# Corporate Diversification, Performance, and Restructuring in the Largest Japanese Manufacturers

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**ABSTRACT**

This article examines the industry diversification of the 142 largest Japanese manufacturers in 1973-98. We find that sample firms steadily increased diversification. Despite the increase, the relatedness of their business measured in three ways based on the Japanese IO table stayed essentially constant. Regression results show that the average relationship between diversification and firm performance is negative. Firms can mitigate the negative impact of diversification on profitability by confining diversification to industries that are closely related to their main business. However, this effect of relatedness is insignificant for firm value (Tobin's Q), suggesting that the profitability increase due to greater relatedness does not last long. Consistently, a wide range of diversified firms restructured themselves in the late 1990s by divesting business units.

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## 1. Introduction

In the last decade, corporate diversification across industries has attracted a great deal of attention by financial economists and management scholars. Research on the diversification discount such as Berger and Ofek (1995) and Lang and Stulz (1994) shows that diversified U.S. firms trade at a significant discount relative to specialized firms. Active debate is still going on as to whether diversification itself is responsible for the discount (Martin and Sayrak, 2003). Recent studies such as Campa and Kedia (2002) and Villalonga (2004a) suggest that, once the endogeneity of diversification status is accounted for, diversification is not detrimental to firm value. Nevertheless, the fact that a staggering number of U.S. firms have divested unrelated businesses to refocus on the areas of their core strength suggests that managing a large diversified corporation successfully is not an easy task (Markides, 1995; Comment and Jarrell, 1995). Organizational economists provide a number of reasons to suspect that large complex organizations like diversified firms might underperform small rivals organized more simply (e.g. Milgrom and Roberts, 1988; Rotemberg and Saloner, 1994; Scharfstein and Stein, 2000).

The wave of corporate refocusing appears to have hit the other side of the Pacific in the late 1990s. Nowadays, the business press is full of articles reporting Japanese companies, even those long considered the bluest of blue, actively slashing unprofitable businesses. As Figure 1 illustrates, the number of publicly announced divestitures in Japan indeed increased dramatically in the wake of corporate restructuring wave in the late 1990s. However, the diversification strategy of Japanese firms was once espoused as economically sound by many observers. For instance, in an influential *Harvard Business Review* article, Prahalad and Hamel (1990) drew heavily on Japanese companies to illustrate the importance of nurturing a firm's core competence to sustain growth without risking financial health.

Why then the large wave of divestitures? What went wrong? Unfortunately,

researchers do not have ready answers to these questions because evidence on the Japanese firm's diversification is limited in supply. In response, this article contributes to increasing our knowledge on corporate diversification, performance, and restructuring in Japan based on a longitudinal sample of 142 largest manufacturers. Our analysis proceeds in three steps to this end. First, we document the long-term development of the sample firms' diversification in 1973-1998 to understand basic facts about corporate diversification in Japan. Second, we investigate the link between diversification and performance in the largest manufacturers over the 25-year period. Because corporate restructuring is generally triggered by poor firm performance, a negative association between diversification and performance is expected if diversification failures were at least partly responsible for the rise of restructuring wave. Third, we shed direct light on the relationship between diversification and restructuring in the late 1990s by studying factors inducing firms to exit businesses through divestitures.

We perform these analyses with emphasis on inter-business relatedness. It is often argued that, for diversification to create value, the firm must keep the relatedness (coherence) of its businesses high. For testing this hypothesis, we follow Lemelin (1982) and Fan and Lang (2000) who used the Input-Output (IO) table describing inter-industry commodity flows to measure relatedness. We are not the first to use the IO table for studying the Japanese firm's diversification. Claessens et al. (2003) employed Fan and Lang's (2000) relatedness indices to study diversification in Japan and eight other Asian economies. However, they measured relatedness based on the 2-digit IO table for the U.S. economy. In this article, we use the Japanese IO table with a finer industry classification to develop three indices, each measuring a different facet of business relatedness: the similarity of production technologies, similarity of human capital requirement, and opportunities for vertical transactions.

This study complements the small but growing literature on diversification in Japan including the seminal studies by Goto (1981) and Yoshihara et al. (1981) who examined the

diversification strategy of the largest industrial firms as we do here. They identified a steady increase in diversification from the late 1950s to early 1970s. Yoshihara et al. (1981) also found out that most of their sample firms confined diversification to industries that were related to their main business. Itoh (2002) notes that one of the three stylized facts about the Japanese diversification is that Japanese firms tend to diversify into more related businesses than U.S. firms.[1]

Financial economists have shown that diversified firms trade at a discount in Japan as they do in the United States (Lins and Servaes, 1999; Hiramoto, 2002; Nakano et al., 2004). Nevertheless, Yasuki (1995) and Miyajima and Inagaki (2003) found that the average degree of diversification in the largest industrial firms continued to increase in the 1980s and 1990s. However, a recent study by the Ministry of Economy, Trade, and Industry (2005) covering a wide spectrum of firm size distribution shows that the average degree of diversification in the manufacturing sector declined by the early 2000s.[2] Miyajima and Inagaki (2003) also note that some of their sample firms decreased diversification after the mid 1990s, auguring the arrival of refocusing wave to Japan.

Our findings are summarized as follows. Consistent with earlier evidence, the average degree of diversification in our sample of the largest manufacturers continued to increase in 1973-1998. Despite this trend, their businesses relatedness measured in three different ways on average stayed constant, indicating that the diversification increase was not led by firms pursuing unrelated diversification. In aggregate, the diversification pattern of the largest Japanese manufacturers was remarkably stable during our study period. The stability of diversification strategy, however, was not brought about by its success because on

[1] The other two stylized facts noted by Itoh (2002) are (i) greater (less) industry focus in the 1960s (1990s) relative to U.S. firms and (ii) diversification through internal growth rather than M&A.

[2] The timing of the arrival of refocusing wave to Japan is somewhat disputable. Morikawa (1998) found that the average diversification level of firms headquartered in Tokyo declined in 1992-1995.

average diversification negatively associates with profitability and firm value. Consistent with the aforementioned hypothesis, the negative effect of diversification on profitability is mitigated to the extent that a firm confines diversification to industries that are closely related to its core business. However, in most of our sample firms, business relatedness was not high enough to overcome the negative impact of diversification. Furthermore, the relationship between firm value and relatedness is statistically insignificant, suggesting that the effect of relatedness to increase profitability does no last long. The analysis of divestitures shows that highly diversified firms actively restructured themselves in the late 1990s by divesting business units. Overall, our results suggest that inefficiencies associated with corporate diversification were widespread in the largest Japanese manufacturers. Since many of them had failed to mitigate the inefficiencies while increasing diversification, they came under strong pressures for restructuring in the late 1990s when their performance hit the historical low.

The rest of this article is organized as follows. The next section introduces data and our diversification indices. Section 3 describes the development of diversification in our sample firms. Section 4 performs a regression analysis of the diversification-performance link. Section 5 investigates the link between diversification and corporate restructuring in the late 1990s with a focus on business unit divestitures. The final section concludes.

