Boundary and Efficiency of Internal Capital Markets and Organizational Structure in Spin-offs: Control vs. Focus

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Abstract: This paper examines how the boundary and efficiency of internal capital markets (e.g., firm size) is affected by corporate spin-offs. A spin-off is classified by its organizational structure: whether or not spun-off firms are *operationally controlled* or *focused* by parent firms after a spin-off. Surprisingly, in about 58% of the 102 spin-off transactions we studied, parent firms retain "control" of spun-off firms through overlapping management. Our result implies that these two types of parent firms are systematically different in their management of the internal capital market. That is, we find that corporate spin-offs themselves do not change investment sensitivity in parent firms after spin-offs. However, investment activities have already been sensitive to the change in Tobin's Q around the spin-off events for the focused parent firms. In contrast, the controlling parent firms turn out to have maintained inefficient capital markets around spin-offs.

We find that most of the focused parent firms in our spin-off sample are much larger than the controlling parent firms prior to spin-offs. Furthermore, for the controlling (focused) parents, the investment sensitivity increases (decreases) as firm size increases. These results are consistent with our argument that a spin-off appears to be a means to maintain an optimal firm size as suggested in Aron (1988), Gertner, Scharfstein, and Stein (1994) and Stein (1997). We show that the pre- and post spin-off market-adjusted performances are also consistent with the efficiency of the internal capital markets under these two types of parents.

JEL Classifications: G31,G34

Keywords: Capital allocation; Internal capital markets; Organizational structure; Operational
Focus; Spin-offs

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Boundary and Efficiency of Internal Capital Markets and Organizational Structure in Spin-offs: Control vs. Focus

A fundamental element in corporate decisions lies in understanding the internal and external capital markets facing firms. Recent literature has focused on the efficiency of internal capital markets. Gertner, Powers and Scharfstein (2002) and Gertner, Scharfstein, and Stein (1994) argue that the relative efficiency of internal and external capital markets is a crucial element in defining the boundaries of the firm. Internal capital markets allow insiders to allocate funds across and within the line of business. Whether or not internal capital markets work well is still in debate. Williamson (1970) argues that internal markets work better than external ones because inside managers are better informed. However, others argue that divisional managers in internal markets may have distorted incentive to misallocate capital among divisions (see Meyer, Milgrom and Roberts 1992; Stein 1997; Scharfstein and Stein 1998; Shin and Kim 2002). Shin and Stulz (1998) find evidence that internal capital is not allocated to the divisions with better investment opportunities. Scharfstein (1998) shows that conglomerate investment is less sensitive to Tobin's Q than investment by more focused firms. Rajan, Servaes and Zingales (2000) also find that conglomerates invest more than stand-alone firms in industries with poor investment opportunities.

Recently, Gertner et al. (2002) and Ahn and Denis (2004) examined spin-offs in order to analyze the efficiency of internal capital markets. Gertner et al. studied how investment behavior changed in the spun-off firms, while Ahn and Denis observed the effect in the combined (parents and spun-offs) firm. Since the quality of internal capital markets depend on the agency problem mentioned above, we expect to observe the improved efficiency of the internal capital market to the extent that the spin-off attenuates the potential agency problem. However, Gertner et al. recognized the limitation of using a spin-off sample: a spin-off transaction is not a random event. If indeed a

spin-off is motivated by the effort to reduce internal capital misallocation (or negative synergy), they argue that we need to be careful in generalizing the result.[1]

The purpose of this paper is to examine the investment behavior of <u>parent</u> firms around spin-offs and its implications for internal capital markets and diversification discounts. We view a spin-off as an outcome arising from the effort of corporate headquarters (or parent managers) to maintain an optimal size of internal capital markets. Aron (1988) provides a theory that optimal firm size is determined as a function of the benefits and costs regarding diversification. Gertner, Scharfstein, and Stein (1994) and Stein (1997) also argue that the size and scope of internal capital markets are a function of diversification and monitoring. These views do not require any investment efficiency improvement from a spin-off itself. In fact, contrary to earlier results, Colak and Whited (2006) do not find any investment efficiency change after spin-offs in contrast with earlier results. We also show that spin-offs themselves do not improve investment efficiencies. We interpret our results in terms of the optimal size of internal capital markets.

