THE DOMINANCE OF DIVERSIFIED VERSUS SPECIALIZED FIRMS ACROSS INDUSTRIES

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Abstract

Some industries are populated primarily by diversified firms, while other industries are dominated by specialized firms, which are present only in such a given industry. In this study, we analyze what factors determine the dominance of diversified versus specialized firms, and its effect on firm performance. In line with transaction cost economics, we show that market concentration and the degree of variability in the diversification pattern of firms in the industry are negatively associated with the importance of the activity accounted by specialized firms across the 720 industries in our study. The performance of diversified firms is greater than that of specialized firms, where diversifiers dominate the industry and vice versa. We also discuss the implication of these results for the literature on firm diversification.

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1. INTRODUCTION

The dominance of specialized (vs. diversified) firms across industries has not been studied, despite its potential contribution to our understanding of vertical integration and diversification. As we can see in Table I, most industries are populated only by diversified firms (i.e. which compete in more than one industry), while in other sectors both specialized and diversified companies compete side to side, and only in a reduced number of industries specialized firms fully dominate the industry. Why diversified companies dominate some sectors and not others? What are the characteristics of those sectors populated by specialized firms? Which type of firm has better performance across these different types of industries? This paper is a first attempt to study empirically the answers to these questions using as guidance transaction costs economics.

At any level of industry definition, firms interact with competitors which may be present across multiple industries. Firms can integrate vertically absorbing input providers and buyers along the value chain, or horizontally across industries. Since Coase, standard economic theory claims that transaction costs are the key variable that determines whether markets or hierarchies will govern transactions between industries. Basically, if the transaction costs of using the market are large, we are likely to observe diversified multi-industry companies; if they are low, we will tend to observe specialized companies competing in separate industries. We will apply this rationale to understand the relative dominance of diversified versus specialized firms across industries.

Drawing from transaction cost economics, we will analyze which type of industries may show substantial transaction costs in their relations with other industries, so that mostly diversified companies should presumably survive in them. Given the impossibility of directly measuring transaction costs between industries, we will focus on two variables that may reveal their existence. On the one hand, the number of players in an industry indicates the likelihood of small numbers bargaining problem (Williamson, 1985) and the resulting higher transactions costs in dealing through the market with firms in such an industry. On the other hand, we will study the possible existence of market failures through the analysis of a common pattern of diversification for the firms in a given sector; thus, if we see that most players in a given industry also report operations in a similar group of industries, we may presume that some underlying market failure makes efficient to be present in all these sectors at the same time. We will investigate empirically the relationship of these two critical structural characteristics, which reflect the possible existence of transaction costs, with the dominance of specialized firms vs. diversifiers across a large set of industries.

Additionally, we will look into the performance consequences of not using the most efficient single vs. multimarket presence. Thus, we will test to what extent, in industries dominated by one of these two types of firms, companies of the other type have a competitive disadvantage that results in lower financial performance. We believe that this approach will bring new light into the important debate around the performance consequences of diversification in industrial organization, finance, and strategic management. This debate is still open with some scholars claiming that diversification

reduces firm performance on average (Lang-Stulz (1994), Berger-Ofek (1995) and Servaes (1996)), while some recent research argues in favour of a positive effect once the endogeneity issue is accounted for, because the decision of firms to diversify may be associated with their initial lower performance (Villalonga (2004a); Campa (2002) and Graham, Lemmons and Wolf (2002)). In this paper, we argue that the effects of diversification can be studied more precisely if we distinguish between industries dominated by specialized firms and those dominated by diversifiers. In contrast to previous literature, we claim that the relationship between diversification and performance is not homogeneous across industries and rather it crucially depends on particular industry characteristics.

The structure of the paper is as follows: In the next section, we explain the analytical framework and formulate the key hypotheses. Section 3 contains the data and variables description. Section 4 reports our findings. In the last section, we present our conclusions and discuss their relevance for the firm diversification literature.

1. Understanding Industry Activity Accounted For By Specialized Firms

In this section, we discuss the key factors that in our opinion may influence the probability of observing a larger number of specialized firms competing in a given industry (in contrast to diversifiers) as well as the consequences on firm performance. As we mentioned earlier briefly, a small number of firms in an industry and their similar pattern of multi-industry presence may indicate the existence of transaction costs that favour the emergence of diversified firms that displace specialized firms operating in such an industry and operating through the market with other firms. Let us analyze in greater detail how these variables are expected to affect the level of industry specialization.

Industry concentration

There are two reasons that explain why specialized firms might be more efficient than multi-industry firms when the industry has a relatively large number of players.

Economists have studied extensively how we get an efficient allocation of resources in competitive industries. In these markets, prices follow closely the marginal cost of production and firms operating in other stages of the value chain have no incentive to integrate towards them. Firms that integrate into competitive industries can hope at most to replicate the efficiency level obtained by specialized firms, fully obtainable through the price mechanism. Thus, little gains for multi-industry firms can be made through integration. Furthermore, integration into a larger entity and the introduction of a new layer in the hierarchy could distort the optimal incentives provided by the market[1] resulting in a destruction of value. Because in highly fragmented markets there is less incentive to incorporate these activities within the hierarchy and multi-industry firms may even become less efficient than specialized firms, we expect than specialized firms will have a relatively larger presence in these markets.

