998), one linked to each other. Thus, under this scenario, the investment process is studied as sequential, growth strategies being regarded as incremental investments undertaken in several steps.

In the particular area of corporate diversification research, certain scholars have attempted to introduce an 'RO logic' into the study of this strategy. In this vein, Zhao (2008) demonstrates that value changes around diversification are closely related to the changes of future growth opportunities. She finds that corporate diversification has a different impact on below and above industry market-to-book average ratio firms. Whereas in the first group diversification increases the market-to-book ratios as a result of the search and exploration of new opportunities, in the second group that relationship reverses, causing a drop in market-to-book ratios due to the exercise of growth options. These findings suggest a trade-off between the exercise and the creation of real options connected to the diversification decision.

As diversification is studied as series of connected real options, current investment opportunities will depend on those acquired in prior investment decisions. Companies will decide to diversify because they have investment opportunities available, probably as a result of prior investments which will have promoted exploration and learning in a particular area (Bowman and Hurry, 1993). Thus, the first stages of diversification are likely to involve primarily the exercise of the real options the company already holds. As these options will be connected with its current portfolio of investments, it will be in a better position to exploit them. As firms move forward diversification by the replacement of real options by assets-in-place, prior acquired real options may become exhausted and the firm will need to search new investment opportunities. Thus, the subsequent diversification movements may mainly focus on the identification of further real options derived from previous investments as well as the generation of new ones by making minor exploratory investments that may give the firm the right to amplify them at a future date. From this level, diversification may serve to enrich firm's growth options portfolio to a greater extent than the exercise of real options. In this regard, Andrés *et al.* (2005) report evidence for a sample of Spanish nonfinancial public companies about the potential of diversification to generate growth options. They find the market value of the growth options portfolio is positively related to the level of diversification. In a similar spirit, Becerra (2009) argues that the addition of new business activities provides the firm with new possibilities for growth. Diversification can open the door to future investment opportunities (Bowman and Hurry, 1993).

According to these arguments, we hypothesize a non-linear relationship between corporate diversification and the firm's growth options – more specifically, the ratio of growth options value to firm total value (GOR). Thus, we enunciate our first hypothesis:

H_1: the impact of the diversification degree on GOR exhibits a U-shaped function.

2.2. The role of the configuration of the growth options portfolio in the value outcomes of corporate diversification

A recent stream of research has pointed out that the value creation through corporate diversification may differ across firms on the basis of certain industry factors and firm-specific characteristics. In this regard, the literature compiles abundant references about the role of growth opportunities. However, the absence of a consensus is noticed. On the one hand, certain studies such as Stowe and Xing (2006) find that the differences in growth opportunities between diversified and single-segment firms do not explain the diversification discount. The discount persists after controlling for that difference, thus diversification by itself does not reduce growth opportunities but rather diversifying firms have a poor growth potential before they diversify.

On the other hand, several research works argue that the differences in growth opportunities impact on corporate value. In this sense, Del Brío *et al*. (2003) yield evidence, for a sample of Spanish companies, regarding that the creation of value is greater in those firms with a more valuable set of investment opportunities. In a similar spirit, Ferris *et al*. (2002) carry out an analysis of diversification for a sample of international joint ventures and they show that diversification is only value-destroying in those enterprises with a poor set of growth opportunities.

As previously noted, the RO approach considers corporate strategies as multistage investments involving the progressive exercise of a series of connected real options (Bernardo and Chowdhry, 2002). As a result, the value created through corporate diversification would be the result of a trade-off between the growth options and the assets-in-place components of firm's value stated by Myers (1977). This point turns into a key issue in determining either the value-enhancing or the value-destroying effects of diversification. A diversification strategy primarily directed towards the generation of real options reduces firm-specific risk, thereby serving as a 'strategic insurance' (Raynor, 2002: 380 –381) which cannot be replicated by investors in their portfolios.

In this regard, Amihud and Lev (1981) stated that the critical question is what kind of risk is reduced by diversification and whether stockholders can diversify it in their individual portfolios. If investors could diversify at a lower cost than enterprises, corporate diversification would destroy value[5]. Therefore, according to all the previous arguments, insofar as diversification mainly translates into the replacement of real options by assets-in-place, this strategy will be likely to result in a discount since these assets are within reach of individual investors, who can replicate it in their own portfolios. In contrast, when diversification comes to fruition by creating new growth options to invest to a greater extent than the exercise of options, this strategy may result in a premium since it provides the company with new assets which are not available to investors. They are firm-specific assets which cannot be replicated in the stock market. The availability of growth opportunities could serve not only to go further in the diversification process by exercising prior acquired rights to invest but also can act as a 'platform investment' to generate further opportunities (Kogut and Kulatilaka, 1994). Furthermore, these options enable the firm to keep the opportunities

[5] Myers (1984: 129) states: 'Corporate diversification is redundant; the market will not pay extra for it'.

open and await new information before a higher commitment, minimizing the cost of failure and maximizing learning (Chang, 1995). Thus, growth options can create economic value by generating future decision rights which offer managers the flexibility to act upon new information and exploit uncertainty.

In summary, all these ideas lead us to hypothesize that the configuration of a firm's growth options portfolio –the weight of growth options value over firm's total value (GOR) – could explain a part of the diversification discounts/premiums. More specifically, we hypothesize that insofar as the generation of growth options dominates over the materialization of assets-in-place, such a diversification may turn into an efficient strategy as it cannot be replicated by individual investors, thereby enhancing the diversification value outcomes. According to this, we state our second hypothesis:

H_2: the higher the GOR, the lower (higher) the discount (premium).

3. RESEARCH DESIGN: Sample selection, variables and econometric model

3.1. Sample selection

We perform our empirical analyses on an unbalanced panel sample of U.S. companies between January, 1998[6] and December, 2010. We start with the entire list of 16,637 public U.S. firms included in the Thomson One database. The sample comprises active enterprises, inactive existing ones as well as inactive non-existing firms in order to minimize the survivorship bias in the final sample. We use Worldscope as the principal source of data (annual data both at the industry segment and company level). Industry segment data is

[6] Our sample starts in 1998, when a change in the reporting standards took place (SFAS 131 instead of SFAS 14). See Berger and Hann (2003) for a summary of the advantages and critics to the SFAS 131.

computed at the 4-digit-SIC code level. Market data such as the number of outstanding shares and share prices are obtained from Datastream. Finally, we draw macroeconomic data from the Bureau of Economic Analysis which belongs to the U.S. Department of Commerce[7].

[INSERT TABLE 1 HERE]

To make the results comparable to previous literature, we use the Berger and Ofek (1995) sample selection criteria – see Table 1. First of all, firm-years with any division in financial services industry and firms' divisions with negative sales are removed. Other Berger and Ofek's requirements are sales figures of at least $20 million as well as the availability of data on total capital, total sales and segment-level sales. Regarding sales, the sum of segment sales cannot differ from the firm`s total sales by more than one percent. These sample selection criteria reduce the sample size to 28,206 firm-year observations for the period 1998 to 2010 (67.113% belonging to pure-play firms and 32.887% to diversifiers)[8]. Next, outliers are dropped from the sample. The final panel sample comprises 16,554 firm-year observations corresponding to 3,165 firms.

[INSERT TABLE 2 HERE]

[INSERT TABLE 3 HERE]

Major groups of industries, as defined by the U.S. Department of Labour[9] - see Table 2 for an overview of the groups and their correspondence with SIC codes-, with a major presence in the sample as firms' core industries are Division D (Manufacturing) – 8,058 firm-year observations; Division I (Services) – 3,628 firm-year observations; Division E

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[7] Official website: http://www.bea.gov/national/index.htm

[8] This proportion of unisegment and multisegment firm-years observations in our sample is similar to that reported by prior works such as Villalonga (2004b).

[9] See the official website website http://www.osha.gov/pls/imis/sic_manual.html

(Transportation, communications, electric, gas, and sanitary services) – 1,670 firm-year observations; and Division G (Retail trade) – 1,500 firm-year observations. Further details about the distribution of firm-years' core industry by sectors are available in Table 3.

[INSERT TABLE 4 HERE]

Table 4 displays the descriptive statistics on key variables referred to general financial characteristics of the enterprises in the sample after the elimination of the outliers. Full-period statistics show a large dispersion in the financial profile of the companies defined by characteristics such as size – either proxied by total assets or by sales figures -, market value – market capitalization and debt components – and performance – EBIT.