There are at least two important reasons for focusing on parent firms instead of spin-offs or combined firms. First, the effect of a spin-off may simply reflect the relative advantage of the external capital market faced by the spin-off firm over the internal capital market. Therefore, any changes in investment efficiency may arise in a favorable financing environment in the external capital market. For the same reason, the <u>combined</u> effect on both parents and spin-offs may be influenced by the external capital market. Second, in order to investigate the effect of the change of internal capital markets on the allocation of resources, we want to focus on the behavior of the parent managers (e.g., headquarters) because they control the investment allocation within the internal capital market. This observation may be particularly important when misallocation of resources within the internal market may be driven by agency problems (Scharfstein, 1998).

Furthermore, it is important, but often overlooked, to note that corporate restructuring affects both assets and management. This has an enormous implication for the efficiency of internal capital

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[1] Refer to Veld and Veld-Merkoulova (2006) for a review of empirical evidence of value creation through spin-offs.

markets. After all, top (headquarters) managers choose corporate decisions, including internal resource allocation, divestitures, and diversification. Therefore, we should benefit from focusing on managerial structure when examining asset allocation or investment. Wruck and Wruck (2002) emphasized the importance of managerial structures and their relationship with performance in spin-offs. In particular, they found that in about 34% of the sample spin-offs, there is an overlap between the top management of parent and spin-off firms. Furthermore, most of these overlapped managers hold governance-oriented positions. The examination of the effect of organizational structure on internal capital markets is well motivated by international evidence in Lin and Servaes (1999). They find that corporate diversification discounts differ in Japan and Germany, most likely because of different governance systems in these two countries. We extend their evidence that institutional structure affects the efficiency of internal capital markets into the domestic realm, in which a corporate spin-off can be categorized into two types according to the different organizational structures – overlap (control) vs. non-overlap (focus).

Schipper and Smith (1986) recognize overlapping managerial structure in equity carve-outs as a means of effectively controlling subsidiary assets.[2] The question is whether "effective" control through overlapping management or focus through non-overlapping management reaps any potential benefit of spin-offs. Interestingly, we also observe a substantial degree of overlapping management in voluntary spin-offs (e.g., 59 out of 102 spin-offs of our final sample). This implies that even after a spin-off, parent firms can exercise their limited control over subsidiary assets through their influence in the spun-off management. Whether this "extended" control over subsidiaries after spin-offs contributes to the efficiency of internal capital markets is an interesting issue to be addressed here. Meanwhile, corporate focus on operations should be the objective of the non-overlapping

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[2] Schipper and Smith (1986) find that in 34 of the 48 equity carve-outs, the President or CEO of the subsidiary is also a parent manager. One or more of the secretary, treasurer, and corporate counsel is the same person for parent and subsidiary. Finally, 56 of 57 subsidiary boards have at least one member who is also a parent director or a manager in the parent firm. Wruck and Wruck (2002) show that in 58 of the 172 spin-offs, spin-off top managers hold a top position in both firms. The most common situation is where a top manager holds a governance-oriented position at both firms (57 of the 58 the cases).

management structure. In fact, Stein (1997) argues that internal capital markets can be efficient when parent firms oversee a small and focused set of projects. This implies that size and "operational" focus may matter in determining the efficiency of internal capital markets.

In addition, our study extends existing literature on several fronts. Dittmar and Shivdasani (2003) examine the behavior of <u>parent firms</u> regarding asset sales of diversified firms that divest their divisions and thus change their organizational structure. Their results support the corporate focus and financing hypotheses for corporate divestitures. They also conclude that asset sales improve the efficiency of investment in the remaining parent firms. By examining spin-off samples that do not involve any cash inflows, however, we can rule out the financing hypothesis and concentrate on the focus issue for corporate restructuring and investment changes.