Additionally, following Klein, Crawford and Alchian (1978), Williamson (1985) and Hart (1995), firm-specific assets could result into under-investment due to potential

[1] For example with the creation of a new principal-agent problem or with the creation of influence costs, cost of trying to influence managerial decisions, see Milgrom-Roberts (1992)

hold-up problems. In an incomplete contract setting, the ex-ante incentives to make firm-specific investments decrease if the owner of the asset does not appropriate the ex-post quasi-rents of her investment. This problem could be mitigated by reassigning the property rights through vertical integration. If this type of problems arises in a buyer-supplier relationship we could expect a larger likelihood of multi-industry firms in industries with higher importance of firm-specific assets[2]. This is, if a company with the role of buyer-seller needs to make investments specific to this bilateral relationship, we are more likely to observe vertical integration. When we incorporate the role of industry concentration in this standard argument regarding vertical integration, we can hypothesize a decreasing importance of relationship specific investments when the number of companies active in a given industry is relatively larger. In other words: The larger the number of players in an industry, the less likely that firm-specific investments subject to the type of hold-up problem that we have explained above may exist.

For these two parallel reasons we propose (**P1**) that in less concentrated industries the proportion of industry activity developed by specialized firms will be relatively greater.

Homogeneity in the degree of industry diversification

Ideally we would like to be able to observe directly the existence of "economies of scope"[3] across industries, coupled with transaction costs (Teece, 1980; 1982). The straightforward hypothesis would be that the existence of economies of scope with other industries would predict a larger importance of multi-industry companies in a given industry, as long as transaction costs also inhibit using market transactions to share activities across firms in these industries. However, since neither economies of scope nor transaction costs are easily measurable we follow an indirect approach that we explain below.

We conjecture that if there are economies of scope coupled with transaction costs between two specific industries, then all firms active in any of these industries could take advantage of being present in the other one. Therefore, we should observe most firms competing in both industries at once in order to take advantage of these economies of scope. Though we can not measure economies of scope directly in our multi-industry study, we can indeed observe the extent to which a diversified firm operating in a particular industry operates in the same set of industries as other diversified firms operating in that same SIC code. With this information we can construct a measure of the homogeneity in the degree of diversification of all participating companies in a given industry as we do in the next section.

We propose (**P2**) that in industries in which all firms present a similar pattern of diversification, i. e. they are active in a similar set of industries, the proportion of activity accounted by specialized firms is going to be smaller, because they cannot take advantage of economies of scope of diversifiers. In contrast, if firms in the industry present a non-homogeneous pattern of diversification, each one being present in very different sets of industries, then there is no evidence of economies of scope, and specialized firms would not have a disadvantage over diversifiers. In this case,

[2] Monteverde and Teece (1982), Masten, S. (1984) and Joskow (1985).
[3] See Panzar (1989) for a formal definition.

therefore, we would not expect diversifiers to dominate the industry; specialized firms should account for a larger part of the industry.

Performance consequences

The previous discussion highlights than under certain circumstances, diversifiers should be more competitive than specialized firms and vice versa. Multi-industry firms that operate in sectors with characteristics that benefit specialization (i.e. industries with many competitors and heterogeneous patterns of diversification) should have a competitive disadvantage. If we are willing to accept that markets work reasonably well, then after some period of time we should observe that these multi-industry firms are replaced by specialized firms, which should eventually dominate the industry. By the same reasoning, specialized firms that operate in industries in which there are economic gains for diversification (i.e. economies of scope along transaction costs) should have a competitive disadvantage, and they should be eventually replaced by the multi-industry companies that will dominate the industry.

Basically, we argue that diversification is neither good nor bad intrinsically, as earlier empirical research on diversification and performance assumed implicitly. In some industries, specialized firms will have an advantage over diversified firms and vice versa. This is a testable hypothesis that claims that diversified firms should perform worse in industries in which specialized companies dominate and, similarly, specialized firms should have lower performance in industries dominated by diversified firms (**P3**).

Control variables

There are two variables that have been frequently associated with the decisions of firms to specialize or diversify: industry size and volatility. Since these variables do not affect the relative competitiveness of diversifiers versus specialized firms as we analyze in this paper based on the rationale of transaction cost economics, we leave them out of our model, but include them in the statistical analysis as control variables.

a) Industry size. Stigler (1951) proposed a well-known model in which the extent of vertical disintegration is limited by total market size. In his model, a large demand makes profitable the emergence of specialized firms that operate exclusively in one stage of the product value chain. For low levels of market size, the existence of these specialized firms is not possible since there is not enough volume to cover the fixed costs needed to set up independent firms in each step of the value chain. The implicit assumption in the argument is that total fixed costs are smaller under a vertical integrated firm, but variable costs are higher. Thus, we will control for the effect of market size on industry specialization, expecting that multi-industry companies will dominate smaller size industries and specialized companies will have greater presence in industries of greater size.

b) Industry volatility. The positive effects of diversification on reducing risk are extensively documented in the field of corporate finance[4]. However, there are also

[4] Even if individual shareholders do not need firm diversification to reduce risk, individual managers may still have an incentive to engage in firm diversification policies to reduce their own , see Amihud and Lev (1981).

reasons to expect that in highly volatile environments hierarchies will perform worse than the decentralized market allocation mechanism. For example, in a standard principal agent problem, the risk-adverse agent´s total compensation increases with total volatility, making more costly for the principal to implement the optimal level of agent´s effort. Furthermore, the higher level of centralization inherent to the hierarchy makes the decision process slower and this could result in higher costs in more volatile industries for the multi-industry companies. Thus, it is not clear whether diversified firms should be more or less dominant than specialized firm in more volatile industries. In any case, industry volatility seems to be a potentially important variable with regard to diversification and we will include it as a control, though its effect on the competitiveness of diversifiers and specialized firms could go either way.