## 2. Data and measurement

### 2.1. Sample

Our sample is the union of two firm sets. The first consists of 118 manufacturers studied by Yoshihara et al. (1981), which were largest in terms of sales or capital in 1970. The second set is the updated sample of largest manufactures in 1998, which we created following the sample selection procedure of Yoshihara et al. (1981). After excluding two

firms for which necessary data is unavailable from the onset of our study period, the combined sample includes 142 firms belonging to the largest end of firm size distribution (see Appendix 1 for a list of the sample firms). Collectively, these firms accounted for a 33% (30%) of total assets (sales) in the Japanese manufacturing sector in 1998.[3]

Beginning in 1973 and ending in 1998, we observe the sample firms' diversification every five years. We therefore have six observations per firm over a 25-year period with equal intervals (i.e. 1973, 78, 83, 88, 93, and 98). Our sample includes six firms that disappeared before 1998 due to mergers (no firms disappeared due to failures). Overall, the sample includes 842 firm-year observations.

Our primary data source is the *Yukashoken Hokokusho*, Japanese equivalent of 10-K, supplying the breakdown of sales by product segments. Since firms adopt different policies in grouping products into a segment, a cross-sectional comparison of raw segment data may not be very meaningful. To facilitate comparisons, we must adjust segment data according to a common standard. For this task, we employ the 4-digit classification (*togo-sho-bunrui*) of the 1985 IO statistics containing 183 industries.[4] The Japanese IO table is updated every five years. We adopt the 1985 version because 1985 is the middle year of our observation period. Hereafter, we use the term segment to refer to the regrouped industry segment, not the original segment appearing in the *Yukashoken Hokokusho*.

An important caveat is that our data is built on the unconsolidated (parent only) financial statement, implying that diversification through subsidiaries is set aside in our analysis. This is because Japanese legal and accounting practices had long centered on

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[3] The total assets and sales for the entire manufacturing sector were taken from the Ministry of Finance's *Financial Statement Statistics of Corporations*.

[4] Ideally, one would like to use a finer industry classification (e.g. SIC 4-digit). For many firms, however, uniquely matching their raw segments to a finer-level industry unambiguously is infeasible. The IO 4-digit classification is comparable to the JSIC 3-digit classification used by Goto (1981) and Yoshihara et al. (1981) who also manually collected data from financial statements.

unconsolidated statement until recently. In our study period, many firms do not disclose the breakdown of consolidated sales by product and, when they do, it is often too crude for our research purpose. As such, all variables used in this study are measured at the parent level, not the firm as a whole.

### 2.2. Measurement of diversification

#### 2.2.1. Degree of diversification

We measure a firm's degree of diversification with three indices popular in the diversification literature: the number of segments, sales share of the core (largest) segment, and Herfindahl index. Our Herfindahl index is sales-based and defined in the familiar fashion as:

$$H_t = \sum_{j \in J_t} S_{jt}^2 , \qquad (1)$$

where $J$ is the set of a firm's segments in year $t$ and $S$ is a segment's share in the firm's total sales (the firm subscript is omitted for ease of notation). Needless to say, the Herfindahl index and core segment's share are inversely related to diversification. They take one for firms specialized in a single industry and approach toward zero as a firm diversifies across many industries.

#### 2.2.2 Relatedness

Lemelin (1982) pioneered the use of IO table for measuring industry relatedness. Fan and Lang (2000) extended his method to measure the relatedness of businesses within a diversified firm. Historically, diversification researchers have measured relatedness with two other methods. The first method pioneered by Rumelt (1974) utilizes the combination

of qualitative and quantitative information to sort firms into distinct strategy groups, such as specialized firms, related diversifiers, and conglomerates (unrelated diversifiers). This method allows researchers to consider numerous factors affecting relatedness including those defying quantification. However, it is discrete and potentially subject to classification errors. Yoshihara et al. (1981) employed this method in their influential study.

The second method relies on a standard industry classification system such as SIC and JSIC based on the assumption that businesses sharing a higher digit industry code are more closely related than those sharing only a lower digit code (e.g. Wernerfelt and Montgomery, 1988; Nakano et al., 2004). Even though this method is easy to apply, it imposes a priori assumptions on the strength of two industries' relatedness. Furthermore, it is silent about how industries are related.

IO-based relatedness indices overcome the weaknesses of these more traditional methods because they are continuous and free from classification errors and do not require a priori assumptions. We employ the following three indices in this research.

**(1) Technological relatedness**

Denoting industry *i*'s purchase from industry *k* per value of *i*'s output as $a_{ik}$, Lemelin (1982) proposes to measure the complementarity of industries *i* and *j* by $\rho_{ij}$, the correlation coefficient of $a_{ik}$ and $a_{jk}$ across all *k*. $\rho$ therefore measures the relatedness of two industries as the similarity of their input structure.[5] We feel that the term complementarity is too general for describing the information content of $\rho$. In this article, we use the term technological relatedness instead because $\rho$ captures the similarity of production technology (or industry value chain in the management parlance) as reflected in the intermediate input

[5] Here, the "inputs" include not only goods and services supplied by upstream firms but also productive services provided by downstream firms, such as distributors and advertising agencies.

use.

For a firm with core business in industry *c*, our first relatedness variable captures the relatedness of non-core businesses to the core as a weighted sum of $\rho_{cj}$ where the weight is a segment's sales share in non-core businesses:[6]

$$TCR_t = \sum_{j \neq c} \frac{S_{jt}}{1 - S_{ct}} \rho_{cj} \quad . \tag{2}$$

The correlation coefficient $\rho$ does not have the time subscript because we use $\rho$s computed from the 1985 IO table for all years.[7]

*TCR* measures the non-core businesses' collective relatedness to the core. It does not represent a firm's overall coherence. It is natural to posit that the firm is most coherent when its activities are confined to a single industry ($S_c$=1). Therefore, we measure a firm's technological coherence (*TCC*) according to the following formula:

$$\begin{aligned} TCC_t &= 1 && \text{if} \quad S_{ct} = 1 \text{ (specialized)} \\ &= S_{ct} + (1 - S_{ct})\, TCR_t && \text{otherwise (diversified).} \end{aligned} \tag{3}$$

These expressions are equivalent to the share-weighted sum of $\rho$s for all *j* including the core (i.e. $TCC = \Sigma_{j \in J} S_j \rho_{cj}$) because $\rho_{cc}$=1. *TCC* captures the notion that firms increase coherence by increasing their focus on the core business and/or limiting diversification to industries that

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[6] All of our relatedness indices are a measure of what Rumelt (1974) calls the "constrained diversification" where businesses are linked in the hub-and-spoke structure. They do not measure the "linked diversification" in which diversified businesses are linked sequentially without going through the hub (core) business (Rumelt, 1974). Measuring the linked diversification is difficult, but a working paper version of this article contains an experimental index (available from the authors upon request).

[7] Ideally, we would like to update $\rho$, but the industry classification in the Japanese IO table frequently changes, making the update infeasible without losing the consistency of industry classification. Fortunately, assuming that $\rho$ does not vary over time is not unreasonable. Fan and Lang (2000) computed a similar measure for U.S. firms using constant $\rho$s based on a single year's IO table and updated $\rho$s computed from IO tables in multiple years. They found that the two methods return very similar value.

are closely related to the core (Teece et al., 1994). However, our formulation implies that a firm increasing diversification (decreasing $S_c$) more or less loses coherence because *TCR* is less than one unless the core and non-core businesses have the identical input structure.