Furthermore, it has been recognized in the literature that previous work on the corporate diversification discount was biased because the old Compustat segment data did not correctly reflect the consequences of managerial decisions (Chevalier, 1999; Whited, 2001). That is, in the old segment data, the reported financial outcomes did not match with the management responsible for them. We advance this management approach to consider the managerial motive behind a spin-off in order to better evaluate and explain investment activities around a spin-off. Recently, Villalonga (2004) used the Business Information Tracking Series database, which is not subject to the bias in the Compustat segment data. He finds a diversification *premium* instead of a discount, calling into question many of the studies based on the business segment data. Finally, Colak and Whited (2006) point out the estimation bias in investment sensitivity with respect to investment opportunity (measured by Tobin's Q). Gertner, Powers, and Scharfstein (2002) and Ahn and Denis (2004) used the median Q of the industry of the business segment. When the segment is a part of a conglomerate, Maksimovic and Phillips (2002) argue that the industry median Q is not a good proxy for investment opportunity. Therefore, we employ firm Q instead to measure investment opportunity.

In sum, we find evidence of efficient internal markets for "operationally" focused spin-offs, although spin-offs themselves do not seem to improve the efficiency in parent firms – a finding consistent with Stein (1997) and Colak and Whited (2006). In contrast, for "operationally" controlled

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spin-offs, we observe inefficiencies. Given previous results in the literature of improved efficiencies in spun-off or combined firms, any improved efficiencies from spin-offs may arise from the change in spin-off firms, not from efficiency changes in parent firms. Consistent with Stein (1997), Gertner, Scharfstein, and Stein (1994), and Aron (1988), we show evidence that the optimal size is critical for the efficiency of internal capital markets. If a firm increases in size, a spin-off is likely to occur in order to achieve an optimal size. Given the positive correlation between size and diversification as presented in Aron (1988), we expect the focused parent firms to be large prior to the spin-offs. In fact, our sample shows that the median size of the focused parent firms is much larger than those of the controlling parent firms.

We also find that there is an interaction effect between asset size and managerial structure in determining the efficiency of the internal capital market. That is, we observe improved efficiency under controlling management with larger parent firms, while the efficiency deteriorates with size under focused management, probably because of the sub-optimal size. This supports the idea that parent firms opt to reduce the size of the assets under monitoring through spin-offs to maintain the optimal firm size. Finally, we find distinctive patterns in pre- and post-spin-off stock market performances under different managerial structures. Significant excess returns persist after spin-offs for operationally focused parents, consistent with Desai and Jain (1999), while insignificant excess returns exist for operationally controlling parents. Also pre-spin-off performances are striking. Excess returns for focused parents have increased over a 3-year period before spin-offs, while those of controlling parents have decreased over the same time period.

In Section I, we describe the data and sample construction and empirical methodology. Section II presents and discusses the empirical results. Section III discusses market performance around announcements of spin-off events and in a long-term time period before and after spin-offs. Section IV concludes.

I. Data Collection and Empirical Methodology

A. *Spin-off and Organizational Structure Data*

We collect spin-off data from 1982 to 2001. Therefore, this study supplements earlier studies in spin-offs with more recent data. The initial sample of 182 spin-offs is obtained from the *Standard and Poor's Annual Dividend Record* and *Moody's Annual Dividend Record*, augmented by the SDC spinoff data. We trace the Lexus/Nexus and the Wall Street Journal (WSJ) Index to check whether the sample collected consists of true spin-off transactions. Since we are interested in voluntary corporate spin-off transactions, we deleted eleven spin-offs in banking and regulated industries. The sample spin-offs with simultaneous confounding events such as takeovers or legal disputes around the spin-off announcements are also deleted (18 cases). This procedure eliminates the potential danger of including the effect of irrelevant events.[3]

Finally, two additional restrictions imposed by data collection that are required of event studies are the following: 1) the daily stock return data need to be available from the CRSP tape; and 2) the number of daily stock returns should be sufficiently large for event studies. Due to either lack of daily stock return data or insufficient number of returns for estimation of the market model in event studies, we deleted 29 cases. Furthermore, the sample is, as shown in Table 1, divided into two groups according to the internal management control over the spun-off firms. We examine the *Moody's Industrial Manual* and *Standard and Poor's Register of Corporations, Officers, and Directors* to obtain the composition of top management. In many small spin-offs, this management information was not available (12 cases). After screening for the financial information mentioned below, our sample is reduced to 102 spin-off transactions in the 1982-2001 time period.[4] Of those 102 spin-offs, 59 cases have overlapping management, while the other 43 have non-overlapping management.

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[3] In fact, Hite and Owers (1983) and Cusatis, Miles, and Woolridge (1993) attribute part of the positive announcement return to the spin-offs associated with merger activities.