3.2. Variables[10]

[INSERT TABLE 5 HERE]

Excess Value

To assess the value outcomes of corporate diversification, we employ the 'excess value' measure developed by Berger and Ofek (1995). It is defined as the natural log of firm's market value to its imputed value. Following Campa and Kedia (2002), market value (MV) of a firm is calculated as the sum of market value of equity (MVE), long- term (StD) and short-term debt (LtD), and preferred stock (PrefStock).

$$MV = MVE + StD + LtD + PrefStock$$

To calculate the imputed value of each segment, we rely on sales multipliers due to broader coverage of Worldscope of sales at the segment-level. A segment's imputed value is computed by multiplying its segment sales (S_i) and the median sales multiplier – the median

[10] See Table 5 for a description of the variables.

ratio of firm's value to total sales - of all single-segment firms operating in the same and most restrictive SIC group which comprises at least five unisegment firms - 4-digit, 3-digit or 2-digit SIC code levels – (IM_i). The firm's imputed value is calculated as the sum of the imputed values of its divisions.

$$IV = \sum_i (S_i \times IM_i)$$

The discount, or premium, associated with diversification strategy is obtained by dividing enterprise value by imputed value (MV/IV) and taking the natural log of this ratio. This ratio bases on the comparison of firm's value against the estimated value that same company would have in case each of its segments operated as stand-alone entities. If excess value is negative, it will imply the existence of a discount. In other words, the negative effects of diversification overcome its benefits and it will result in a value-destroying strategy. Otherwise, we will find a premium.

<u>Growth options value to total firm's value (GOR)</u>

GOR is estimated by five different proxies found in prior literature. We use four direct proxies: the market to book assets ratio – MBAR – (Adam and Goyal, 2008); the market to book equity ratio – MBER – (Adam and Goyal, 2008); the ratio of market value to book value of assets – MABA - (Cao *et al*., 2008) and Tobin's Q – Q – (Cao *et al*., 2008).

$$MBAR = \frac{share\_price * common\_shares\_outstanding + preferred\_stock + current\_liabilities + long\_term\_debt - deferred\_taxes\_and\_investment\_tax\_credit}{total\_assets}$$

$$MBER = \frac{share\_price * common\_shares\_outstanding}{common\_equity}$$

$$MABA = \frac{total\_assets - common\_equity + share\_price * common\_shares\_outstanding}{total\_assets}$$

$$Q = \frac{share\_price * common\_shares\_outstanding + preferred\_stock + current\_liabilities - current\_assets + long\_term\_debt}{total\_assets}$$

Furthermore, we employ an inverse proxy defined by Cao *et al*. (2008): the debt equity ratio (DTE).

$$DTE = \frac{current\_liabilities + long\_term\_debt + preferred\_stock}{share\_price * common\_shares\_outstanding}$$

In addition, we construct five dummy variables (dummyMBAR, dummyMBER, dummyMABA, dummyQ and dummyDTE) which equal 1 if the observation of the corresponding proxy is above the sample mean and zero otherwise.

Degree of diversification (DIVER)

First, diversified firms are identified by a dummy variable (dummyDIVER) which equals 1 if the firm has at least two segments in different 4-digit SIC codes and null value, otherwise. Secondly, we approximate the diversification scope by: the number of segments at the 4-digit SIC code level (numsegments); the Herfindahl index (Hirschman, 1964) and the entropy measure (Jacquemin and Berry, 1979).

The Herfindahl index (HERF) is often defined as: $HERF = 1 - \sum_n P_i * W_i$

where 'n' is the number of firm's segments, 'P_i' the proportion of the firm's sales from industry i and 'W_i' a weight factor. 'P_i' is often used as the weight. Thus, the Herfindahl index converts to one minus the sum of the squared proportion of each segment sales to firm's total sales. Unisegment firms will show a Herfindahl index equal to zero and the closer this index is to one, the higher the level of diversification.

On the other hand, the Entropy measure (TotalEntropy) considers the diversification across different levels of industry aggregation and within them. The higher the total entropy, the higher the degree of diversification, but this index is not surpassed. The formula for calculating the total level of diversification can be expressed as follows:

$$TotalEntropy = 1 - \sum_n P_i * \ln\left(\frac{1}{P_i}\right)$$

where 'P_i' is the proportion of business activity (sales) in the SIC code i for a corporation with 'n' different 4-digit SIC businesses.

Control variables

In the models where the excess value is explained, we control for factors which are likely to affect excess value and are not related to the diversification decision. Thus, following prior researches (Berger and Ofek, 1995; Campa and Kedia, 2002), we control for financial leverage, firm size, profitability, and industry. Financial leverage is estimated by the ratio of long-term debt to total assets - henceforth, LDTA (Campa and Kedia, 2002) and firm size is approximated by the natural logarithm of the book value of total assets - LTA (Campa and Kedia, 2002). Furthermore, we include the LTA squared (LTA2) to control for a possible non-linear effect of firm size on firm value. Profitability is computed by the ratio EBIT to sales (EBITsales).

We introduce eight dummy variables to account for the nine major divisions (dumIndustries) - the financial industry is excluded as stated earlier - defined by the U.S. Department of Labour. In general, dummy industry i (i=1,…,8) takes 1 if the firm report some segment operating in industry i and zero otherwise. Santaló and Becerra (2008) argue that the effect of this strategy on firm value is not homogeneous across industries. In addition, we control for the year effect by dummy years (dumYears).

In the model to explain GOR, we include financial leverage - in this case, following prior studies such as Andrés *et al*. (2005), we estimate it as the ratio total debt with cost to total assets (DTA); firm size (LTA) (Andrés *et al*., 2005), and both industry and year dummies as control variables. Corporate debt may reduce a firm's incentive to undertake the efficient exercise of firm growth options with an expiration date before the debt maturity (Myers, 1977). Myers predicts an inverse relationship between corporate borrowing and the proportion of firm value due to real options. Another control variable is firm size. Insofar as the RO analysis analyzes growth strategies as the progressive exercise of real options, an increase in firm size can be interpreted as the replacement of its growth options by assets-in-place (Andrés *et al.*, 2005).

[INSERT TABLE 6a HERE]

[INSERT TABLE 6b HERE]

Table 6a provides information about the descriptive statistics of the variables involved in the analysis for the full sample. As a whole, the sample firms show a low diversifying profile - 1.3501 business segments on average, ranging the number of segments between 1 and 6. Tables 6b replicates the summary statistics information disaggregated by the diversification status – focused and diversified firms' subsamples. Overall, the statistics do not display broad differences in GOR proxies between unisegment and multisegment companies, which may be explained by the low average levels of diversification among the firms in the sample. We also notice the presence of an average discount in both subsamples, higher among diversified firms.

3.3. Econometric model and estimation method

We use two different models to test our hypotheses. Hypothesis 1 is tested by estimating the model stated below– Model I:

$$GOR_{it} = \alpha + \beta_1 * DIVER_{it} + \beta_2 * LTA_{it} + \beta_3 * DTA_{it} + \beta_4 * dumIndustries_{it} + \beta_5 * dumYears_{it} + \nu_{it}$$

where i identifies each firm, t indicates the year of observation, α and β_j are the coefficients to be estimated and ν_{it} is the random disturbance for each observation.

On the other hand, we specified Model II to test our second hypothesis:

$$ExcessValue_{it} = \alpha + \beta_1 * GOR_{it} + \beta_2 * DIVER_{it} + + \beta_3 * LDTA_{it} + \beta_4 * EBITsales_{it} + \beta_5 * LTA_{it} + \beta_6 * LTA2_{it} + \beta_7 * dumIndustries_{it} + \beta_8 * dumYears_{it} + \nu_{it}$$

where i identifies each firm, t indicates the year of observation (from 1 to 13), α and β_j are the coefficients to be estimated, and ν_{it} represents the random disturbance.

As stated earlier, an extensive body of research has highlighted the endogenous self-selection arising in the diversification-performance models (Campa and Kedia, 2002; Villalonga, 2004b; Miller, 2004, 2006; among others). If diversification is not a random status but rather firms self-select to diversify, the diversification variable will be correlated with the error term. In this case, the Ordinary Least Squares (OLS) estimators would not be consistent (Greene, 2003). Heckman (1979) proposes a two-stage estimation methodology to correct for this sample selection, considering it as a simple specification error or an omitted variable problem.