2. Data and Variable Description

For operational purposes, we identify an industry as a four-digit SIC code[5] from the Compustat database. In 1997, a change in the SEC regulations forced public companies to disclose their segment information exactly in the same way as they were internally organized. Because this change in SEC regulations about the disclosure of segment information could have an important impact in the performance consequences of firm diversification[6], we will use data only from 1998 onwards to measure industry specialization, that is, the proportion of sales obtained by all specialized firms in a given industry (in contrast to the proportion of sales attributable to diversifiers in such an industry).

The number of industries in the dataset oscillates between 761 in 1998 and 727 in 2001, as Table 1.A shows. Most industries are exclusively populated by diversified firms, but in close to 40% of the industries in the sample specialized and diversified firms compete with each other. Considering all industries, around 12% to 14% of overall sales are made by specialized firms, while the rest are attributable to diversified firms. These numbers show that diversified firms clearly dominate our economy, though there is still an important number of specialized firms competing alongside in their own industry against diversifiers.

It should be noted that there may be industries in the large database Compustat in which we have just one observation for a single firm. We might suspect that single-firm industries could mislead our conclusions about industry specialization. We checked whether the pattern of industry specialization changes when excluding the firms that report just one segment. Table I.B shows these descriptive statistics in the reduced sample. We lose around 10% of the sample depending on the year, but we can see how the percentage of industry activity accounted for by specialized companies does not change much; for example in 2001 this percentage was 14% using the whole sample and 15% using the restricted sample.

We combine data from different Compustat databases. From Compustat Industrial (1998-2001), we take corporate information for all US public companies. We also use Compustat Segment (1998-2001) to get business segment data. We cross the

[5] We discuss later how our results might change with different industry definitions.
[6] For a description of all imperfections of segment data prior to 1997 see Villalonga (2004b)

information from the two data sets using the Standard & Poor's firm identifier. Descriptive statistics for all the variables in year 2001 are shown in Table II.

Percentage of activity accounted for by specialized firms

There are some segments (four-SIC codes) that we cannot allocate to any industry since they do not report their activity with the 4 digit level of detail. We drop these observations losing 10% of firms in our sample. We consider specialized firm those that operate in only one industry (i.e. business segment) and diversifiers those for which Compustat reports data for more than one business segment. Total industry sales is computed by adding all individual segment sales of diversifiers plus all specialized firm sales operating in such an industry for that year. Once we have this total, we are able to compute the share of industry sales accounted for by specialized firms.

Market structure

For each four-digit SIC code, we add all specialized firms and segments of diversified firms that operate in that particular industry in a given year. The sum of both categories gives us the total number of players in each SIC code. For example in 2001, for the SIC 2013, "Sausage and other prepared meats" there was a total of six players operating. Four of them: Bob Evans Farms, Sara Lee Corporation, Atlantic Premium and Provena Foods were operating in additional industries like Restaurants, Beverages or Household Products. Two of them Bridgeford Foods and Smithfield were operating only on "Sausage and other prepared meats". We can then compute the Herfindhal Hirschman Index to measure industry concentration based on segment sales figures to obtain market shares.

Variation in the diversification pattern at the industry level

The computation of this variable requires detailed explanation. For clarification purposes, specific examples are shown in Appendix I. For each possible pair of industries we compute the number of firms that are operating simultaneously in both of them. As a result we have a symmetric square matrix whose number of rows and columns is equal to the number of different industries we have in the sample. Note that in the diagonal of this matrix we have the total number of players in each industry. Let m_{ij} be the element of this matrix located in row i column j, I the total number of industries in the sample, O_{ij} is an index function equal to zero if m_{ij} =0 and equal to 1 otherwise. Our measure of homogeneity in the diversification structure of the industry i, H_i, is calculated as follows:

(1)

$$H_i = \frac{\sum_{j \neq i}^{I} \left(\frac{m_{ij}}{m_{ii}} \right)^2}{\sum_{j \neq i}^{I} O_{ij}}$$

If the industry i is populated only by specialized firms then H is assigned a value equal to zero. Note that basically H is a measure of the variance of a variable: the proportion of firms in industry i that operate in the rest of the industries.

We have defined H such that its maximum value is one, corresponding to the situation in which all firms in the industry have the same diversification structure. For example, in 2001 for the SIC code 5139 " Footwear wholesale", there are only two firms active: Genesco and the Weyco Group. Both firms are also operating in only one more SIC code 5661, "Shore Stores". We say that the "Footwear wholesale" industry has a homogeneous diversification structure meaning that all units active in this sector have the same pattern of diversification. We can check that in (1), both the numerator and denominator will be equal to one and as a result H will be one. Instead in SIC code 1429, "Crushed & broken stone" in 2001 there are two firms: Azco Mining that operates only in that industry and Vulcan Material that has also a segment in SIC code 2812, " Alkalies & chlorine". Therefore for SIC code 1429, the numerator is $(1/2)^2$ and the denominator is equal to 1. As a result, our measure of homogeneity in the diversification structure is 0.25.