[4] The spin-off cases with some NASDAQ firms are excluded because the top management composition is not available.

In this research, an organizational structure is called an overlapping (or controlling) structure when one or more top managers or directors of the parent firm also holds a top managerial or director position in the spun-off firm. When there is no overlapped management, we call that non-overlapping or focused structure. We believe that overlapping management strongly indicates that the parent wants to control the spun-off operation even after spin-offs occur. At times, in addition to the major motivations mentioned earlier, a spin-off provides a way of preparing for an upcoming takeover bid for the subsidiary firm. This puts the shareholders in a better position to benefit from a takeover negotiation by exposing the subsidiary's operation to the market for better assessment of the company and thus a better price for the subsidiary (see Hite and Owers (1983) and Cusatis, Miles and Woolridge (1993)). Therefore, in order to minimize any confounding effects, we obtain the overlapping management information two years after a spin-off.

B. Corporate Financial Data in Spin-offs

The financial data are obtained from Compustat and Annual Reports. Such financial data will contain the following variables for each parent firm: capital expenditures, market value of equity, book value of equity, total assets, and preferred stocks. We eliminate samples in which such necessary financial information cannot be obtained (10 cases). The two important variables in the empirical investigation will be the measures of investment and investment opportunities. Capital expenditures normalized by total asset size will be used as a measure of investment. Tobin's Q will be employed to measure investment opportunity. We use the definition of the Q variable used in Chung and Pruitt (1994): (Market Value of Equity + PS + Debt) / Total Assets, where PS is the liquidating value of the firm's outstanding preferred stock; Debt is the value of the firm's short-term liabilities net of its short-term asset, plus the book value of the firm's long-term debt. The data are aligned into an event time panel of years –3 to +3 where year 0 is the fiscal year when the spin-offs occurred.

Table 2 provides summary statistics on key variables for the parent firms before and after spin-offs. The mean Q variables increased from 1.11 to 1.25, while the normalized capital expenditures decreased from 6.27% to 5.87%. Similar patterns are observed for the median values. Even though the investment opportunity measured by Q seems to have improved after spin-offs, capital expenditures on average declined after spin-offs. That is, we do not observe any efficiency improvements after spin-offs. However, when we decompose the sample into two, based on the organizational structure, we observe some intriguing results, as shown in Table 2. Under the overlapping (controlling) spin-off structure, both capital expenditure and Q decreased. However, under the non-overlapping (focused) spin-off structure, both mean Q and capital expenditures increased rather significantly. It seems that investment opportunity greatly improved after eliminating the spun-off division for the focused structure. The market considers this as a positive outcome since the parent firms may resolve potential negative synergy. The overall results suggest that "managerial" focus seems to be significant in making more efficient investment. Unexpectedly, the average asset size actually increased after spin-offs, especially under controlling structures. For example, the average asset size changed from $8.6 million to as much as $10 million under the controlling management. In contrast, the post-spinoff asset size was about the same with $7.4 million under the non-overlapping (focused) structure. However, when we look at the median asset size, the focused parents ($4.5 million) are almost four times as large as the controlling ones ($1.2 million). This suggests that very large parent firms on average dominate the controlling sample. For example, the top 1 percentile of parent firm's sizes are $274 million and $43 million for the controlling and focused sample, respectively. To avoid the effect of the outliers, we focus on the median size in future discussion.[5] The relatively large asset size of the focused parents is consistent with the

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[5] We adjusted the asset size for inflation. The subsequent regression results were almost identical, but the pattern still exists.

hypothesis that parent firms reduce the size of the asset under their control in order to maintain an optimal firm size.

II. Investment and Efficiency of Internal Capital Market

We determine whether spin-offs change investment behavior by examining whether the sensitivity of investment to Q changes after the spin-offs occur. We presume that a more efficient internal market suggests more investment with better investment opportunities. We also examine how asset size affects investment efficiency under different managerial structures. We estimate the following regression equation for years -3,-2,-1, 1, 2, 3, excluding the event year:

$$I_{it} = \alpha_i + \beta_1 * Q_{it} + \beta_2 * Q_{it} * Before + \beta_3 * Before + \beta_4 * LnA * Q_{it} + \sum_t \gamma_t Year_t + \varepsilon_{it}$$

The dependent variable I_{it} is the capital expenditures divided by total assets of firm i in period t. The firm-specific intercept term captures firm-fixed effects. *Before* is a dummy variable taking the value of 1 in years -1, -2, and -3 and zero otherwise. *Q* is Tobin's Q measuring investment opportunity. *LnA*Q* is the interaction term for the logarithm of the total assets and Q variable. *Year* is a calendar year dummy.