More specifically, we take the Heckman two-step estimator. In a first stage, we estimate a probit equation by maximum likelihood to model the firm's propensity to diversify – the selection equation - and to estimate the self-selection correction, lambda (λ). This λ_i estimator is introduced as an additional regressor in the second stage[11], where we estimate our main two models – the outcomes equations - indicated above by OLS. In the absence of any selectivity in the sample, the correlation (ρ) between the residuals of the selection equation and the outcome equation is close to zero and the coefficient of lambda lacks of statistical significance. In case there was self-selection in the sample, this coefficient turns significant:

[11] Without the inclusion of lambda as a regressor in the outcome equation, we would be assuming that the diversification status is randomly assigned within the sample.

some factors that lead firms to diversify also impact on firm value, thus justifying the application of the Heckman's procedure.

Correcting the self-selection bias, Models I and II are reformulated as follows:

$$GOR_{it} = \alpha + \beta_1 * DIVER_{it} + \beta_2 * LTA_{it} + \beta_3 * DTA_{it} + \beta_4 * dumIndustries_{it} + \beta_5 * dumYears_{it} + \beta_\lambda * \lambda + \nu_{it}$$

$$ExcessValue_{it} = \alpha + \beta_1 * GOR_{it} + \beta_2 * DIVER_{it} + + \beta_3 * LDTA_{it} + \beta_4 * EBITsales_{it} + \beta_5 * LTA_{it} + \beta_6 * LTA2_{it} + \beta_7 * dumIndustries_{it} + \beta_8 * dumYears_{it} + \beta_\lambda * \lambda + \nu_{it}$$

where the term λ corrects the self-selection bias which would arise if we would have failed to consider that the diversification decision is not made randomly.

All estimations results detailed in the next section contain the estimation of lambda (λ) as an additional explanatory variable and its statistical significance to identify the presence of selectivity in the sample. The Wald test included at the bottom of the tables tests the joint significance of the estimated coefficients.

4. RESULTS

4.1. Selection equation: a probit estimation

The estimations of Models I and II share the first stage of the Heckman's procedure: the probit estimation of the selection equation to model the firms' propensity to diversify. Following Campa and Kedia (2002), we introduce firm characteristics, industry characteristics and macroeconomic characteristics as drivers of the diversification decision.

Regarding firm characteristics, firm size (LTA), profitability (EBITsales), and the level of investment in current operations - approximated by the ratio capital expenditures to total sales (CAPEXsales) - are likely to affect the decision to diversify. Bigger enterprises are seen to benefit from corporate diversification to a greater extent than smaller ones due to the presence of economies of size (Penrose, 1959). Firms may pursue this strategy as a means to improve their levels of profitability. Moreover, we control for the level of investment in current operations since firms may undertake this strategy as a search of further opportunities in other industries. We also re-estimate the model by including these variables lagged one period (Campa and Kedia, 2002) since they can play a part in the current corporate decisions.

Industry characteristics may play an important role in the diversification decision. As Campa and Kedia (2002), we introduce two proxies[12] for the industry attractiveness: the fraction of firms in the firm's core industry that are diversified (PNDIV), and the proportion of the firm's core industry sales accounted for by diversifiers (PSDIV).

Finally, we capture two macroeconomic factors: the real growth rates of gross domestic product (changeGDP), and the number of months in the year the U.S. economy was in a recession (CONTRACTION). For the first variable, we take the GDP percent change based on chained 2005 dollars. As this data is available quarterly, we compute the no. of quarters in which this change is negative - recession - and then, we convert this data into months. Finally, we introduce year dummies to control for the time effect.

The complete model to be estimated in the first-stage of all Heckman regressions can be expressed as follows:

$$D^*_{it} = \gamma_1 \ LTA_{it} + \gamma_2 \ EBIT/sales_{it} + \gamma_3 \ CAPEX/sales_{it} + \gamma_4 \ LTA_{it-1} + \gamma_5 \ EBIT/sales_{it-1} + \gamma_6 \ CAPEX/sales_{it-1} + \gamma_7 \ PNDIV_{it} + \gamma_8 \ PSDIV_{it} + \gamma_9 \ changeGDP_{it} + \gamma_{10} \ CONTRACTION_{it} + \gamma_{11} \ dumYears_{it} + \eta_{it}$$

$$D_{it}=1 \text{ si } D_{it}^*>0$$

[12] We calculate these two proxies at the 4-digit SIC level.

$D_{it}=0$ si $D_{it}*<0$

where D^*_{it} is an unobserved latent variable that is observed as $D_{it}=1$ if $D*_{it}>0$ and zero otherwise and η_{it} is an error term.

[INSERT TABLE 7 HERE]

Table 7 reports the estimations of the probit model specified above. The goodness-of-fit (pseudo-R squared) lies in the 0.1562 – 0.1602 range. As expected, bigger size encourages firms to diversify. This variable is significant in all regressions except for those where lagged values are included. EBITsales also shows statistical significance in almost all regressions and the results reveal that less profitable enterprises are more likely to diversify. When significant, the coefficient associated with CAPEXsales has as negative sign, thus firms are more liable to diversity when they hold limited investments in their current activities, probably in an attempt to gain access to further opportunities.

As far as industry variables are concerned, PNDIV and PSDIV are significant by any standards (p-value=0.000). This result agrees with Campa and Kedia’s (2002) and Villalonga’s (2004b) findings that firms are more likely to take the diversification decision when there are a high fraction of diversifiers in their core industry.

Also in line with Campa and Kedia (2002), the macroeconomic variables –changeGDP and CONTRACTION – mostly lack of statistical significance in the explanation of the diversification decision–except for probits in columns (1) and (3). In column (1), changeGDP turns out to be significant at the 5 percent level and it indicates that firms are more likely to diversify in an scenario of economic growth.

As a whole, our results suggest that characteristics at firm and industry levels are the key drivers in the diversification decision. In order to estimate the second stage of the Heckman's procedure for our Models I and II, we take the probit model estimated in column (1) – Table 7 - to compute the correction for self-selection λ. This model contributes to minimizing the loss of observations. We omitted lagged values of firm variables since they proved to be mostly insignificant and their inclusion leads to the loss of a great number of observations. We also dispense with year dummies as they do not contain statistical significance in most cases. Thus, probit model (1) allows our Heckman's estimation to have at least four exclusion restrictions[13] since the variables PNDIV, PSDIV, changeGDP and CONTRACTION – contained in the probit model – are excluded in the estimations of the outcome equations.

4.2. Estimation results Model I

[INSERT TABLE 8 HERE]

Table 8 reports the estimations results of the Model I in which we regress the different proxies for GOR on several diversification indexes to check the robustness of the results. According to the Wald test, variables are joint significant by any standards (p-value=0.000 in all cases). It is important to note that the estimated coefficient associated with lambda proves to be significant above the 1percent level in almost all regressions, confirming the existence of selectivity in our sample. This finding goes along with our theoretical arguments that the drivers of the diversification decision also impact on firms' value and thus, it is necessary to control for this endogenous self-selection. Furthermore, as the coefficient of lambda is positive (negative in the case of the regressions on DTE since it is an inverse proxy for GOR), it suggests that a greater likelihood of diversifying translates into higher GOR since

[13] The application of Heckman's methodology requires the existence of exclusion restrictions: the existence of at least one variable included in the selection equation which is not contained in the outcome equation (Puhani, 2000). The lack of exclusion restrictions is likely to give rise to collinearity problems.

the characteristics encouraging firms to diversify are positively correlated with GOR. In all alternative estimations, we find that, in general, the choice of the proxy for the dependent variable GOR and the diversification measure affects the level of significance in the case of numsegments but results remain unchanged and statistically significant in most cases.

A key finding of our analysis is that the relationship between GOR and the diversification measures takes a U-form. In the first steps of this growth strategy, enterprises diversify mainly by exercising prior acquired investment rights. As a result, in these initial stages corporate diversification has a negative impact on the GOR insofar as it means the replacement of real options by assets-in-place. However, the company will reach a minimum from which this relationship reverses, turning into positive. From this critical point, as we hypothesized, diversification turns into a source of real options for enterprises. The strongest evidence of this curvilinear relationship is found with the Herfindahl and Total Entropy indexes which manage to capture a broader scope of this strategy. This result only loses statistical significance in the case of numsegments where being applied to explain MBAR, MABA and Q, due to their limited nature to capture the diversification scope.