Industry size

Total industry size has been measured as total industry sales in a given year adding both sales from specialized firms and sales from segments of diversified companies that operate in that given industry.

Industry Volatility

We measure volatility in an industry by the weighted average of firm volatility. The weights we use are the market share of each segment. Firm volatility has been computed using stock return volatility in the past 60 months.

3. Results

Preliminary evidence

In Table III we can see how it seems to be a negative correlation between our measure of the percentage of activity accounted for by specialized firms and both the Homogeneity in the diversification structure at the industry level and the concentration measured by the Herfindhal Index. On average, in fragmented industries with a non-homogeneous diversification structure, specialized firms account for 28% of the activity while in Homogeneous and Concentrated Industries this number decreases to only 7%.

In Graph 1 and Graph 2 we have more evidence about this negative correlation between our dependent variable and both industry concentration and the variation in the diversification structure.

Regressions

We confirm these intuitions regressing the proportion of industry sales by specialized firms on the industry concentration ratio and our measure H of homogeneity

in the diversification structure. In Table IV we can see that both independent variables are indeed negatively correlated with the relative presence of specialized firms in the sample of 720 industries. The Herfindhal Index of industry concentration and our measure H of homogeneity of diversification pattern are both negatively correlated with the percentage of industry sales from specialized firms.

Note that the variable of homogeneity in the diversification structure has a non-linear influence with a quadratic term that is positive and statistically significant. This suggests a possible U form relation between homogeneity in the diversification structure and the proportion of activity of specialized firms. In particular, the functional form that links the percentage of activity done by specialized firms, Y, and the homogeneity in the diversification structure follows is as follows:

$Y= -0.83H + 0.70H^2$
And therefore
$dY/dH = -0.83 +1.4H$

Note that the homogeneity in the diversification structure only increases the importance of specialized firms for those values of H larger than 0.59. Less than 2% of the observations have a value of H larger than 0.59[7] and therefore for 98% of the sample H has a negative effect on the proportion of activity accounted by specialized firms, as it was expected.

Finally, since our dependent variable is constrained by definition to be between zero and one, we estimate a non-linear regression that accounts for this fact. In particular, we use a functional form $Y = 1\text{-}1/\exp(b_0 + \Sigma b_i x_i)$ that guarantees that the dependent variable will only be contained in the interval between zero and one. The results are also reported in Table IV and they are qualitatively the same than we found with the simple OLS regression[8]. As a summary we can conclude that we find strong empirical evidence in favor of **P1** and **P2**.

Next, we test **P3** using segment ROS as measure of performance[9]. Table V displays numerically how the relative performance of diversified and specialized companies changes dramatically as the proportion of industry sales made by specialized firms increases. For those industries in which specialized firms represent less than 60% of total sales, diversifiers have much better performance than specialized firms. The differences in performance become substantially smaller when specialized firm begin to dominate the industry, and eventually specialists achieve slightly greater performance than diversifiers in terms of median ROS. This can also be seen in Graph 3.

These observed patterns could be driven because structural industry differences in performance as we claim, but they could also be due to other differences in diversified versus specialized companies that influence their financial performance. We tried to control for them using standard fixed-effects regression analysis. With this purpose we construct a dummy for multi-industry (diversification) equal to one if the firm is active in more than one four digit SIC code. Additionally, we define a dummy that has a value

[7] In Table II we can see that the mean value of H is 0.17 and the median is 0.04
[8] We also did the regression analysis using dummies for the quartiles of the two key independent variables and obtained also a significant negative association with the dependent variable.
[9] We also used ROA as an alternative measure of performance and obtained very similar results.

of one if the business operates in a four-digit SIC code in which more than 50% of the activity, as measured by total sales, is performed by specialized firms. In Table VI we regress business ROS on a set of industry dummies, firm size, the diversification dummy, and its interaction with the specialized industry dummy. The results confirm that diversified firms indeed perform better than specialized industries across the board, except when specialized firms dominate the industry, thus supporting P3.

Robustness checks

Although we have reported the regression with the cross section of industries just for the year 2001, our results are qualitative the same in any other given year from 1998 to 2001. We do not include these results and other robustness checks discussed below in the paper to avoid flooding the paper with tables, but these results are available and could be requested to the authors.

Another concern is the robustness of our empirical findings to the exclusion from the sample of those industries from which we have just a single firm observation. We have replicated our analyses in the restricted sample and obtained the same results that we have documented in the paper.

Finally, one may have some issues regarding the industry definition we have used to construct our industry variables. We have equated industry with a four-digit SIC code. It might be too much or too less aggregation. For example, one might wonder about being appropriate to consider as diversified a firm that is operating both at SIC 2047 "Dog and Cat Food" and SIC 2048 "Prepared Feeds and Feed Ingredients for Animals and Fowls". On the contrary, SIC code 2052 Cookies and Crackers can aggregate two industries that have absolutely nothing to do with each other. Again, we have test if our results are robust to the use of different industry definitions and we have replicated our analysis taking the three digit SIC code as the unit of analysis. Once again, our results are qualitatively the same although the statistical significance decreases slightly.