We can use a firm-specific measure of Q here because we only use parent firms, thus avoiding the potential bias problem associated with the industry median Q in the previous literature.[6] The specification above is similar to Gertner et al. (2002), except for its inclusion of the interaction term *LnA*Q*. In order to control for any effect of size on the efficiency of internal capital markets, we add the interaction term between asset size and the effect of Q on investment activities. Furthermore, the interaction term allows us to observe any differential patterns in investment efficiencies as a function of size under different organizational forms.

Table 3 reports the results of the above estimating equation. Overall, the coefficient of Q is insignificant, which suggests that in general, parents do not respond to changes in firm Qs. Further, the coefficient estimate of the interaction term, β_2, is also insignificant; thus there is no evidence supporting the increase in the efficiency of internal capital markets after spin-offs. However, this overall conclusion does not hold when we compare between the two different samples – controlling and focused spin-offs. Under the controlling (overlapping) structure, investment sensitivity is negative and insignificant, and there is no differential change in investment activities before and after spin-offs in response to the changes in investment opportunity. On the other hand, we observe a strong efficient capital market for focused parents. That is, β_1 under focused parents is positive and significant at the 5% level. Again, the investment sensitivity stays the same after spin-offs (i.e., the coefficient of Q*Before is insignificant).

We propose a couple of interpretations. First, these findings are consistent with the argument that any improved investment efficiency after spin-offs may arise from spin-off firms instead of from the parents as shown in Gertner et al. Second, we argue that spin-offs may not necessarily be a result of inefficient internal capital markets because parents in efficient internal capital markets also did spin off their subsidiaries, and the efficiency in both parents (controlling or focused) does not improve after spin-offs. Third, consistent with the optimal size hypothesis, the internal capital market is most efficient around focused spin-offs, supported by the significant estimate on Q (i.e., 0.095).

The results of the interaction between firm size and Q are also consistent with the optimal size argument. For example, under the controlling spin-offs, the coefficient (0.0031) on *LnA*Q* is positive and significant at the 10% significance level. The larger the asset size is, the more sensitive the investment becomes, (or equivalently, the more efficient the internal capital market becomes). On

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[6] Gertner et al. mentioned the potential estimation problems in using the industry Q instead of the firm-specific Q. They cannot use a firm-specific measure of Q because the spin-offs are not publicly traded before the spin-off transactions.

the other hand, under focused parents, the interaction term coefficient (-0.012) is negative and statistically significant at the 5% significance level. This means that the larger the firm size, the less efficient the internal capital market becomes.

We argue that on average, focused parents have increased in size to an optimal level before spin-offs. That is, as the firm size becomes larger than or close to the optimal point, parents decide to spin off the subsidiaries because the efficiency of the internal capital market decreases with the larger-than-optimal firm size. The opposite is true under the controlling spin-off structure. There is still a room to grow for efficiency under the controlling parents to achieve the optimal size. That is, it is optimal to increase the size of the internal capital market for the controlling spin-offs. The positive estimated coefficient (i.e., 0.0031) on *LnA*Q* indicates that the efficiency increases as the firm size increases. These two pieces of evidence support the argument that corporate headquarters tends to use spin-offs as a means to achieve an optimal asset size under the management's control. However, we then need to explain why the controlling parents decide to spin off because the parents could keep the size of the internal capital market without spin-offs. We conjecture that headquarters may expect the size to increase after spin-offs. The subsidiaries may grow faster as independent entities with their access to the external capital market.

III. Market Performance around Corporate Spin-offs

A. Market response around announcement days

This preliminary investigation will shed light on any differential market behavior around the spin-off announcements. Abnormal returns are computed using the standard market model; the estimation period is from $t = -280$ to $t = -40$ relative to the event date ($t = 0$). The day before the press announcement appeared in the *Wall Street Journal* is designated as the event date. The shareholders' overall wealth change due to spin-offs is measured by the average cumulative abnormal returns over the three-day period centered on the announcement dates, i.e., CAR[-1,1].