We calculate the minimum of the curve (the maximum in the case of DTE as it is an inverse proxy). We based our calculations on the numsegments proxy since it is more illustrative and easier to interpret. For this, we take the estimations of the Model I with proxies MBER and DTE in which numsegments contains statistical significance. We obtained the following critical points in the MBER and DTE sub-models respectively: numsegments*=3.0645; numsegments*=2.8158. Thus, we can place the turning point from which diversification starts being a source of real options around 3 segments.

Furthermore, the positive sign of the estimator of lambda supports prior findings since it confirms that drivers of diversification are associated with a positive effect on the set of growth opportunities. Thus, enterprises may decide to embark on this business strategy to take advantage of and to exercise prior investment rights available and thus, this strategy starts mainly as the progressive exercise of these real options until a point where an already diversify firm go deeper in its diversification status by searching and acquiring further investment opportunities.

As reported in Table 6b, on average, there are no broad differences in the proxies for growth opportunities between focused and diversified companies. On average, diversified firms subsample show 2.2860 segments. Thus, on average, they have not reached yet the critical point of 3 segments where we report evidence that the corporate diversification begins to have a positive impact on the growth options portfolio and be a source of real options for enterprises.

As far as the control variables are concerned, they prove to be significant in the majority of the regressions. Along with Myers (1977), DTA, when significant, has a negative effect since a high leverage discourages an efficient exercise of the real options available in the firm. However, the sign of the coefficient linked to LTA runs contrary to our prediction, reporting a positive effect. A possible explanation for this finding may lie on the findings developed before. Since corporate diversification mainly contributes to generating additional investment opportunities in advanced stages of this strategy process, the enterprise will be bigger by then and thus, a bigger size would be a signal of the reach of such a breakpoint in the curve and the beginning of the point where diversification is primarily based on the generation of new investment opportunities instead of the exercise of the prior acquired ones.

In order to check the robustness of our results, our empirical analysis is replicated by using an alternative approach of the Heckman's estimation procedure: the Heckman maximum likelihood (ML) estimator which estimates both the probit equation and the outcome equation by maximum likelihood in a single analytic step. Most results remain similar[14].

4.3. Estimation results Model II

[INSERT TABLE 9 HERE]

To test our second hypothesis, first we perform a difference of means test – Table 9 - to check whether the difference of the excess value mean between the set of firms showing a set of growth opportunities below (GOR proxy equals 0 -1 in the case of DTE) or above the sample mean (GOR proxy equals 1 - 0 in the case of DTE) is statistically significant. We assume that the variances of both sub-groups defined by the dummy variables are equal. This preliminary test is strongly supportive of our second hypothesis. It confirms the existence of statistical significant differences - at any level greater than 1percent (p-value=0.000 in all cases) - in the mean outcomes of the diversification strategy (Excess Value) depending on the weight of investment opportunities value over firm's total value. A diversification premium is found, on average, in those enterprises with a more valuable set of growth opportunities relative to firm's value; whereas the group of firms with GOR values below the sample mean trade at a discount on average. Thus, as predicted, the diversification strategy turns into a value-enhancing strategy in those companies with a better set of growth opportunities.

[INSERT TABLE 10 HERE]

Next, we verify the robustness of these empirical findings by estimating Model II. We carry out the second stage of Heckman's procedure to compute the Heckman two-step estimators in the outcome equation – see Table 10. It only makes sense to interpret the regressions displayed in the shaded columns. For those columns, the coefficient of lambda is significant what allows us to reject the null hypothesis that the correlation (ρ) between the

[14] The table is omitted in this paper due to space limitations. Results available upon request from the corresponding author.

residuals of the selection equation and the outcome equation is zero and thus, the use of Heckman's estimation is justified to control for the existing self-selection bias in the sample. Furthermore, as the Wald test indicates, variables are jointly significant in all regressions.

Again, our second hypothesis receives strong support. Along the results obtained from the difference of means test performed previously, we find a positive and statistically significant relationship (p-value=0.000) between the GOR proxies and the excess value. Results are robust to the different proxies and to the estimation by the alternative Heckman ML approach[15]. Contrary to Stowe and Xing (2006), we identified a significant contribution of the value of the firm's set of growth opportunities to the value impact of diversification. In the hypothesized direction, we report evidence that the larger the fraction represented by growth opportunities over firm's total value, the higher excess value and thus, the lower discount - or the greater premium. This finding is consistent with prior works such as Ferris *et al*. (2002) or Del Brío *et al*. (2003).

The diversification scope is introduced as control variable in all the estimations. In line with prior stream of research - such as Berger and Ofek (1995) or Servaes (1996) -, our results reveal that diversified firms trade at a discount in the 1998 – 2010 period, even controlling for self-selection. One possible explanation for this result may lie on the diversification profile of the firms in our sample. On average, multisegment firms have not reached the critical point – estimated earlier as 3 segments approximately – after which diversification mainly contributes to enhance the firm's real options portfolio. The average number of segments for the full sample is 1.3501 (<3 business segments) so, in this stage, diversifying mostly involves the exercise of growth options, which causes a drop in GOR and as a result, a negative impact on the excess value.

[15] Results available upon request from the corresponding author.

5. SUMMARY AND CONCLUSIONS

We join the debate of the diversification-value linkage. From an RO approach, we attempt to shed light on this controversial relationship by demonstrating that this strategy may have a value-enhancing effect on one of the components of a firm's market value defined by Myers (1977): the present value of its future growth opportunities.

Our paper contributes to the existing body of literature in six different ways. First, we deal with the '*diversification puzzle*' from an original angle: the RO approach. The RO lens allow us to look at this puzzle in a different way by explaining business diversification and its effects on firm's value in terms of purchase and subsequent exercise of growth options. As far as we know, the use of the RO reasoning to frame corporate diversification has been little explored in the literature.

In second place, supporting on the RO approach, we attempt to narrow the gap between Strategy and Finance. We take into consideration research works form both streams of literature to build an integrated framework in which to study diversification. RO emerges as a promising approach in Strategic Management as well as in reconciling the strategic and financial perspectives. Its increasing application becomes patently clear as reviewing the 'top' Strategic Management journals such as the *Strategic Management Journal* or the *Academy of Management Review*. We follow prior research to develop our hypotheses on an RO basis and thus, attempt to demonstrate the usefulness of the RO analysis to explain strategic issues.

Thirdly, we make a contribution to the scarce existing empirical literature about real options and corporate diversification. We report evidence that the first diversification decisions imply the exploitation of the growth opportunities currently available for the firm by replacing growth options by assets-in-place and thus, causing a decline in the real options ratio. This finding goes along with Zhao (2008), who reports a decline in the market to book ratios as a result of materializing growth opportunities into assets-in-place. After a certain level of diversification – in our sample, it is placed around 3 business segments - business diversification involves primarily a search of further growth opportunities in a greater extent than an exercise of the existing ones, becoming a source of new investment opportunities.

As a fourth contribution, we introduce an additional piece in the diversification puzzle - firm's growth opportunities – and we demonstrate its relevance in the explanation of the diversification value outcomes. We follow Campa and Kedia's (2002) study by demonstrating that firm-specific characteristics -in our research, the growth options value to firm's total value - significantly explain the diversification outcomes. The configuration of the firm's growth options portfolio plays a part in the explanation of the diversification discounts/premiums. Diversified firms show a higher value over that would have in case their segments operated as individual firms, in those firms with a higher growth options ratio.

The last two significant contributions of this study stem from the sample and the estimation methodology. We test our hypotheses in a post-1997 sample (the 1998 –2010 period), after the SFAS 131 came into force. Little empirical research has so far been carried out under this new reporting standard. Certain works as He (2009) argue that the change of the reporting standard alters the nature of the data and consequently, the empirical findings. Moreover, we use one of the latest econometric methods applied in recent diversification studies – the Heckman two-stage procedure – to correct the possible endogenous self-selection arising in the diversification model.