5. Implications for the diversification literature

This paper provides further empirical evidence of the validity of transaction costs economics in understanding the emergence and the efficiency of diversified versus specialized firms. We can see that in industries with certain characteristics associated with high transaction costs (few players present also in a similar set of other industries) diversifiers account for a larger share of sales and have better performance than specialists competing in those industries. In contrast, under the opposite circumstances specialists have greater presence and achieve greater performance.

The fact that some industries seem to be more favourable environments for diversified firms than for specialists and vice versa has important implications for the diversification literature. The effect of diversification on performance should not be homogeneous across all industries. In other words, there should not be necessarily neither a positive nor a negative diversification-performance relationship valid across all industries. Whether the performance of a firm entering a new business improves or deteriorates depends among other things on the relative efficiency of diversifiers and specialists in the two industries involved. If there are significant economies of scope

and transactions costs between the two business activities, then those firms that are present in both industries should have an advantage over specialists and eventually come to dominate those industries. Only in these cases, diversification and performance will be positively correlated. Keeping this caveat in mind and given the abundance of diversifiers in our economy, however, it seems more reasonable to expect a diversification premium than a discount, as the most recent research in finance finds (Villalonga (2004a); Campa (2002)). In any case, our paper shows that it is the underlying industry characteristics what makes diversifiers or specialists more efficient and thus the dominant players in an industry.

One caution we should keep in mind when interpreting these findings is our sample construction process. We have used information exclusively from public companies. Private companies certainly have a different pattern of characteristics than public companies. As a consequence, we are measuring with some noise both the total level of what we call industry specialization, our dependent variable, and the different industry characteristics that form our set of independent variables. As long as these types of noises are not correlated among each other, our results would be general, reliable and independent of the inclusion of private company characteristics in the analysis. Future work should test the robustness of our results to the use of both private and public company information to measure the different industry characteristics.

APPENDIX 1

In this appendix we provide some examples of hypothetical industries to illustrate how our index of homogeneity in the diversification structure works. We consider an economy in which there are only three companies: A, B and C; and three sectors: I and II and III. We compute our index H for all different possibilities:

Example 1

	Industry I	Industry II	Industry III
Company A	**X**	**X**	**X**
Company B	**X**	**X**	**X**
Company C	**X**	**X**	**X**

In the first Example we assume that all companies are present in the three sectors. In this case our index H would be exactly the same for all three sectors:

$$H_a = \frac{(\frac{3}{3})^2 + (\frac{3}{3})^2}{1+1} = 1$$

a = I, II, III

This is, all companies in all sector have a completely homogeneous diversification structure and therefore our index obtains a maximum value equal to one.

Example 2

	Industry I	Industry II	Industry III
Company A	**X**		
Company B		**X**	
Company C			**X**

This would be the total opposite case, our index would be computed as follows:

$$H_a = \frac{(\frac{0}{1})^2 + (\frac{0}{1})^2}{0+0} = 0$$

A = I, II, III

Note that we equal it to zero by assumption in our definition of the index.

Example 3

	Industry I	Industry II	Industry III
Company A	**X**	**X**	
Company B			**X**
Company C	**X**	**X**	**X**

Now our index would have different values in the different industries:

$$H_a = \frac{(\frac{2}{2})^2 + (\frac{1}{2})^2}{1+1} = \frac{5}{8}$$

a=I,II

$$H_{III} = \frac{(\frac{1}{2})^2 + (\frac{1}{2})^2}{1+1} = \frac{1}{4}$$

Note that our index is larger for industries I and II than for industry III since in this last industry we have a company that is not present in any of the other industries and therefore is less likely that there exists an important economies of scope when operating in industry III and in any other industry.

Table I.A Descriptive Statistics of industry specialization

Year	% Industries with only diversified firms	% Industries with only specialist firms	% Industries with both types of firms	Average Percentage of sales made by specialist firms	Total number of industries
1998	64	0.6	35	12	761
1999	64	0.7	35	12	775
2000	64	0.7	35	13	761
2001	63	0.9	36	14	727

Table I.B Descriptive Statistics of industry specialization, only those industries with total number of firms larger than one

Year	% Industries with only diversified firms	% Industries with only specialist firms	% Industries with both types of firms	Average Percentage of sales made by specialist firms	Total number of industries
1998	59	0.5	30	14	669
1999	60	0.5	29	13	677
2000	59	0.7	30	15	665
2001	58	0.7	31	15	639

Table II: Descriptive Statistics. Industry characteristics, year 2001

	Mean	Median	Standard Deviation	Num. of industries
% Sales by specialized firms	0.14	0	0.25	720
Herfindhal Index	0.50	0.44	0.33	720
Homogeneity in the diversification structure[10]	0.17	0.04	0.30	720
Industry Sales[11]	12738	2098	39230	720
Volatility[12]	0.28	0.24	0.12	720
Number of firms	13.9	5	32.7	720

(Level of observation is a four-digit SIC code)