**(2) Human capital relatedness**

The resource-based view of the firm in strategy maintains that firms diversify across industries to utilize slack internal resources (Penrose, 1959; Montgomery, 1994). This view is consistent with Panzar and Willig's (1981) theory of economies of scope demonstrating that the existence of a multi-product firm implies the existence of "quasi-public" inputs that can be shared across products. Teece (1980) posits that such inputs (resources) are most likely intangible assets, especially organizational know-how embodied in employees. The sharability of human capital therefore likely affects the firm's diversification decisions importantly. Odagiri (1992) observes that Japanese firms enter new industries by leveraging human capital accumulated in extant businesses.

Our second relatedness index measures the similarity of human capital required in productions as measured by the composition of industry employment by occupation. The employment matrix of the 1985 Japanese IO statistics disaggregates the employment of 84 industries into 57 occupations.[8] Denoting the share of occupation *o* in industry *i*'s total employment $e_{io}$, we measure the similarity of industries *i* and *j*'s labor input structure by $r_{ij}$, the correlation coefficients of $e_{io}$ and $e_{jo}$ over all *o*. Our second relatedness index is then defined as:

$$HCR_t = \sum_{j \neq c} \frac{S_{jt}}{1 - S_{ct}} r_{cj} \,. \qquad (4)$$

[8] A finer version of the matrix includes as many as 287 job categories for 84 industries. The industry classification of the employment matrix is coarser than but consistent with that of commodity flow table.

To the extent that skills and knowledge of employees in the same occupation are transferable across industries, *HCR* describes opportunities for sharing know-how between the firm's core and non-core businesses.

Based on *HCR*, we measure a firm's overall coherence in human capital use as follows:

$$\begin{aligned} HCC_t &= 1 && \text{if} \quad S_{ct} = 1 \text{ (specialized)} \\ &= S_{ct} + (1 - S_{ct})\, HCR_t && \text{otherwise (diversified).} \end{aligned} \qquad (5)$$

The same remarks for *TCC* apply.

**(3) Vertical relatedness**

Our third measure of relatedness is the vertical relatedness index devised by Fan and Lang (2000). Firms operating in industries connected through buyer-supplier relationships (i.e. vertically integrated firms) may achieve superior performance by saving production and transaction costs. Fan and Lang (2000) posit that two industries are vertically related to the extent that each industry requires the other's outputs in their own productions. They measure the vertical relatedness of industries $i$ and $j$ ($v_{ij}$) by averaging each industry's input coefficient with respect to the other [i.e. $v_{ij} = 0.5(a_{ij} + a_{ji})$]. The vertical relatedness of a firm's non-core businesses to the core is then defined as:

$$VTR_t = \sum_{j \neq c} \frac{S_{jt}}{1 - S_{ct}} v_{cj} . \qquad (6)$$

Defining a firm's coherence in terms of vertical relatedness is not straightforward. Unlike $\rho$ and $r$ for which $\rho_{ii}\,(r_{ii}) \geq \rho_{ij}\,(r_{ij})$ for $i \neq j$ because they are correlation coefficients, $v_{ii}$

is often less than $v_{ij}$ and, of course, this does not mean that firms specialized in *i* are less coherent than firms operating in *i* and *j*. As such, we do not extend *VTR* to measure a firm's overall coherence.

## 3. Diversification patterns of largest industrial firms

Table 1 documents the development of sample firms' diversification in 1973-1998. The top three sections contain indices measuring the extent of diversification. Consistent with earlier evidence, our sample firms on average increased diversification steadily. The mean Herfindahl index and share of core segment in total sales continued to decrease over the 25-year period.[9] Yoshihara et al. (1981) report that the average diversification of 118 firms in our sample increased in 1958-1973. Taken together, their and our evidence indicates that the trend toward greater diversification continued for at least four decades in the largest Japanese manufacturers. Consistent with Miyajima and Inagaki (2003), however, our data also suggests that there were refocusing firms as well as diversifying firms in the mid 1990s: the average segment count declined in 1998 mainly due to down-scoping by firms operating more than five segments (top 25%).

The middle three sections of Table 1 report relatedness indices. The average technological relatedness of non-core businesses to the core (*TCR*) stayed constant until the mid 1980s and declined slightly but statistically insignificantly after that period.[10] The mean human capital relatedness (*HCR*) also declined in the 1990s though at a statistically insignificant pace. The average vertical relatedness (*VTR*) was constant over the study

[9] The share of core segment understates the progress of diversification in 42 firms in which the identity of core segment changed during the study period. When the core segment of these firms is fixed at the one that was largest in 1973, the sales share of core segment averaged over all sample firms declined from 70% in 1973 to 58% in 1998.

[10] The statistical significance of declines is based on a regression of *TCR* on year dummies where the base year is 1973.

period. On average, therefore, we do not observe that businesses operated by our sample firms grew significantly unrelated despite the trend toward greater diversification. This finding again echoes Yoshihara et al. (1981) who made a similar observation for 1958-1973. Because of the stability of business relatedness, the declines of firm coherence indices reported in the bottom two sections are comparable to (*TCC*) or less than (*HCC*) the decline in the core segment's sales share measuring industry focus.

In addition to the above points, Table 1 reveals substantial firm heterogeneity in diversification posture. The Herfindahl index at the top 25% was two times as large as that at the bottom 25% throughout the study period. Heterogeneity arises in part due to industry-level factors as shown by Table 2 reporting the industry mean of selected indices for selected years. We find that firms whose main products are textile products and chemicals tend to be highly diversified. In contrast, firms in the petroleum refinery industry are very much specialized. The F-test reported in Table 2's bottom line rejects the hypothesis that the mean does not vary by industry for all reported indices and years (p-value =0.00).

Another factor underlying the heterogeneity in diversification posture is *keiretsu* relationships. We found that, consistent with the view that firms affiliated with a *keiretsu* industrial group over-expand due to pressures by main banks (Weinstein and Yafeh, 1995), 72 firms attending the executive meeting of a six major *keiretsu* (i.e. Mitsui, Mitsubishi, Sumitomo, Fuji, Sanwa, and Dai-ichi Kangyo) were more diversified than other firms. We also found that the average relatedness of non-core businesses to the core was higher for those *keiretsu*-affiliated firms possibly because *keiretsu* coordinates member firms' activities to avoid overlaps and competitions. These differences are statistically significant. However, unreported ANOVA shows that *keiretsu* affiliation explains only a 1-2% of the total variance of a diversification index while industry affiliation accounts for a 20-45% of the variance.

The large variance unexplained by industry and to a lesser extent *keiretsu* affiliation represents the idiosyncrasy of individual firm's diversification strategy. We do not find strong systematic patterns in this important source of heterogeneity. We do not observe that firms operating in unrelated industries are highly diversified firms as suggested by Wernerfelt and Montgomery (1988) and others: the correlations of relatedness and diversification degree indices are generally weak and statistically insignificant (the Herfindahl index and *HCR* correlate most strongly with a correlation coefficient of 0.15). Likewise, we do not observe that firms that grew large in unrelated industries were firms that increased diversification fast over the entire study period or a sub-period.