From a practical point of view, our study also has major implications for business management. Our findings could be translated into a practical guidance for managers regarding why and how they should diversify their businesses to create value. We encourage both practitioners and scholars to give up the myopic analysis of corporate investments widely spread over years and look at diversification through different lens: a RO analysis, which promotes an active management to exploit and explore investment opportunities, and the importance of flexibility to exploit uncertainty to create value.

Finally, we analyze some limitations of our study that could open future research lines. First, our sample only contains firms from United States. We are aware of the necessity to replicate our study on an international sample of companies where the country effect should be controlled for. Further research is also required to analyze in depth the nature of the endogeneity arising in diversification models. It could be interesting to check the robustness of our results by applying alternative econometric techniques. Moreover, another methodological limitation we have to face refers to the difficulties in finding a satisfactory measure to approximate the proportion of growth options value to firm's total value. These intangible assets are not directly observable.

In addition, the search for moderating factors in the diversification-performance relationship should also be further addressed. Diversification may be a value-destroying strategy under some conditions but not under others. Our study sheds light on the important role of growth opportunities to explain the diversification value outcomes. This corporate strategy proves to have a positive impact on excess values in those enterprises with a more valuable set of growth opportunities. This evidence shown in this paper enables us to connect with the latest findings concerning the existence of moderating factors in the diversification - value relationship. Supporting on the RO approach, two different investment paths may be distinguished: an only-stage investment versus an incremental investment. They could give rise to two opposite diversification patterns respectively: an assets-in-place diversification – primarily based on the exercise of real options – and an options-based one – involving minor investments in new business mainly aimed at the exploration and purchase of new growth options. Each pattern of diversification leads to a different configuration of the growth options portfolio and thus, they may diverge in their impact on enterprise value. This moderating role of the pattern of diversification in diversification-value linkage opens a new path of research to explore in subsequent works.

6. REFERENCES

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APPENDIX

Table 1
The distribution of observations in the sample (SIC codes classification)

This table reports distribution of the firm-year observations between the unisegment and diversified firms' subsamples, before and after the application of the Berger and Ofek's (1995) sample selection criteria. The central columns contain the number of observations dropped from the initial sample due to the report of any business segment in the financial industry or the fail to meet the other Berger and Ofek's criteria described in the text.

	Initial sample (Obs.)					Final sample (Obs.)		
Year	**Uni**	**Multi**	**Total**	**Financial industry**	**No meet other criteria**	**Uni**	**Multi**	**Total**
1998	4282	1726	6008	1603	2392	1243	770	2013
1999	4309	1842	6151	1607	2433	1247	864	2111
2000	4083	1902	5985	1548	2326	1206	905	2111
2001	3977	1841	5818	1478	2311	1133	896	2029
2002	4133	1643	5776	1517	2250	1205	804	2009
2003	4337	1495	5832	1550	2283	1271	728	1999
2004	4506	1394	5900	1490	2308	1403	699	2102
2005	4670	1318	5988	1477	2338	1500	673	2173
2006	4746	1251	5997	1450	2238	1655	654	2309
2007	4719	1159	5878	1404	2082	1767	625	2392
2008	4479	1096	5575	1345	1807	1825	598	2423
2009	4319	1060	5379	1304	1853	1688	534	2222
2010	4067	983	5050	1214	1523	1787	526	2313
Total	56627	18710	75337	18987	28144	**18930**	**9276**	**28206**
%	75.165%	24.835%	100.000%			**67.113%**	**32.887%**	100.000%

Authors' elaboration

Table 2
Standard Industrial Classification Division Structure

This table shows the major groups of industries – as defined by the United States Department of Labour – and their correspondence with the 2-digit SIC codes groups.

DIVISION	MAJOR GROUPS (2-digit SIC codes in parentheses)
A Agriculture, Forestry and Fishing	Agricultural Production Crops (01); Agriculture production livestock and animal specialties (02); Agricultural Services (07); Forestry(08); Fishing, hunting, and trapping (09).
B Mining	Metal Mining (10); Coal Mining (12); Oil And Gas Extraction (13); Mining And Quarrying Of Nonmetallic Minerals, Except Fuels (14).
C Construction	Building Construction General Contractors And Operative Builders (15); Heavy Construction Other Than Building Construction Contractors (16); Construction Special Trade Contractors (17).
D Manufacturing	Food And Kindred Products (20); Tobacco Products (21); Textile Mill Products (22); Apparel And Other Finished Products Made From Fabrics And Similar Materials (23); Lumber And Wood Products, Except Furniture (24); Furniture And Fixtures (25); Paper And Allied Products (26); Printing, Publishing, And Allied Industries (27); Chemicals And Allied Products (28); Petroleum Refining And Related Industries (29); Rubber And Miscellaneous Plastics Products (30); Leather And Leather Products (31); Stone, Clay, Glass, And Concrete Products (32); Primary Metal Industries (33); Fabricated Metal Products, Except Machinery And Transportation Equipment (34); Industrial And Commercial Machinery And Computer Equipment (35); Electronic And Other Electrical Equipment And Components, Except Computer Equipment (36); Transportation Equipment (37); Measuring, Analyzing, And Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks (38); Miscellaneous Manufacturing Industries (39).
E Transportation, Communications, Electric, Gas, And Sanitary Services	Railroad Transportation (40); Local And Suburban Transit And Interurban Highway Passenger Transportation (41); Motor Freight Transportation And Warehousing (42); United States Postal Service (43); Water Transportation (44); Transportation By Air (45); Pipelines, Except Natural Gas (46); Transportation Services (47); Communications (48); Electric, Gas, And Sanitary Services (49).
F Wholesale Trade	Wholesale Trade-durable Goods (50); Wholesale Trade-non-durable Goods (51).
G Retail Trade	Building Materials, Hardware, Garden Supply, And Mobile Home Dealers (52); General Merchandise Stores (53); Food Stores (54); Automotive Dealers And Gasoline Service Stations (55); Apparel And Accessory Stores (56); Home Furniture, Furnishings, And Equipment Stores (57); Eating And Drinking Places (58); Miscellaneous Retail (59).
H Finance, Insurance, And Real Estate	Depository Institutions (60); Non-depository Credit Institutions (61); Security And Commodity Brokers, Dealers, Exchanges, And Services (62); Insurance Carriers (63); Insurance Agents, Brokers, And Service (64); Real Estate (65); Holding And Other Investment Offices (67).
I Services	Hotels, Rooming Houses, Camps, And Other Lodging Places (70); Personal Services (72); Business Services (73); Automotive Repair, Services, And Parking (75); Miscellaneous Repair Services (76); Motion Pictures (78); Amusement And Recreation Services (79); Health Services (80); Legal Services (81); Educational Services (82); Social Services (83); Museums, Art Galleries, And Botanical And Zoological Gardens (84); Membership Organizations (86); Engineering, Accounting, Research, Management, And Related Services (87); Private Households (88); Miscellaneous Services (89).
J Public Administration	Executive, Legislative, And General Government, Except Finance (91); Justice, Public Order, And Safety (92); Public Finance, Taxation, And Monetary Policy (93); Administration Of Human Resource Programs (94); Administration Of Environmental Quality And Housing Programs (95); Administration Of Economic Programs (96); National Security And International Affairs (97); Nonclassifiable Establishments (99).

Source: United States Department of Labor: Occupational Safety & Health Administration website (http://www.osha.gov/pls/imis/sic_manual.html.

Table 3
Distribution of firm-years by sectors (core industry). Major groups

This table presents the number and percentage of firm-year observations by primary division. The final sample comprises 16,554 firm-year observations (12,047 firm-year observations from unisegment firms and 4,507 firm-year observation from diversified firms).

Divisions	Firm-year observations	% firm-year obs.	Firm-year obs. (unisegment firms)	Firm-year obs. (diversified firms)
A	0	0	0	0
B	603	3.643	439	164
C	120	0.725	90	30
D	8,058	48.677	5,699	2,359
E	1,670	10.088	1,220	450
F	975	5.890	629	346
G	1,500	9.061	1,274	226
H	0	0	0	0
I	3,628	21.916	2,696	932
J	0	0	0	0
Total	**16,554**	**100**	**12,047**	**4,507**

Table 4
Descriptive statistics of the data [U.S. companies (1998-2010)]

This table contains descriptive statistics of general financial variables for the final sample of 16,554 firm-year observations – both unisegment (12,047 firm-year observations) and multisegment companies (4,507 firm-year observations). Figures are expressed in millions dollars.