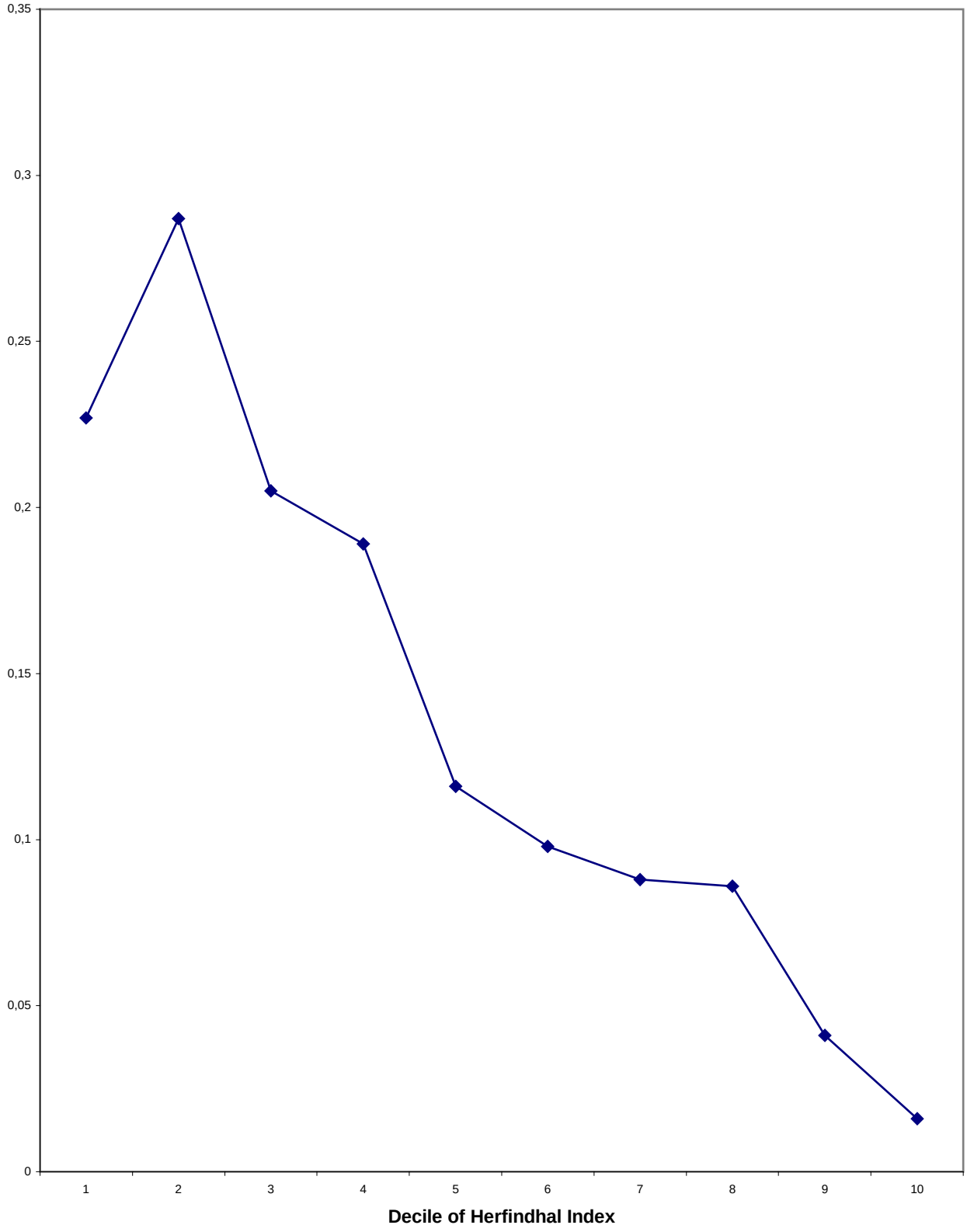
[10] As it has been defined in Section 4.
[11] In Millions of dollars
[12] Standard deviation divided by mean of stock price in the last 60 months.

TABLE III: Proportion of activity by specialized firms depending on the degree of market concentration and the variation in the diversification structure at the industry level, year 2001

	Homogeneous degree of diversification[3]	Heterogeneous degree of diversification[4]
High concentrated industries[1]	Mean = 7% Median = 0%	Mean = 27% Median = 4%
Low concentrated industries[2]	Mean = 20% Median = 3%	Mean= 28% Median= 25%

[1] Industries with in-sample Herfindhal Hirschman Index larger than 3000, it includes the top 50% concentrated four digit SIC industries in the sample.
[2] Industries with in-sample Herfindhal Hirschman Index lower than 3000, it includes the 50% less concentrated four digit SIC industries in the sample
[3] Industries with in-sample homogeneity index larger than 0.02, it includes the top 50% homogeneous four digit SIC industries in the sample.
[4] Industries with in-sample homogeneity index lower than 0.02, it includes the 50% less homogeneous four digit SIC industries in the sample.

Graph 1: Average proportion of industry activity accounted by specialized companies as a function of industry concentration ratio (Herfindhal Index), year 2001.



Graph 2: Average activity accounted by specialized firms as a function of the homogeneity of the diversification structure, year 2001.