## 4. Diversification and firm performance

### 4.1. Specification and variables

In this section, we examine the diversification-performance link in Japanese firms. Extant evidence on this subject is mixed but weighs more toward the view that diversification is detrimental to shareholder wealth. Lins and Servaes (1999) find that diversified Japanese firms traded at a discount relative to specialized firms in the mid 1990s. Hiramoto (2002) and Nakano et al. (2004) also identify a significant diversification discount for the late 1990s and early 2000s. In contrast, Claessens et al. (2003) find a significant valuation premium in diversified Japanese firms and that the premium increases with the vertical and horizontal relatedness of diversified businesses. They, however, find that diversification negatively affects profitability though vertical relatedness ameliorates this effect.

Research on the diversification-performance link suggests pitfalls we should try to avoid. One is the confounding effect of the firm's industry affiliation. Firms domiciled in different industries diversify differently due to industry-level factors such as technology and market concentration (Lemelin, 1982; Montgomery and Hariharan, 1991). Montgomery

(1985) shows that such industry-level heterogeneity obscures the effects of diversification and industry on firm performance. We address this problem by including fixed effects for the 16 broad industries in Table 2 in our regression models.[11] During our study period, macroeconomic conditions such as economic growth and foreign exchange rates changed dramatically. Because these changes are likely to have affected industries differently, we allow the industry fixed effects to vary over time to control for changing macroeconomic and industry conditions.

Another issue highlighted by Campa and Kedia (2002) and Villalonga (2004a) is the endogeneity of the firm's diversification status. Three prominent perspectives on corporate diversification (i.e. market power, agency, and resource-based views) all imply that factors causing performance differentials in firms also influence the firm's diversification decisions (Montgomery, 1994). Research on the profit persistence suggests that firm differentials in these factors do not disappear easily (Maruyama and Odagiri, 2002; Villalonga, 2004b). To control for persistent firm heterogeneity that is not orthogonal to diversification variables, our regression models include firm fixed effects.

We estimate two sets of specifications. In the first set, we regress firm performance on the Herfindahl, technological coherence (*TCC*), or human capital coherence (*HCC*) index, which are observable for all firms.[12] The model we estimate is as follows:

$$y_{it} = \alpha_i + \beta_{lt} + \gamma \cdot d_{it} + \boldsymbol{\delta} \cdot \mathbf{z}_{it} + \varepsilon_{it}, \qquad (7)$$

where $\alpha$ is the firm-fixed effect, $\beta$ is the time-varying industry effect, $d$ is a diversification

[11] An alternative method would be to use excess performance measures adjusted for the industry composition of a firm's businesses, a method popular in the finance literature. This is infeasible for our study simply because necessary data (e.g. industry median Q according to the IO 4-digit classification) is unavailable.

[12] We do not use the three diversification indices simultaneously because of their high correlations.

index, **z** is a vector of control variables, and $\varepsilon$ is the random disturbance term. Estimations are performed on the full sample pooling observations for six years ($t$ = 1973, 78, 83, 88, 93, and 98) and all firms including specialized firms operating only one industry segment.

The second set of specifications is estimated on a sample excluding specialized firms to isolate the effects of two factors underlying firm coherence: the focus on the core business and the relatedness of diversified businesses to the core. For example, the model using *TCR* as a relatedness measure is specified as follows:

$$y_{it} = \alpha_i + \beta_{lt} + \gamma_s \cdot S_{cit} + \gamma_r (1 - S_{cit}) TCR_{it} + \boldsymbol{\delta} \cdot \mathbf{z}_{it} + \varepsilon_{it}. \qquad (8)$$

*TCR* is weighted by $1-S_c$, the combined share of non-core segments, because the index's effect on firm performance will depend on the relative weight of non-core businesses in the firm's entire operations.

We measure firm performance with two metrics: ROA and Tobin's Q. Claessens et al. (2003) suggest that the short-run and long-run effects of diversification on performance diverge if "learning-by-doing" is important in profiting from diversification. For instance, diversification may decrease profitability in the short-run because of its increasing administrative and organizational complexities. In the long-run, however, firms may learn to manage the complexities and benefit form diversification's upsides such as synergy gains. In this scenario, the effect of diversification on ROA measuring the current performance is negative, but its effect on Tobin's Q can be positive because Tobin's Q capitalizes expected future rents (Lindenberg and Ross, 1981).

Our control variables include firm size, R&D and advertising intensities, leverage, and revenue growth rate. The definition and descriptive statistics of all regression variables are provided in Table 3. Appendix 2 presents the correlation matrix of these variables.

### 4.2. Estimation results

Table 4 presents estimation results of the specification described in (7). The dependent variable is ROA in the first three columns and Tobin's Q in the last three columns. Results are qualitatively the same regardless of the dependent variable. In Columns (1) and (4), the coefficient on the Herfindahl index is positive and significant, indicating that industry specialization (diversification) increases (decreases) firm performance.[13] Firm coherence measured by *TCC* and *HCC* also positively and significantly associates with profitability in Columns (2) and (3) and firm value in Columns (5) and (6). Qualitatively identical and quantitatively similar results obtain when specialized firms are excluded from estimations. These results suggest that the increase of diversification and resultant decrease of coherence exerted downward pressures on the performance of sample firms in 1973-1998.[14]

Table 5 reports estimation results of the specification given in (8) decomposing the effect of firm coherence into industry-focus and relatedness effects. The first three columns report estimation results for ROA. The effect of the core segment's sales share is positive and significant in Columns (1) and (2) and marginally significant in Column (3) ($p = 0.11$). The coefficients on relatedness indices weighted by the combined share of non-core segments are also positive and highly significant in Columns (1)-(3). The negative impact of diversification is therefore ameliorated to the extent that a firm confines diversification to industries that are closely related to its core business. However, the fact that diversification on average associates with profitability negatively despite this offsetting effect of relatedness suggests that, in the majority of our sample firms, business relatedness was not high enough

[13] The estimate in Column (4) implies that the diversification discount evaluated at the sample mean level of diversification is around 15%, which is comparable to Lins and Servaes's (1999) estimate of 10% for Japanese firms in the mid 1990s and estimates of 10-20% for U.S. firms by Berger and Ofek (1995) and Lang and Stulz (1994) among others.

[14] In the last section, we found evidence suggesting that firms affiliated with a *keiretsu* and those that are not behave differently in diversifying across industries. In response, we examined whether *keiretsu* affiliation affects the diversification-performance link by introducing the interaction effect of *keiretsu* affiliation dummy and diversification indices into our regression models. No significant interaction effects were detected.

to overcome the negative impact of diversification.[15]

Turning to Columns (4)-(6) where the dependent variable is Tobin's Q, we find that the effect of core segment's sales share is significantly positive, confirming the value of industry focus. However, none of the coefficients on relatedness indices differ significantly from zero even though they are positive as in Columns (1)-(3). These results suggest that the effect of relatedness to increase profitability tends to be short-lived and the value of coherence is mostly the value of industry focus in the long run. This may be because opportunities for synergies due to industry relatedness are available to all firms operating in the same industry. If firms sharing the same industry background enter new businesses in a herding fashion, gains from diversification will quickly disappear due to intensified competition except for firms endowed with unique synergistic advantages. Levy (2001) and Porter and Sakakibara (2004) point out that "me-too-entry (diversification)" by firms in the same industry has materially increased competition in Japan.

Overall, this section's analysis suggests that many largest manufacturers had failed to turn diversification into a source of superior performance rather than a liability despite their long pursuit of diversification. This suggests that, by the late 1990s when the performance of many Japanese firms hit the historical low, they were under strong pressures for restructuring. In the next section, we shed direct light on the link between corporate restructuring and diversification in the late 1990s.