Variable	N	Mean	Median	STD	Min.	Max.	1st quartil	3rd quartil
Total Sales	16,554	1475.991	308.7555	4265.445	20.01	98540	90.933	1120.056
Total Assets	16,554	1400.56	320.502	2920.466	4.5800	21972	91.9698	1187.725
Common Equity	16,554	612.1729	172.485	1250.963	0.2387	15835	52.312	556.082
EBIT	16,554	113.9356	19.1145	352.1681	-6740.195	5039	1.522	94.724
Market capitalization	16,554	1731.068	353.8434	4482.616	1.3400	78973.82	88.0205	1282.935
Total Debt	16,554	367.2181	31.167	959.7748	0	12358.83	2.309	261.523
Total observations	16,554 observations after the elimination of the outliers [Unisegment firms: 12,047 obs. (72.77%); diversified firms: 4,507 obs. (27.23%)]							

Authors' elaboration

Table 5
Description of the variables

This table contains a summary of the variables used in the analysis. The first column indicates the label of each variable, the second column provides the definition of the variable and the third column offers the source from which that definition is obtained.

VARIABLE	DEFINITION	SOURCE
Excess Value	Natural log of the ratio Enterprise value to its imputed value.	Berger and Ofek (1995)
Growth option value to firm total value (GOR)		
MBAR	The market to book assets ratio.	Adam and Goyal (2008)
MBER	The market to book equity ratio.	Adam and Goyal (2008)
MABA	The ratio of market value to book value of assets.	Cao *et al.* (2008)
Q	Tobin's Q	Cao *et al.* (2008)
DTE	The debt equity ratio.	Cao *et al.* (2008)
Degree of diversification (DIVER)		
dummyDIVER	Dummy variable: Equals 1 if the firm is diversified, and zero otherwise.	
Numsegments	Number of business segments at the 4-digit SIC code level.	
HERF	Herfindahl index $HERF = 1 - \sum_n P_i * W_i$	Hirschman (1964)
TotalEntropy	Total entropy index. $TotalEntropy = 1 - \sum_n P_i * ln(\frac{1}{P_i})$	Jacquemin and Berry (1979)
Control variables		
LDTA	The ratio of long-term debt to total assets.	Campa and Kedia (2002)
DTA	The ratio of total debt with cost to total assets.	Andrés *et al*. (2005)
LTA	Natural log of the book value of assets.	Campa and Kedia (2002); Andrés *et al*. (2005)
EBITsales	The ratio EBIT to firm total sales.	Campa and Kedia (2002)
CAPEXsales	The ratio capital expenditures to total sales.	Campa and Kedia (2002)
dumIndustries	9 major divisions (excluding the financial division) → eight dummy variables.	The United States Department of Labour
dumYears	13 years (1998-2010 period) → twelve dummy variables.	
Control variables at the industry level		
PNDIV	Fraction of companies in the firm's core industry that are diversified.	Campa and Kedia (2002)
PSDIV	Proportion of the firm's core industry sales accounted for by diversifiers.	
Control variables at the macroeconomic level		
changeGDP	The GDP percent change based on chained 2005 dollars.	Campa and Kedia (2002)
CONTRACTION	Number of months in the year the U.S. economy was in a recession.	

Authors' elaboration

Table 6a

[Summary statistics of variables for the full sample (1998-2010)]

This table displays descriptive statistics of the variables involved in our models for the final sample of 16,554 firm-year observations of unisegment (12,047 firm-year observations) and multisegment companies (4,507 firm-year observations).
Some observations contain missing data for some variables. Excess Value is the measure developed by Berger and Ofek (1995) to assess the value created by diversifying. MBAR (the market to book assets ratio), MBER (the market to book equity ratio), MABA (the ratio of market value to book value of assets), Q (Tobin's Q), and DTE (the debt equity ratio) are five different proxies for the growth options portfolio value relative to firm's total value. Numsegments (number of business segments), HERF (the Herfindahl index), and TotalEntropy (the Entropy index) measure the level of diversification.Control variables: LTA (size), EBIT/sales (profitability), CAPEX/sales (level of investment in current operations), DTA(financial leverage), changeGDP (real growth rates of gross domestic product), CONTRACTION (the number of months in the year the U.S. economy was in a recession), PNDIV (fraction of firms in the firm's core industry that are diversified), PSDIV (the proportion of the firm's core industry sales accounted for by diversifiers).

Variable	N	Mean	Median	Standard deviation	Min.	Max.	1st quartil	3rd quartil
Excess Value	16,554	-0.0574	0.0000	0.7875	-2.8458	2.6628	-0.5338	0.4335
Proxies for growth opportunities								
MBAR	16,554	1.7384	1.4352	0.9642	0.0835	5.5235	1.0533	2.1346
MBER	16,554	2.5459	2.0223	1.7410	0.0399	8.8081	1.2600	3.3834
MABA	16,554	1.7930	1.4947	0.9503	0.1415	5.5228	1.1205	2.1863
Q	16,554	1.2308	0.9688	0.9408	0.0000	4.9612	0.5731	1.6355
DTE	16,554	0.6431	0.3590	0.7661	0.0016	4.3593	0.1542	0.7913
Diversification indexes								
numsegments	16,554	1.3501	1	0.6521	1	6	1	2
HERF	16,554	0.0983	0	0.1853	0	0.7925	0	0.0683
Total Entropy	10,238	0.2233	0.0000	0.3311	0	1.6559	0.0000	0.4991
Control variables								
LTA	16,554	5.8406	5.7699	1.7308	1.5217	9.9975	4.5215	7.0798
EBIT/sales	16,554	0.0543	0.0681	0.1843	-1.1784	1.1792	0.0143	0.1303
CAPEX/sales	16,554	0.0684	0.0332	0.1105	0	0.9348	0.0166	0.0677
DTA	16,554	0.1955	0.1719	0.1735	0	0.7390	0.0230	0.3208
LDTA	16,554	0.1581	0.1187	0.1617	0	0.7391	0.0016	0.2687
PNDIV	16,554	0.4364	0.4231	0.2194	0	1	0.2857	0.5714
PSDIV	16,554	0.5549	0.5919	0.2973	0	1	0.3325	0.7960
changeGDP	16,554	0.0222	0.0270	0.0195	-0.026	0.048	0.0180	0.0360
CONTRACTION	16,554	1.6651	0	3.0931	0	9	0	0

Authors' elaboration

Table 6b

[Summary statistics of variables for the unisegment and diversified firms subsamples (1998-2010)]

This table shows descriptive statistics of the variables involved in our models for the unisegment (12,047 firm-year observations) and diversified firms (4,507 firm-year observations) subsamples. Some observations contain missing data for some variables. Excess Value is the measure developed by Berger and Ofek (1995) to assess the value created by diversifying. MBAR (the market to book assets ratio), MBER (the market to book equity ratio), MABA (the ratio of market value to book value of assets), Q (Tobin's Q) and DTE (the debt equity ratio) are five different proxies for the growth options portfolio value relative to firm's total value. Numsegments (number of business segments), HERF (the Herfindahl index) and TotalEntropy (the Entropy index) measure the level of diversification. Control variables: LTA (size), EBIT/sales (profitability), CAPEX/sales (level of investment in current operations), DTA(financial leverage), changeGDP (real growth rates of gross domestic product), CONTRACTION (the number of months in the year the U.S. economy was in a recession), PNDIV (fraction of firms in the firm's core industry that are diversified), PSDIV (the proportion of the firm's core industry sales accounted for by diversifiers).