Table 4 shows the results of the event study. Consistent with previous work, there is a significant market response to the spin-offs under both managerial structures. The three-day average cumulative abnormal returns (CARs [-1,1]) are very significant for both structures: they are 2.96% (t = 3.56) for focused parents (i.e., non-overlapping management) and 2.83% (t = 3.48) for the controlling parents (i.e., overlapping management), as shown in Table 4. The difference is not statistically significant at any conventional level. This market response is consistent with the optimal size hypothesis. For focused parents, the effort to maintain an optimal size by shedding off the subsidiary is perceived favorable by the market. At the same time, for controlling parents, the market may favorably view a spin-off as a means to grow in size under the parent's control through overlapping structure.

B. Long-term market performance: pre- vs. post-spin-off market performances

Table 4 shows the results of post-spin-off market-adjusted performance of parent firms. Here we observe a very distinctive pattern in different managerial structures. Positive abnormal returns persist over three years after spin-offs for "operationally focused" parents, while no significant abnormal returns are observed for the overlapping (controlling) management structure. The result is consistent with the optimal size hypothesis of spin-offs: parents with focus and optimal size benefit from the efficient internal capital market. During the first six months, the excess returns stay at an annualized 15.6%, which is significant (t = 1.88). Even two years later, the excess returns are still significant at 4.8% (t = 2.03). This suggests that the market rewards the parents for operational focus and optimal size. In contrast, for controlling parents, we do not observe any positive excess returns. This implies that the internal capital market may likely improve with the overall size but may still be below the optimal size, and preventing parents from benefiting from economies of scale regarding size and scope under the controlling structure.

Table 4 also shows an interesting pattern before a spin-off. The parent firms which intend to control spin-off operations (overlapping management) perform poorly a few months prior to spin-offs relative to the market. On the other hand, the parent firms that focus on their own operation,

completely independent of the spin-offs, perform better than the market benchmark a few months into the spin-offs. When we examine a three-year period prior to the spin-offs, the performance of the "focused" parents have improved over the 3-year time period while that of the "controlling" parents have deteriorated over the same time period. Poor performance leading to spin-offs suggest that parent managers may be pressured to spin off divisions. Wruck and Wruck (2002) provide some evidence that outside blockholder ownership in spin-offs is larger than that of the peer benchmark. Therefore, the pressure from the outside blockholders to spin off divisions can be substantial when firms are performing poorly.

IV. Summary and Conclusions

We examine the boundary and efficiency of internal capital markets around spin-offs to determine whether headquarters make corporate restructuring decisions to achieve the optimal size of corporate assets under operational control. We find some evidence supporting the optimal size argument regarding spin-offs. Firm size in particular affects investment efficiency in a different way under alternative organizational structures. That is, we observe improved efficiency under controlling management with larger parent firms, while the efficiency deteriorates with size under focused management, most likely because of the sub-optimal size. This supports the idea that parent firms opt to reduce the size of their assets under monitoring through spin-offs to maintain the optimal firm size.

The efficiency of the internal capital market around spin-offs depends on the managerial structure after spin-offs. In general, we find that focused (controlling) parents maintain the efficient (inefficient) internal capital market around spin-offs. However, we do not observe any differential improvement in the efficiency after spin-offs themselves. Thus we suggest that any efficiency gain documented in the exant literature may be due to the efficiency change in spun-off firms. Furthermore, our result supports the hypothesis that operational focus after spin-offs determines the success of spin-offs due to the efficient capital market. Controlling parents seem to follow their path of inefficient investment policies even after spin-offs, reflected in poor post-spin-off performance.

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TABLE 1 : Decomposition of Spin-offs Data by Internal Organizational Structure over the Period 1982-2001

The final spin-off sample data are classified according to internal organizational structure. An internal structure is called non-overlapping management (focused) when no top managers or directors are overlapped between the parent and spin-off firms. Overlapping management (controlling) is when there is some overlap of top managers in the parent and spin-off firms. Information about managerial composition is obtained from Moody's Industrial Manual and Standard and Poor's Register of Corporations, Officers, and Directors.