## 5. Analysis of restructuring

Corporate restructuring encompasses a wide range of actions to transform the firm's

[15] The specification in (8) implies that a diversification progress increasing the non-core segments' sales shares proportionately improves firm performance when a firm's relatedness index is greater than $\gamma_s/\gamma_r$. Based on the coefficient estimates in Columns (1)-(3), the threshold level for ROA (the ratio of diversified firms exceeding that level) is estimated at 0.42 (28%) for *TCR*, 0.80 (41%) for *HCR*, and 0.06 (25%) for *VTR*.

organization, business portfolio, and financial structure for better performance, of which most directly related to diversification failures is the portfolio restructuring involving divestitures and closures of unsuccessful businesses (John et al., 1992; Bowman and Singh, 1993). We focus on business unit divestitures that epitomize the restructuring wave in the late 1990s as we saw in Introduction.

Our divestiture data was sourced from Recof, an M&A boutique firm maintaining an extensive database of Japanese M&As. Table 6 presents the distribution of our dependent variable in this section, the number of divestitures a firm made in 1998-2000. About a third of our sample firms undertook at least one divestiture. Because the dependent variable is a count variable, we analyze its determinants using the negative binominal regression. Our independent variables include firm size, leverage, Tobin's Q, and a dummy variable for *keiretsu* affiliated firms as well as diversification indices, all of which are defined as in the earlier sections and take the value for 1998.

Regression results reported in Table 7 confirm that there existed a close link between corporate diversification and restructuring in the late 1990s. In Column (1), the coefficient on the Herfindahl index is negative and significant, indicating that highly diversified firms actively restructured themselves by selling off business units. Likewise, Columns (2) and (3) reveal that the restructuring intensity inversely and significantly relates to firm coherence. Results in Columns (4)-(6) suggest that the effect of coherence to ease restructuring pressures mainly stems from industry focus because the coefficient on share-weighed relatedness index is significant only in Column (5) where business relatedness is measured by *HCR*. The finding that only human capital relatedness mitigates pressures for divestitures suggests that the quest for human capital synergies guides the restructuring as well as growth behavior of Japanese firms. Overall, the analysis in this section suggests that failures of past diversified expansions stimulated the sample firms' restructuring in the late 1990s.

## 6. Conclusion

Many large established Japanese firms experienced severe performance setbacks in the 1990s. Because these firms typically operate in many industries, this article studies the development and consequences of 142 largest manufacturers' diversification with emphasis on inter-business relatedness. We find that the average degree of diversification increased steadily in 1973-98. Despite this trend toward greater diversification, the relatedness of businesses operated by our sample firms on average stayed constant, suggesting that the diversification increase was not led by firms pursuing unrelated diversification. Nevertheless, the average relationship between diversification and firm performance is negative. The negative impact of diversification on firm performance is mitigated to the extent that a firm confines diversification to industries that are closely related to its core business. However, this effect appears to be generally short-lived because the effect of relatedness on firm value differs insignificantly from zero. Consistently, a wide range of diversified firms restructured themselves via divestitures in the late 1990s.

Our research has several limitations. First, our research sample is relatively small, covering only the largest firms. Corporate diversification, however, is not confined to the largest end of firm size distribution. Our results in this paper might misrepresent the overall picture of the Japanese firm's diversification strategy. Second, despite our focus on the largest firms, we did not examine growth through subsidiaries due to data limitations. Morikawa (1998) finds that diversification through subsidiaries is important especially for large firms and the scope of businesses covered by subsidiaries tends to greater than that of the parent firm. This suggests that some of our findings such as the stability of business relatedness might not hold if we take the whole firm as our observation unit.

These and other limitations notwithstanding, our results suggest many interesting future research avenues. In particular, our results suggest that the diversification strategy of

the largest manufacturers was stable despite its poor performance. Why? Financial researchers claim that the rise of active market for corporate control in the 1980s was instrumental in reversing the U.S. firm's diversification through burst-up takeovers and takeover threats (e.g. Mitchell and Lehn, 1990; Shleifer and Vishny, 1991). Then, is it the failure of Japanese corporate governance system to substitute for the active market for corporate control that should be blamed? Alternatively, it may be we to be blamed: our estimations might have failed to pick up the true value of diversification due to econometric problems discussed in the diversification discount literature (Martin and Sayrak, 2003). If so, how should we estimate the value? Regardless of possible measurement errors, many diversified Japanese firms have voluntarily and vigorously restructured themselves in recent years. Corporate diversification in Japan clearly needs more research.

## Appendix 1:
## List of sample firms

**Food products**
Snow Brand Milk Products
Morinaga Milk Industry
Meiji Dairies
Nisshin Flour Milling
Yamazaki Baking
Takara Shuzo
Asahi Breweries
Kirin Brewery
Sapporo Breweries
Nichirei
Nippon Suisan
Maruha
Nichiro
Nippon Meat Packers

**Textile products**
Asahi Kasei
Kuraray
Teijin
Mitsubishi Rayon
Unitika
Toray Industries
Kanebo
Toyobo

**Paper and pulp**
Jujo Paper
Oji Paper
Honshu Paper
Daishowa Paper Manufacturing
Sanyo-Kokusaku Pulp

**Chemicals**
Showa Denko
Denki Kagaku Kogyo
Mitsui Toatsu Chemicals
Shin-Etsu Chemical
Japan Synthetic Rubber
Ube Industries
Sumitomo Chemical
Mitsubishi Chemical
Kureha Chemical Industry
Tosoh
Mitsui Chemicals
Kyowa Hakko Kogyo
Hitachi Chemical

**Other chemicals**
Tanabe Seiyaku
Shionogi
Takeda Chemical Industries
Sankyo
Yamanouchi Pharmaceutical
Daiichi Pharmaceutical
Dainippon Ink and Chemicals
Fuji Photo Films
Konica
Shiseido
Kao

**Petroleum refinery**
Cosmo Oil
Mitsubishi Oil
Maruzen Oil
Showa Shell Sekiyu
Tonen Corporation
Nippon Oil

**Rubber products**
Bridgestone
Yokohama Rubber

**Stone, clay and glass products**
Nihon Cement
Onoda Cement
Sumitomo Osaka Cement
Asahi Glass
Nippon Sheet Glass
TOTO

**Iron and steel**
Kawasaki Steel
NKK
Nisshin Steel
Kobe Steel
Sumitomo Metals
Nippon Steel
Mitsubishi Steel
Daido Steel
Hitachi Metals
Japan Steel Works
Toyo Seikan

**Nonferrous metals**
Japan Energy
Mitsubishi Materials
Mitsui Kinzoku
Sumitomo Metal Mining
Dowa Mining
Nippon Light Metal
Sumitomo Light Metal
Sumitomo Electric
Furukawa Electric
Hitachi Cable
Fujikura Electric Wire

**Machineries**
Niigata Engineering
Kubota
Komatsu
Daikin Industries
NSK
Koyo Seiki
Sumitomo Heavy Industries
Toyota Industries
Ebara

**Electric machineries**
Toshiba
Mitsubishi Electric
Hitachi
Fuji Electric
Fujitsu
Oki Electric
NEC
Matsushita Electric Works
Sony
Sharp
Sanyo Electric
JVC
Matsushita Electric Industrial
Pioneer
Omron
TDK
Alps Electric
Denso
Casio Computer
Kyocera Corporation
Murata Manufacturing