	UNISEGMENT FIRMS dummyDIVER=0				DIVERSIFIED FIRMS dummyDIVER=1			
	Mean	**STD**	**Min.**	**Max.**	**Mean**	**STD**	**Min.**	**Max.**
Excess Value	-0.0393	0.7773	-2.8458	2.6628	-0.1058	0.8121	-2.8304	2.6308
Growth opportunities proxies								
MBAR	1.7605	0.9809	0.0835	5.5235	1.6791	0.9158	0.2157	5.4271
MBER	2.5386	1.7397	0.0399	8.8081	2.5654	1.7444	0.0759	8.7370
MABA	1.8107	0.9674	0.1980	5.5228	1.7459	0.9016	0.1415	5.4883
Q	1.2422	0.9541	0.0000	4.9612	1.2001	0.9038	0.0027	4.9474
DTE	0.6292	0.7649	0.0016	4.3581	0.6803	0.7680	0.0065	4.3593
Diversification indexes								
numsegments	1	0	1	1	2.2860	0.5986	2	6
HERF	0	0	0	0	0.3611	0.1768	0.0001	0.7925
Total Entropy	0.0000	0.0000	0.0000	0.0000	0.5746	0.2834	0.0005	1.6559
Control variables								
LTA	5.7134	1.6836	1.5217	9.9975	6.1808	1.8079	1.8918	9.9852
EBIT/sales	0.0520	0.1935	-1.1762	1.1792	0.0604	0.1567	-1.1784	0.9196
CAPEX/sales	0.0708	0.1164	0	0.9348	0.0617	0.0923	0	0.8670
DTA	0.1884	0.1769	0	0.7390	0.2145	0.1628	0	0.7307
LDTA	0.1512	0.1643	0	0.7391	0.1763	0.1530	0	0.6848

Authors' elaboration

Table 7
Probit model [first stage of the Heckman's estimation]

This table displays the estimations of the different specifications of the selection equation - the first stage of Heckman's procedure. This probit model estimates firms' propensity to diversify. The dependent variable takes the value of 1 when the firm is diversified and zero otherwise. The pseudo-R square indicates the goodness of fit. Standard error is reported in parentheses under coefficients. ****, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Probit	(1)	(2) with lags	(3) with dummy years	(4) with lags and dummy years
Constant	-2.6356***	-2.6479***	-2.7298***	-2.7800***
	(0.0602)	(0.0732)	(0.0713)	(0.0850)
Firm characteristics				
LTA	0.1108***	-0.0474	0.1134***	-0.0470
	(0.0069)	(0.0658)	(0.0069)	(0.0661)
EBIT/sales	-0.1592**	-0.0450	-0.1391**	-0.0192
	(0.0655)	(0.1075)	(0.0660)	(0.1083)
CAPEX/sales	-0.7678***	-0.5510**	-0.7887***	-0.5599**
	(0.1115)	(0.2610)	(0.1122)	(0.2620)
LTA $_{t-1}$		0.1678***		0.1700***
		(0.0655)		(0.0658)
EBIT/sales $_{t-1}$		-0.0531		-0.0713
		(0.1018)		(0.1027)
CAPEX/sales $_{t-1}$		-0.3274		-0.3357
		(0.2465)		(0.2482)
Industry characteristics				
PNDIV	2.1820***	2.1367***	2.1400***	2.1232***
	(0.0682)	(0.0810)	(0.0702)	(0.0835)
PSDIV	0.5856***	0.6358***	0.5770***	0.6252***
	(0.0492)	(0.0594)	(0.0495)	(0.0597)
Macroeconomic characteristics				
ChangeGDP	2.4047**	0.9054	1.4355	0.1500
	(0.9429)	(1.1328)	(1.4136)	(1.5901)
CONTRACTION	0.0074	-0.0049	0.0157*	0.0103
	(0.0058)	(0.0068)	(0.0084)	(0.0095)
Dummies year	NO	NO	YES	YES
N. of obs.	16,554	11,745	16,554	11,745
Log. Likelihood	-8177.981	-5755.1745	-8167.4142	-5746.8648
Pseudo-R^2	0.1562	0.1590	0.1573	0.1602

Authors' elaboration

Table 8
Estimation results model I (Heckman two-step estimator)

This table reports the Heckman second stage estimation by OLS (the Heckman's two-step estimator) of Model I –outcome equation. Different proxies for growth options ratio to firm's total value (GOR) – either MBAR (the market to book assets ratio), MBER (the market to book equity ratio), MABA (the ratio of market value to book value of assets), Q (Tobin's Q), or DTE (the debt equity ratio) – are regressed on diversification scope variables - either Numsegments (number of business segments), HERF (the Herfindahl index), and TotalEntropy (the Entropy index) – alternatively so as to check the robustness of the results. Firm size (LTA), financial leverage (DTA), industry effect (Industry dummies), and time effect (Year dummies) are controlled in all estimations. The Inverse Mills Ratio ((λ_i) is included as an additional regressor to correct the potential self-selection bias in the sample. The Wald test contrasts the null hypothesis of no joint significance of the explanatory variables. Standard error is reported in parentheses under coefficients. ****, **, and * denote statistical significance at the 1%, 5% , and 10% level, respectively.

	Dependent variable: MBAR			Dependent variable: MBER			Dependent variable: MABA			Dependent variable: Q			Dependent variable: DTE		
Constant	1.3074***	1.3988***	1.3844***	1.8013***	1.4085***	1.3150***	1.3341***	1.3864***	1.3691***	0.5966***	0.6362***	0.6323***	0.3597**	0.5477***	0.4914***
	(0.1932)	(0.1044)	(0.1064)	(0.3769)	(0.2038)	(0.2099)	(0.1902)	(0.1028)	(0.1048)	(0.1927)	(0.1042)	(0.1062)	(0.1417)	(0.0767)	(0.0778)
Diversification indexes															
numsegments	-0.0692			-0.5130**			-0.0916			-0.0985			0.2247**		
	(0.1213)			(0.2368)			(0.1194)			(0.1210)			(0.0890)		
numsegments2	0.0144			0.0837**			0.0179			0.0196			-0.0399***		
	(0.0196)			(0.0383)			(0.0193)			(0.0196)			(0.0144)		
HERF		-0.8951***			-1.7201***			-0.8672***			-0.8483***			0.6189***	
		(0.2634)			(0.5153)			(0.2596)			(0.2630)			(0.1939)	
HERF2		0.9699***			2.0723***			0.9572***			0.9510**			-0.7770***	
		(0.3782)			(0.7397)			(0.3727)			(0.3776)			(0.2783)	
TotalEntropy			-0.4989***			-0.8549***			-0.4831***			-0.4865***			0.4473***
			(0.1477)			(0.2920)			(0.1456)			(0.1475)			(0.1082)
TotalEntropy2			0.3255***			0.5848***			0.3191***			0.3306***			-0.3248***
			(0.1110)			(0.2193)			(0.1094)			(0.1108)			(0.0813)
Control variables															
LTA	0.0648***	0.0660***	0.0683***	0.1835***	0.1835***	0.1925***	0.0832***	0.0843***	0.0869***	0.0972***	0.0983***	0.0999***	-0.0654***	-0.0658***	-0.0619***
	(0.0082)	(0.0082)	(0.0085)	(0.0160)	(0.0160)	(0.0167)	(0.0081)	(0.0081)	(0.0083)	(0.0082)	(0.0082)	(0.0085)	(0.0060)	(0.0060)	(0.0062)
DTA	-1.3429***	-1.3562***	-1.3714***	0.1054	0.0893	0.0676	-1.3494***	-1.3617***	-1.3807***	-0.8525	-0.8647***	-0.8816***	2.5372***	2.5446***	2.5338***
	(0.0856)	(0.0854)	(0.0901)	(0.1673)	(0.1672)	(0.1782)	(0.0844)	(0.0842)	(0.0888)	(0.0854)	(0.0853)	(0.0899)	(0.0629)	(0.0629)	(0.0660)
Inverse Mills Ratio (λ_i)	0.1752***	0.1612***	0.1968***	0.1192*	0.1015	0.1577**	0.1368***	0.1237***	0.1543***	0.1514***	0.1385***	0.1699***	-0.0693***	-0.0614**	-0.0754***
	(0.0340)	(0.0340)	(0.0380)	(0.0661)	(0.0661)	(0.0748)	(0.0334)	(0.0334)	(0.0374)	(0.0339)	(0.0338)	(0.0379)	(0.0249)	(0.0249)	(0.0277)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238
No. Censored Obs.	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260
No. Uncensored Obs.	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978
Wald Chi2 $X^2(22)$	561.94***	580.28***	511.02***	334.34***	343.32***	328.25***	573.75***	590.35***	532.44***	478.29***	492.43***	454.26***	2075.99***	2079.25***	1870.63***