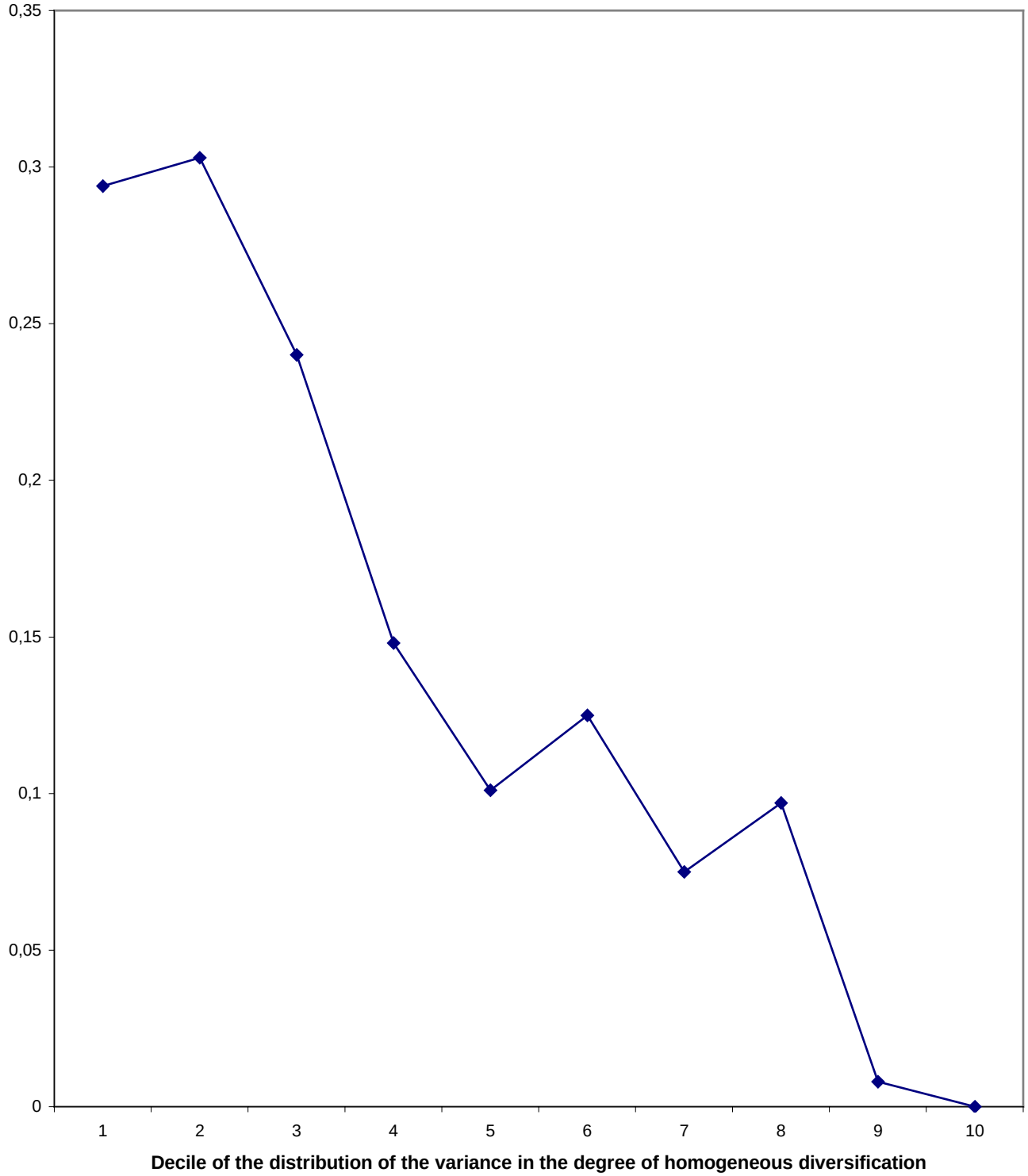


Table IV: Explaining the proportion of industry activity accounted for by specialized firms, year 2001

Variable	OLS	OLS	OLS	OLS	Non-linear regression
Constant	0.25***	0.25***	0.14***	0.13***	0.16***
	(0.01)	(0.01)	(0.04)	(0.05)	(0.06)
Herfindhal index of industry concentration	-0.24***	-0.13***	-0.19***	-0.10***	-0.126***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
Homogeneity in the industry diversification pattern		-0.83***	-0.69***	-0.70***	-0.76***
		(0.16)	(0.17)	(0.17)	(0.19)
Homogeneity in the industry diversification pattern square		0.70***	0.60***	0.61***	0.66***
		(0.15)	(0.15)	(0.16)	(0.16)
Log of industry size			0.012***	0.013***	0.013**
			(0.004)	(0.005)	(0.005)
Industry volatility				0.02	0.01
				(0.04)	(0.06)
R^2	0.10	0.13	0.13	0.14	-
N	720	720	720	720	720

Dependent variable for all regressions is the percentage of sales accounted for by specialized firms in each of the 720 business segment.
First four columns are OLS regressions. The last column shows the non-linear regression results using the following functional form:
$Y = 1\text{-}1/\exp(b_0 + \Sigma b_i x_i)$

TABLE V: Differences in performance as a function of the proportion of industry sales accounted for by specialized companies.