**Transportation equipment**
IHI
Hitachi Zosen
Mitsui Engineering and Shipbuilding
Kawasaki Heavy Industries
Mitsubishi Heavy Industries

**Automobiles**
Fuji Heavy Industries
Mazda Motor
Nissan Motor
Hino Motors
Daihatsu Motor
Isuzu Motors
Toyota Motor
Honda Motor
Suzuki Motor
Aisin Seiki
Yamaha Motor

**Precision instruments**
Shimadzu
Canon
Ricoh
Olympus

**Other manufacturing**
Yamaha
Dai Nippon Printing
Toppan Printing

**Appendix 2: Correlation matrix of regression variables**

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ROA | | | | | | | | | | | | | |
| 2 | Tobin's Q | 0.380 | | | | | | | | | | | | |
| 3 | *H* | 0.187 | 0.080 | | | | | | | | | | | |
| 4 | *TCC* | 0.143 | 0.085 | 0.804 | | | | | | | | | | |
| 5 | *HCC* | 0.045 | 0.014 | 0.574 | 0.739 | | | | | | | | | |
| 6 | *Sc* | 0.181 | 0.074 | 0.976 | 0.832 | 0.581 | | | | | | | | |
| 7 | (1-*Sc* )×*TCR* | -0.080 | 0.010 | -0.406 | 0.167 | 0.180 | -0.406 | | | | | | | |
| 8 | (1-*Sc* )×*HCR* | -0.166 | -0.074 | -0.595 | -0.267 | 0.281 | -0.618 | 0.654 | | | | | | |
| 9 | (1-*Sc* )×*VTR* | -0.134 | -0.092 | -0.280 | -0.097 | -0.111 | -0.278 | 0.339 | 0.222 | | | | | |
| 10 | Firm size | -0.312 | -0.004 | -0.226 | -0.119 | -0.053 | -0.239 | 0.243 | 0.236 | 0.188 | | | | |
| 11 | R&D intensity | 0.111 | 0.258 | -0.032 | -0.057 | -0.154 | -0.045 | -0.005 | -0.094 | -0.171 | 0.134 | | | |
| 12 | Advertising intensity | 0.219 | 0.148 | 0.251 | 0.222 | 0.139 | 0.252 | -0.089 | -0.162 | -0.190 | -0.211 | 0.126 | | |
| 13 | Leverage | -0.414 | -0.352 | -0.244 | -0.257 | -0.134 | -0.229 | -0.027 | 0.136 | 0.293 | 0.003 | -0.288 | -0.432 | |
| 14 | Revenue growth | 0.327 | 0.124 | 0.070 | 0.097 | 0.074 | 0.077 | 0.026 | -0.017 | -0.041 | -0.171 | -0.043 | 0.115 | -0.124 |

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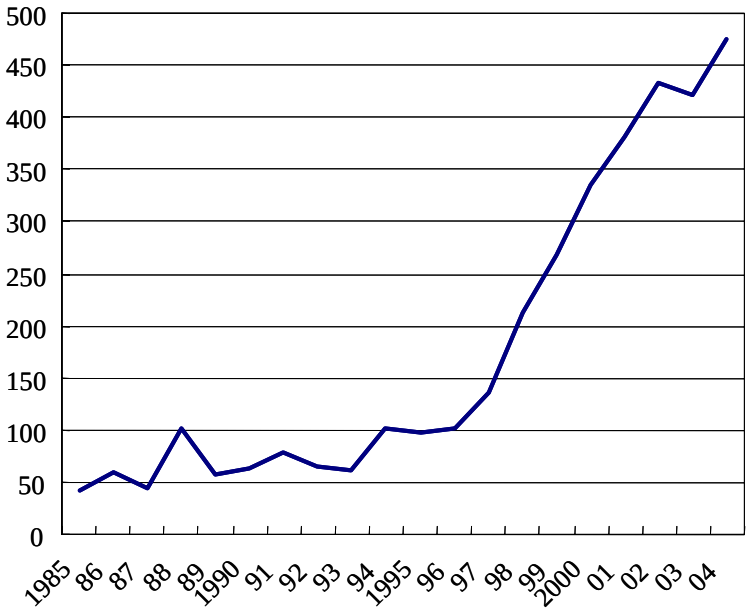
**Figure 1: The number of divestitures made by Japanese firms**




Source: Recof Corporation.

**Table 1: Diversification patterns of sample firms in 1973-1998**

| | Year | n | Mean | SD | Q1 | Median | Q3 |
|---|---|---|---|---|---|---|---|
| Sales share of core segment (*Sc*) | 1973 | 142 | 0.70 | 0.21 | 0.55 | 0.72 | 0.89 |
| | 1978 | 142 | 0.69 | 0.21 | 0.53 | 0.69 | 0.87 |
| | 1983 | 141 | 0.66 | 0.22 | 0.50 | 0.65 | 0.83 |
| | 1988 | 141 | 0.65 | 0.22 | 0.47 | 0.64 | 0.81 |
| | 1993 | 140 | 0.63 | 0.22 | 0.45 | 0.61 | 0.82 |
| | 1998 | 136 | 0.62 | 0.23 | 0.44 | 0.59 | 0.79 |
| Herfindhal index (*H*) | 1973 | 142 | 0.60 | 0.25 | 0.40 | 0.58 | 0.80 |
| | 1978 | 142 | 0.58 | 0.24 | 0.39 | 0.54 | 0.78 |
| | 1983 | 141 | 0.55 | 0.24 | 0.38 | 0.50 | 0.70 |
| | 1988 | 141 | 0.54 | 0.24 | 0.35 | 0.51 | 0.68 |
| | 1993 | 140 | 0.52 | 0.24 | 0.33 | 0.47 | 0.69 |
| | 1998 | 136 | 0.51 | 0.25 | 0.33 | 0.45 | 0.66 |
| Number of segments | 1973 | 142 | 3.46 | 1.92 | 2 | 3 | 5 |
| | 1978 | 142 | 3.46 | 1.81 | 2 | 3 | 5 |
| | 1983 | 141 | 3.56 | 1.79 | 2 | 3 | 5 |
| | 1988 | 141 | 3.72 | 1.71 | 2 | 3 | 5 |
| | 1993 | 140 | 3.79 | 1.77 | 3 | 4 | 5 |
| | 1998 | 136 | 3.70 | 1.67 | 3 | 4 | 5 |
| Technological relatedness of non-core segments (*TCR*) | 1973 | 124 | 0.34 | 0.28 | 0.12 | 0.23 | 0.47 |
| | 1978 | 126 | 0.34 | 0.28 | 0.12 | 0.25 | 0.48 |
| | 1983 | 127 | 0.34 | 0.27 | 0.13 | 0.25 | 0.44 |
| | 1988 | 128 | 0.33 | 0.26 | 0.13 | 0.25 | 0.44 |
| | 1993 | 127 | 0.31 | 0.26 | 0.11 | 0.25 | 0.41 |
| | 1998 | 123 | 0.30 | 0.26 | 0.12 | 0.24 | 0.43 |
| Human capital relatedness of non-core segments (*HCR*) | 1973 | 124 | 0.64 | 0.31 | 0.38 | 0.68 | 0.95 |
| | 1978 | 126 | 0.64 | 0.33 | 0.33 | 0.72 | 0.97 |
| | 1983 | 127 | 0.63 | 0.33 | 0.32 | 0.68 | 0.95 |
| | 1988 | 128 | 0.64 | 0.33 | 0.33 | 0.70 | 0.94 |
| | 1993 | 127 | 0.62 | 0.33 | 0.26 | 0.72 | 0.95 |
| | 1998 | 123 | 0.62 | 0.34 | 0.25 | 0.71 | 0.94 |
| Vertical relatedness of non-core segments (*VTR*) | 1973 | 124 | 0.04 | 0.06 | 0.00 | 0.01 | 0.06 |
| | 1978 | 126 | 0.04 | 0.06 | 0.00 | 0.01 | 0.06 |
| | 1983 | 127 | 0.04 | 0.06 | 0.00 | 0.01 | 0.07 |
| | 1988 | 128 | 0.04 | 0.06 | 0.00 | 0.01 | 0.07 |
| | 1993 | 127 | 0.04 | 0.06 | 0.00 | 0.01 | 0.05 |
| | 1998 | 123 | 0.04 | 0.06 | 0.00 | 0.01 | 0.05 |
| Technological coherence (*TCC*) | 1973 | 142 | 0.80 | 0.19 | 0.66 | 0.86 | 0.97 |
| | 1978 | 142 | 0.79 | 0.18 | 0.66 | 0.82 | 0.96 |
| | 1983 | 141 | 0.78 | 0.19 | 0.62 | 0.81 | 0.93 |
| | 1988 | 141 | 0.76 | 0.19 | 0.62 | 0.77 | 0.94 |
| | 1993 | 140 | 0.74 | 0.19 | 0.60 | 0.74 | 0.92 |
| | 1998 | 136 | 0.73 | 0.20 | 0.60 | 0.73 | 0.92 |
| Human capital coherence (*HCC*) | 1973 | 142 | 0.89 | 0.13 | 0.81 | 0.95 | 1.00 |
| | 1978 | 142 | 0.88 | 0.14 | 0.81 | 0.94 | 1.00 |
| | 1983 | 141 | 0.87 | 0.15 | 0.77 | 0.93 | 1.00 |
| | 1988 | 141 | 0.86 | 0.16 | 0.74 | 0.94 | 1.00 |
| | 1993 | 140 | 0.85 | 0.17 | 0.72 | 0.93 | 1.00 |
| | 1998 | 136 | 0.85 | 0.19 | 0.76 | 0.93 | 1.00 |