Authors' elaboration

Table 9
Two-group mean comparison test

This table shows the difference between the excess value means of firms with a set of growth opportunities below (dummyMBAR=0, dummyMBER=0 dummyMABA=0, dummyQ=0, or dummyDTE=1 subgroups) and above the sample mean (dummyMBAR=1, dummyMBER=1 dummyMABA=1, dummyQ=1, or dummyDTE=0 subgroups). The sample comprises 16,554 firm-year observations for the 1998-2010 period. In each panel, a different GOR proxy is used to classify the enterprises into the two groups. We assume equality of variances between both groups. ****, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variable: Excess value						
	Obs.	**Mean**	**Estándar deviation**	**Min.**	**Max.**	**Difference of means test between groups (1-2)**
Group 1: dummyMBAR=0	10,482	-0.3222	0.7231	-2.8458	2.5708	Mean difference = -0.7220*** p-value= 0.000 t-statistic= -63.3759 Degrees of freedom= 16,552
Group 2: dummyMBAR=1	6,072	0.3998	0.6767	-2.8052	2.6628	
Group 1: dummyMBER=0	10,216	-0.2986	0.7240	-2.8458	2.5708	Mean difference = -0.6302*** p-value= 0.000 t-statistic= -54.3259 Degrees of freedom= 16,552
Group 2: dummyMBER=1	6,338	0.3315	0.7278	-2.8052	2.6628	
Group 1: dummyMABA=0	10,516	-0.3223	0.7233	-2.8458	2.5708	Mean difference = -0.7265*** p-value= 0.000 t-statistic= -63.7663 Degrees of freedom= 16,552
Group 2: dummyMABA=1	6,038	0.4041	0.6735	-2.8052	2.6628	
Group 1: dummyQ=0	10,333	-0.3425	0.7172	-2.8458	2.3849	Mean difference = -0.7586*** p-value= 0.000 t-statistic= -67.8754 Degrees of freedom= 16,552
Group 2: dummyQ=1	6,221	0.4162	0.6607	-2.5809	2.6628	
Group 1: dummyDTE=0	11,289	0.1226	0.7388	-2.8458	2.6628	Mean difference = 0.5660*** p-value= 0.000 t-statistic= 45.7065 Degrees of freedom= 16,552
Group 2: dummyDTE=1	5,265	-0.4434	0.7490	-2.8330	2.5708	

Authors' elaboration

Table 10
Estimation results model II (Heckman two-step estimator)

This table reports the Heckman second stage estimation by OLS (the Heckman's two-step estimator) of Model II –outcome equation. The Excess Value measure developed by Berger and Ofek (1995) is regressed on different proxies for growth options ratio to firm's total value (GOR) – either MBAR (the market to book assets ratio), MBER (the market to book equity ratio), MABA (the ratio of market value to book value of assets), Q (Tobin's Q), or DTE (the debt equity ratio). The diversification status – either measured by the either Numsegments (number of business segments), HERF (the Herfindahl index), and TotalEntropy (the Entropy index) –, firm size (LTA) and its square (LTA2), profitability (EBITsales), financial leverage (LDTA), industry effect (Industry dummies), and time effect (Year dummies) are controlled in all estimations. The Inverse Mills Ratio (λ_i) is included as an additional regressor to correct the potential self-selection bias in the sample. The Wald test contrasts the null hypothesis of no joint significance of the explanatory variables. Standard error is reported in parentheses under coefficients. ****, **, and * denote statistical significance at the 1%, 5%, and 10% level.

	Dependent variable: EXCESS VALUE (Estimations with MBAR)			Dependent variable: EXCESS VALUE (Estimations with MBER)			Dependent variable: EXCESS VALUE (Estimations with MABA)			Dependent variable: EXCESS VALUE (Estimations with Q)			Dependent variable: EXCESS VALUE (Estimations with DTE)		
Constant	-2.4143***	-2.3901***	-2.4072***	-2.4392***	-2.3768***	-2.3992***	-2.4492***	-2.4208***	-2.4370***	-2.0327**	-2.0094***	-2.0369***	-1.2106***	-1.1617***	-1.2214***
	(0.1202)	(0.1167)	(0.1215)	(0.1310)	(0.1271)	(0.1322)	(0.1201)	(0.1166)	(0.1214)	(0.1186)	(0.1151)	(0.1197)	(0.1370)	(0.1327)	(0.1372)
Growth oppportunities proxies															
MBAR	0.5278***	0.5260***	0.5212***												
	(0.0106)	(0.0105)	(0.0113)												
MBER				0.2206***	0.2199***	0.2136***									
				(0.0059)	(0.0058)	(0.0062)									
MABA							0.5374***	0.5357***	0.5308***						
							(0.0107)	(0.0107)	(0.0115)						
Q										0.5408***	0.5392***	0.5344***			
										(0.0105)	(0.0105)	(0.0113)			
DTE													-0.4998***	-0.4988***	-0.5036***
													(0.0159)	(0.0158)	(0.0170)
Diversification indexes															
numsegments	-0.0217			-0.0089			-0.0211			-0.0244			-0.0197		
	(0.0158)			(0.0171)			(0.0157)			(0.0156)			(0.0178)		
HERF		-0.2168***			-0.2549***			-0.2265***			-0.2367***			-0.2937***	
		(0.0528)			(0.0574)			(0.0528)			(0.0523)			(0.0596)	
TotalEntropy			-0.1249***			-0.1358***			-0.1292***			-0.1375***			-0.1484***
			(0.0357)			(0.0388)			(0.0357)			(0.0353)			(0.0399)
Control variables															
LTA	0.3441***	0.3473***	0.3521***	0.4662***	0.4695***	0.4773***	0.3422***	0.3454***	0.3505***	0.3264***	0.3299***	0.3370***	0.2747***	0.2789***	0.2902***
	(0.0331)	(0.0330)	(0.0348)	(0.0359)	(0.0359)	(0.0378)	(0.0330)	(0.0330)	(0.0348)	(0.0327)	(0.0327)	(0.0345)	(0.0375)	(0.0374)	(0.0392)
EBITsales	0.2419***	0.2268***	0.2732***	0.4871***	0.4663***	0.5314***	0.2184***	0.2024***	0.2470***	0.1746***	0.1582***	0.2059***	0.3240***	0.3011***	0.3456***
	(0.0618)	(0.0618)	(0.0680)	(0.0666)	(0.0666)	(0.0731)	(0.0618)	(0.0618)	(0.0679)	(0.0614)	(0.0614)	(0.0674)	(0.0701)	(0.0701)	(0.0766)
LDTA	0.7025***	0.6950***	0.6722***	-0.0028	-0.0118	-0.0329	0.7197***	0.7117***	0.6902***	0.4304***	0.4236***	0.4016***	1.2422***	1.2308***	1.2050***
	(0.0669)	(0.0668)	(0.0709)	(0.0711)	(0.0709)	(0.0751)	(0.0669)	(0.0667)	(0.0709)	(0.0653)	(0.0651)	(0.0691)	(0.0837)	(0.0836)	(0.0883)
LTA2	-0.0189***	-0.0190***	-0.0196***	-0.0293***	-0.0294***	-0.0302***	-0.0195***	-0.0197***	-0.0203***	-0.0186***	-0.0188***	-0.0195***	-0.0135***	-0.0137***	-0.0146***
	(0.0026)	(0.0026)	(0.0027)	(0.0028)	(0.0028)	(0.0030)	(0.0026)	(0.0026)	(0.0027)	(0.0026)	(0.0026)	(0.0027)	(0.0029)	(0.0029)	(0.0031)
Inverse Mills Ratio (λ_i)	-0.0520**	-0.0581**	-0.0698***	0.0222	0.0128	0.0095	-0.0326	-0.0392*	-0.0487*	-0.0406*	-0.0473**	-0.0576**	-0.0003	-0.0100	-0.0116
	(0.0238)	(0.0238)	(0.0269)	(0.0258)	(0.0258)	(0.0291)	(0.0238)	(0.0238)	(0.0268)	(0.0236)	(0.0236)	(0.0266)	(0.0268)	(0.0268)	(0.0300)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238	16,554	16,554	10,238
No. Censored Obs.	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260	12,047	12,047	6,260
No. Uncensored Obs.	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978	4,507	4,507	3,978
Wald Chi2 $X^2(24)$	3556.42***	3582.83***	3112.67***	2312.48***	2342.02***	2032.98***	3578.35***	3607.93***	3132.41***	3717.50***	3750.11***	3262.46***	1822.40***	1854.74***	1679.26***