Proportion of industry sales by specialized companies		*ROS specialized companies*	*ROS segment of diversified companies*	*ROS diversified minus ROS specialized*
Less than 20%	Mean	-27.4%	-0.9%	**26.5%**
	Median	-3.1%	5.9%	**9.0%**
	N	548	1030	**-----**
Between 20 % and 40%	Mean	-29%	0.7%	**29.7%**
	Median	-3.0%	7.3%	**10.3%**
	N	952	924	**-----**
Between 40% and 60%	Mean	-27.8%	2.4%	**30.2%**
	Median	-0.5%	6.0%	**6.5%**
	N	272	357	**-----**
Between 60% and 80%	Mean	1.9%	3.0%	**1.1%**
	Median	3.6%	5.5%	**1.9%**
	N	176	250	**-----**
More than 80%	Mean	-10.9%	-0.4%	**10.5%**
	Median	3.5%	-1.7%	**-5.20%**
	N	189	81	**-----**

All observations correspond to the year 2001.

Graph 3: Segment ROS of diversified firms versus ROS of specialized firms

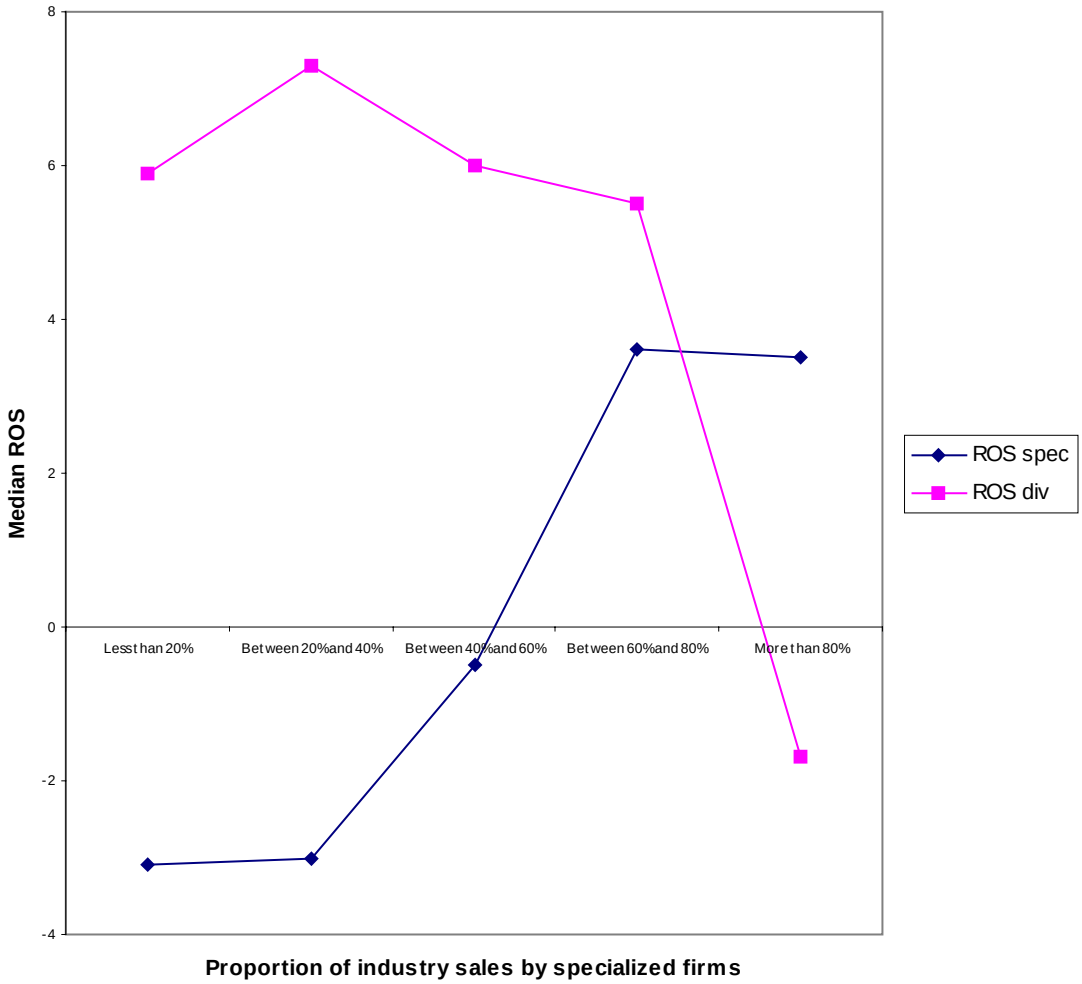


TABLE VI: Differences in performance as a function of the proportion of industry sales accounted by specialized companies

Independent Variables	Dependent variable: Segment ROS
Constant	-1.17***
	(0.02)
Diversified firm[1]	0.09***
	(0.02)
Diversified firm*Specialized Industries[2]	-0.06*** (0.00)
Size[3]	0.06***
	(0.00)
N	6090
R^2	0.21

This table shows the results of a OLS regression using Compustat segment dataset corresponding to the year 2001. Segments belonging to industries populated only by diversified firms or only by non-diversified firms are excluded from the sample. The regression has been done with four-digit SIC code industry dummies. Standard errors are in parenthesis and have been adjusted to account for firm heteroskedasticity.
[1]Dummy equal to one if the segment belongs to a firm that operates in more than one 4 digit SIC code.
[2]Dummy equal to one if the segment operates in a four digit SIC code in which more than 50%[13] of the activity, as measured by total sales, is performed by non-diversified firms. This is, firms that only operate in that four-digit SIC code.
[3]Log of segment sales in year 2000.

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