Year	Overlapping (Controlling)	Non-overlapping (Focused)	Total
Total	59	43	102

TABLE 2: Summary Statistics: Mean (Median) Capital Expenditure, Asset size, and Q Values around Spin-offs. CE ratio = Capital Expenditure / Total Assets; Q = Tobin's Q. Total Assts are in thousands. Total assets are in 2001 dollars.

Panel 1: All Samples

Variable	All (530)	Pre-spin-off (275)	Post-spin-off (255)
CE ratio	6.08% (5.28%)	6.27% (5.70%)	5.87% (4.75%)
Q ratio	1.18 (0.89)	1.11 (0.86)	1.25 (0.96)
Total Asset	8,651 (2,266)	8,127 (2,404)	9,217 (1,943)

Panel 2: Overlapping Structure (Controlling)

Variable	All (298)	Pre-spin-off (152)	Post-spin-off (146)
CE ratio	5.25% (4.54%)	5.96% (5.00%)	4.51% (4.30%)
Q ratio	1.18 (0.92)	1.24 (0.93)	1.12 (0.88)
Total Asset	9,588 (1,171)	8,680 (1,270)	10,533 (1,171)

TABLE 2 (Continued)

Panel 3: Non-overlapping Structure (Focused)

Variable	All (232)	Pre-spin-off (123)	Post-spin-off (109)
CE ratio	7.14% (6.26%)	6.65% (6.43%)	7.69% (6.13%)
Q ratio	1.18 (0.89)	0.95 (0.78)	1.44 (1.08)
Total Asset	7,448 (4,579)	7,443 (4,559)	7,454 (4,600)

TABLE 3: Investment Sensitivity around Spin-offs
The regression results are obtained when the capital expenditures are regressed against Q,
Before **dummy, the interaction between Q and the** *Before* **dummy variable, the logarithm**
of asset size (LNAST), and the interaction between asset size and Q (*LnA*Q***), controlling**
for fixed-firm effects. t-values are in the parentheses.

Variable	All (530)	Controlling (298)	Focused (232)
Q	-0.001 (-0.065)	-0.0090 (-0.725)	0.095 (2.291)**
Before	0.0080 (1.592)	0.208 (3.78)***	-0.0079 (-1.022)
Q*Before	0.0003 (0.035)	0.000 (0.003)	0.0132 (0.904)
LNAST	-0.001 (-0.610)	0.002 (1.033)	-0.0023 (-1.413)
LnA*Q	0.0013 (0.828)	0.0031 (1.86)*	-0.012 (-2.338)**

* indicates the 10% significance level
** indicates the 5% significance level
*** indicates the 1% significance % level.

TABLE 4 : Market Responses: Announcement Effects and Pre- and Post-spinoff Market Performance.

In panel 1, announcement effects are measured by Average Cumulative Abnormal Returns around announcement days (-1, 1). In panels 2 and 3, pre- and post-spinoff performance is based on the excess returns for 3 years before and after spin-offs.

Panel 1: Announcement Effect

	All (102)	Focused (43)	Controling (59)
CAR (-1,1)	2.88% (4.84)***	2.96% (3.35)***	2.83% (3.48)***

Panel 2: Post-Spinoff Performance

Structure	3 month	6 month	12 month	24 month	36 month
Overall (%)	0.1982 (0.335)	0.6592 (1.44)	0.3766 (1.32)	0.1372 (0.631)	-0.103 (-0.521)
Focused (%)	1.301 (1.34)	1.37 (1.88)*	0.916 (2.32)**	0.498 (2.03)**	0.122 (0.489)
Controlling (%)	-0.634 (-0.000)	0.1227 (0.0000)	-0.031 (-0.000)	-0.13 (-0.183)	-0.282 (-0.493)

Panel 3: Pre-Spinoff Performance

Structure	3 month	6 month	12 month	24 month	36 month
Overall (%)	1.751 (2.58)**	1.233 (2.42)**	0.902 (2.52)**	0.588 (2.25)**	0.461 (2.72)**
Focused (%)	3.396 (3.56)***	2.541 (3.40)***	0.991 (2.37)**	0.441 (1.36)	0.099 (0.482)
Controlling (%)	0.552 (0.61)	0.280 (0.421)	0.837 (1.56)	0.693 (1.81)*	0.727 (2.95)***