**Table 2: Mean diversification indices by industry**

| | | Herfindahl index | | | *TCR* | | | *HCR* | | | *VTR* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Industry | # firms | 1978 | 1988 | 1998 | 1978 | 1988 | 1998 | 1978 | 1988 | 1998 | 1978 | 1988 | 1998 |
| Food products | 15 | 0.68 | 0.68 | 0.63 | 0.26 | 0.25 | 0.21 | 0.79 | 0.87 | 0.79 | 0.02 | 0.02 | 0.01 |
| Textile products | 8 | 0.37 | 0.29 | 0.27 | 0.25 | 0.21 | 0.16 | 0.48 | 0.41 | 0.28 | 0.05 | 0.04 | 0.03 |
| Paper and pulp | 5 | 0.58 | 0.66 | 0.72 | 0.04 | 0.06 | 0.00 | 0.43 | 0.59 | 0.51 | 0.04 | 0.04 | 0.03 |
| Chemicals | 14 | 0.38 | 0.33 | 0.33 | 0.27 | 0.32 | 0.18 | 0.41 | 0.41 | 0.39 | 0.03 | 0.04 | 0.02 |
| Chemical products | 11 | 0.72 | 0.71 | 0.75 | 0.26 | 0.27 | 0.27 | 0.68 | 0.59 | 0.69 | 0.02 | 0.01 | 0.01 |
| Petroleum refinery | 6 | 0.98 | 0.98 | 0.97 | 0.08 | 0.08 | 0.08 | 0.97 | 0.97 | 0.97 | 0.28 | 0.28 | 0.28 |
| Rubber products | 2 | 0.71 | 0.63 | 0.59 | 0.69 | 0.65 | 0.65 | 0.93 | 0.88 | 0.88 | 0.00 | 0.00 | 0.00 |
| Stone and ceramic products | 6 | 0.64 | 0.57 | 0.46 | 0.37 | 0.31 | 0.31 | 0.51 | 0.49 | 0.48 | 0.00 | 0.01 | 0.00 |
| Iron and steal | 11 | 0.51 | 0.47 | 0.44 | 0.14 | 0.12 | 0.11 | 0.42 | 0.43 | 0.42 | 0.11 | 0.09 | 0.08 |
| Nonferrous metals | 11 | 0.59 | 0.53 | 0.50 | 0.48 | 0.36 | 0.32 | 0.68 | 0.65 | 0.62 | 0.07 | 0.08 | 0.07 |
| General machineries | 9 | 0.53 | 0.51 | 0.45 | 0.28 | 0.26 | 0.27 | 0.71 | 0.72 | 0.73 | 0.01 | 0.01 | 0.01 |
| Electric machineries | 21 | 0.61 | 0.53 | 0.49 | 0.46 | 0.45 | 0.45 | 0.71 | 0.70 | 0.68 | 0.02 | 0.02 | 0.02 |
| Automobiles | 11 | 0.54 | 0.55 | 0.55 | 0.74 | 0.74 | 0.72 | 0.93 | 0.93 | 0.92 | 0.08 | 0.10 | 0.12 |
| Other transportation equipment | 5 | 0.33 | 0.25 | 0.22 | 0.35 | 0.28 | 0.25 | 0.76 | 0.75 | 0.78 | 0.01 | 0.00 | 0.00 |
| Precision instruments | 4 | 0.51 | 0.45 | 0.43 | 0.14 | 0.18 | 0.23 | 0.38 | 0.41 | 0.33 | 0.00 | 0.00 | 0.00 |
| Other manufacturing | 3 | 0.84 | 0.81 | 0.77 | 0.36 | 0.34 | 0.19 | 0.41 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 |
| F-statistics | | 4.54 | 6.24 | 6.27 | 4.67 | 5.26 | 6.61 | 2.83 | 3.32 | 3.59 | 7.81 | 6.29 | 7.01 |
| (p-value) | | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |

**Table 3: Definition and descriptive statistics of regression variables**

| Variable | Definition | n | Mean | SD |
|---|---|---|---|---|
| ROA | Operating income/total assets | 842 | 0.051 | 0.040 |
| Tobin's Q | (Market value of equity + liabilities)/total assets | 842 | 1.453 | 0.482 |
| *H* | Herfindahl index | 842 | 0.551 | 0.246 |
| *TCC* | Technological coherence index | 842 | 0.769 | 0.189 |
| *HCC* | Human capital coherence index | 842 | 0.867 | 0.159 |
| *Sc* | Sales share of the core segment | 755 | 0.619 | 0.197 |
| (1-*Sc*)×*TCR* | Non-core segments' sales share × technological relatedness index | 755 | 0.120 | 0.111 |
| (1-*Sc*)×*HCR* | Non-core segments' sales share × human capital relatedness index | 755 | 0.230 | 0.167 |
| (1-*Sc*)×*VTR* | Non-core segments' sales share × vertical relatedness index | 755 | 0.015 | 0.022 |
| Firm size | Log of total assets | 842 | 12.75 | 1.003 |
| R&D intensity | R&D expense/total assets | 842 | 0.017 | 0.022 |
| Advertising intensity | Advertising expense/total assets | 842 | 0.012 | 0.020 |
| Leverage | Debt/total assets | 842 | 0.332 | 0.187 |
| Revenue growth | Growth rate in sales | 842 | 0.045 | 0.157 |

Note: All variables are measured in book value unless otherwise noted.

**Table 4: Effects of diversification and coherence on firm performance**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | ROA | ROA | ROA | Tobin's Q | Tobin's Q | Tobin's Q |
| *H* | 0.023** | | | 0.497*** | | |
| | (0.011) | | | (0.140) | | |
| *TCC* | | 0.040*** | | | 0.562*** | |
| | | (0.015) | | | (0.182) | |
| *HCC* | | | 0.057*** | | | 0.558*** |
| | | | (0.016) | | | (0.197) |
| Firm size | -0.005 | -0.005 | -0.003 | -0.011 | -0.006 | 0.009 |
| | (0.004) | (0.004) | (0.004) | (0.048) | (0.049) | (0.049) |
| R&D intensity | 0.217** | 0.209** | 0.237** | 2.330* | 2.480* | 2.927** |
| | (0.107) | (0.106) | (0.105) | (1.314) | (1.314) | (1.303) |
| Advertising intensity | 0.082 | 0.074 | 0.066 | 0.104 | 0.144 | 0.190 |
| | (0.115) | (0.115) | (0.114) | (1.414) | (1.418) | (1.419) |
| Leverage | -0.063** | -0.065*** | -0.066*** | -0.774*** | -0.784*** | -0.772*** |
| | (0.013) | (0.013) | (0.013) | (0.158) | (0.158) | (0.158) |
| Revenue growth | 0.030*** | 0.030*** | 0.029*** | 0.152* | 0.154* | 0.149* |
| | (0.007) | (0.007) | (0.007) | (0.086) | (0.086) | (0.086) |
| R-squared (within) | 0.537 | 0.540 | 0.544 | 0.624 | 0.622 | 0.621 |
| # observations | 842 | 842 | 842 | 842 | 842 | 842 |

Note: All regressions include firm and industry-time fixed effects. In parentheses are standard errors. *** significant at the 0.01 level. ** significant at the 0.05 level. * significant at the 0.1 level.

**Table 5: Effects of industry focus and relatedness on firm performance**

| Specification | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | ROA | ROA | ROA | Tobin's Q | Tobin's Q | Tobin's Q |
| *Sc* | 0.040*** | 0.045*** | 0.021 | 0.524*** | 0.571*** | 0.385** |
| | (0.015) | (0.017) | (0.013) | (0.193) | (0.215) | (0.164) |
| $(1\text{-}S_c)\times TCR$ | 0.096*** | | | 0.533 | | |
| | (0.031) | | | (0.384) | | |
| $(1\text{-}S_c)\times HCR$ | | 0.056*** | | | 0.342 | |
| | | (0.020) | | | (0.247) | |
| $(1\text{-}S_c)\times VTR$ | | | 0.360** | | | 0.832 |
| | | | (0.163) | | | (2.053) |
| Firm size | -0.007 | -0.006 | -0.009* | -0.031 | -0.023 | -0.040 |
| | (0.004) | (0.005) | (0.004) | (0.056) | (0.057) | (0.055) |
| R&D intensity | 0.224** | 0.239** | 0.226** | 3.105** | 3.195** | 3.091** |
| | (0.109) | (0.110) | (0.110) | (1.379) | (1.381) | (1.381) |
| Advertising intensity | 0.090 | 0.083 | 0.090 | -0.100 | -0.149 | -0.081 |
| | (0.119) | (0.119) | (0.119) | (1.496) | (1.497) | (1.499) |
| Leverage | -0.063*** | -0.062*** | -0.058*** | -0.642*** | -0.640*** | -0.618*** |
| | (0.014) | (0.014) | (0.014) | (0.174) | (0.174) | (0.174) |
| Revenue growth | 0.026*** | 0.026*** | 0.026*** | 0.157* | 0.153* | 0.157* |
| | (0.007) | (0.007) | (0.007) | (0.089) | (0.089) | (0.089) |
| R-squared (within) | 0.556 | 0.554 | 0.552 | 0.621 | 0.621 | 0.620 |
| # observations | 755 | 755 | 755 | 755 | 755 | 755 |

Note: All regressions include firm and industry-time fixed effects. In parentheses are standard errors.
*** significant at the 0.01 level. ** significant at the 0.05 level. * significant at the 0.1 level.

**Table 6: Distribution of divestiture count**

| # Divestitures in 1998-2000 | # firms | Fraction |
|---|---|---|
| 0 | 91 | 0.67 |
| 1 | 20 | 0.15 |
| 2 | 12 | 0.09 |
| 3 | 5 | 0.04 |
| 4 | 6 | 0.04 |
| 5+ | 2 | 0.01 |
| Sum | 136 | 1.00 |

**Table 7: Negative binominal regressions of divestiture count**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *H* | -1.724** | | | | | |
| | (0.702) | | | | | |
| *TCC* | | -1.791** | | | | |
| | | (0.761) | | | | |
| *HCC* | | | -1.931*** | | | |
| | | | (0.742) | | | |
| *Sc* | | | | -1.705** | -2.101** | -1.367* |
| | | | | (0.859) | (0.902) | (0.841) |
| $(1\text{-}S_c)\times TCR$ | | | | -1.863 | | |
| | | | | (1.444) | | |
| $(1\text{-}S_c)\times HCR$ | | | | | -1.602* | |
| | | | | | (0.863) | |
| $(1\text{-}S_c)\times VTR$ | | | | | | 2.293 |
| | | | | | | (5.819) |
| Firm size | 0.686*** | 0.757*** | 0.784*** | 0.812*** | 0.821*** | 0.740*** |
| | (0.170) | (0.173) | (0.174) | (0.182) | (0.178) | (0.178) |
| Leverage | 2.280** | 2.191** | 2.413** | 2.095** | 2.297** | 2.219** |
| | (0.994) | (0.999) | (0.983) | (1.042) | (1.022) | (1.058) |
| Tobin's Q | 0.455 | 0.459 | 0.439 | 0.359 | 0.365 | 0.386 |
| | (0.358) | (0.356) | (0.359) | (0.361) | (0.364) | (0.366) |
| *Keiretsu* dummy | 0.588* | 0.613* | 0.679** | 0.476 | 0.491 | 0.454 |
| | (0.333) | (0.332) | (0.326) | (0.346) | (0.343) | (0.349) |
| $\alpha$ | 0.836** | 0.854** | 0.825** | 0.797** | 0.754** | 0.851** |
| | (0.380) | (0.386) | (0.385) | (0.376) | (0.370) | (0.387) |
| Log likelihood | -135.2 | -135.6 | -135.1 | -128.0 | -127.1 | -128.7 |
| #observations | 136 | 136 | 136 | 123 | 123 | 123 |

Note: $\alpha$ denotes the dispersion parameter. In parentheses are standard errors.
*** significant at the 0.01 level. ** significant at the 0.05 level. * significant at the 0.1 leve