Stock Price Informativeness, Investment Decisions, and Firm Performance: Evidence from Spinoffs

Youngsuk Yook*

ABSTRACT

A growing literature in finance has made the assumption that informativeness of stock price has an impact on a firm's managerial decisions and operating performance. However, empirical evidence to justify this assumption is sparse. In this study, I investigate this assumption using a sample of corporate spinoffs from 1975 to 2001. I find that changes in informativeness around the spinoff are positively related to the subsequent changes in operating performance of the parent firms. Furthermore, I find that those firms with increased informativeness make significant adjustments to improve investment efficiency following the spinoff. The results suggest that investment decisions serve as one of the channels through which information contents in stock price contribute to firm performance. My findings provide support for the view that informed trading matters to the real sector as well as to the financial markets.

* SKK Graduate School of Business, SungKyunKwan University, and Kenan-Flagler Business School, The University of North Carolina at Chapel Hill, Phone: 02-740-1515, Email: yooky@skku.edu

I. Introduction

Does the informativeness of a firm's stock price affect its management decisions and operating performance? A stream of research suggests that the stock price provides information feedback to the managers, leading to better management decisions.[1] For instance, some investors may trade based on their private information about the firm's competitors. Understanding how much the markets know about their firm, the managers have reasonable expectation about their firm's stock price movements. Therefore, when they observe unexpected trading activities, the managers can deduce the information contents. Others propose that the stock market plays a role in monitoring the managers. Holmstrom and Tirole (1993, p.678) state that "the stock price incorporates performance information that cannot be extracted from the firm's current or future profit data. The additional information is useful for structuring managerial incentives." Both stories suggest that the information contents of stock price have impact on the real sector through the channel of managerial decisions.[2]

In this study, I empirically investigate the proposed connection between information contents of stock price and the real sector. Specifically, I measure the change in stock price informativeness over time and analyze how it relates to the managerial decisions and the subsequent performance. The stock price informativeness of a firm does not vary considerably over time.[3] Therefore, my goal is to find a corporate event that drastically changes informativeness of stock prices. Corporate spinoffs provide a natural experiment for this study

[1] Boot and Thakor (1997), in comparing the role of the financial markets and that of a bank, argue that financial markets have information feedback, which affect the real decisions. Subrahmanyam and Titman (1999), while examining the choice between private and public financing, suggest that the benefit of going public is a more informative stock price, which can lead to better management decisions. Habib, Johnsen, and Naik (1997) and Chang and Yu (2004) propose that corporate spinoffs facilitate more informative stock price, which helps managers improve their investment decisions.

[2] I note that the impact of stock price informativeness is subject to the managerial incentive structure according to the second story. However, in this paper, I only focus on the association between stock price informativeness and managerial performance ceteris paribus.

[3] I estimated a measure of stock price informativeness for entire CRSP firms from 1991 to 1999 using daily stock prices. The year-to-year changes in informativeness were roughly one tenth in magnitude of the changes of the sample firms around the spinoff with an exception of year 1998.

because the significance of changes in informativeness around the spinoff is well documented and supported theoretically. Chang and Yu (2004) and Goldman (2005) theoretically demonstrate that firms that choose to spin off meet with an increase in information production. Huson and MacKinnon (2003) discover significantly more intensive informed trading and higher transaction costs following the spinoff.[4] Using a sample of corporate spinoffs from 1975 to 2001, I test the association between price informativeness and subsequent firm performance. The results show that those firms with increased informativeness following the spinoff tend to have more improvement in the subsequent performance. A further investigation shows that the additional information facilitates more efficient investment decisions: those firms with increased informativeness subsequent to the spinoff make significant adjustments in an attempt to resolve investment inefficiency. The findings suggest that managerial decisions serve as a channel through which the informative stock price contributes to firm performance. The results are robust to a number of sensitivity checks including managerial compensation hypothesis and corporate focus hypothesis.

Two types of informativeness measures are employed for the investigation. First, firm-specific return variation is calculated using daily stock prices: (1) return variation unexplained by market return (MM), and (2) return variation unexplained by market return and industry return (MI). Higher firm-specific return variation indicates more private information in the stock price (the informativeness measures are discussed in more detail in the next section.) Secondly, using intraday transactions data, I obtain the relative effective bid-ask spread (REBA). REBA is defined as two times the absolute difference between the transaction price and the quote midpoint outstanding at the time of the trade, divided by the quote midpoint. The spread reflects the degree

[4] This empirical finding, more information production by investors following the spinoff, is consistent with the internal capital market literature, which implies diversified firms have more information asymmetry with investors than standalones. Spinoff lessens the informational gap between the firm and investors, providing investors with a strong incentive to engage in information production.

of information asymmetry in the markets; thus, it is expected to be widened when there is more private information in the markets (Glosten and Milgrom (1985)). Operating performance is essentially a profitability measure, captured by industry-adjusted return on assets.

The regression results with both informativeness measures support the hypothesis that changes in informativeness around the spinoffs are positively associated with subsequent changes in the operating performance of parent firms. The effect is economically significant as well: for a firm experiencing the mean change in informativeness around the spinoff, the industry-adjusted performance increases from 3.78% in the first year following the spinoff to 4.5% (5.43%) in the second (third) year when the firm-specific return variation measure is utilized. The impact on performance is similar when REBA is utilized. I further analyze whether management decisions serve as a channel through which the changes in stock price informativeness affect the subsequent performance. I focus on changes in investment decisions, among various managerial decisions, in relation to changes in price informativeness. According to the Q theory, firms should invest more (less) as investment opportunities increase (decrease). In other words, investment efficiency is evaluated by assessing the alignment between a firm's investment opportunity and its level of actual investment. I consider a firm over-investing (under-investing) if it invests more (less) than its industry when it has less (more) investment opportunities relative to its industry. I find that, among the firms suffering from an overinvestment or underinvestment problem prior to the spinoff, those firms with increased informativeness make significant adjustments to resolve investment inefficiency after the spinoff. This finding suggests that increased informed trading activities induce the managers to make better investment decisions, which appear to, at least partially, account for the improved operating performance.

The results are robust to the following sensitivity checks. First, the association between management compensation and firm performance is considered. Post-spinoff stock price being a

better indicator of the division's performance, CEOs with more stock compensation are expected to have stronger incentives to increase the firm's performance following the spinoff. However, increased stock-based compensation appears to have only a marginal effect on the subsequent firm performance and does not affect the association between price informativeness and performance. Secondly, I explore the corporate focus hypothesis that focus-improving firms achieve better operating performance following the spinoff by getting rid of unrelated divisions and concentrating on the division for which managerial skills and resources are well-suited. I find that while focus-improving firms demonstrate more performance improvement during the testing period than do non-focus-improving firms, the difference in their performance changes is not statistically significant. Third, I consider a scenario under which the removal of poorly performing subsidiaries helps improve the performance of the parent subsequent to the spinoff. The results show that although some of the spinoffs are undertaken to eliminate poorly performing divisions, spun-off subsidiaries do not, on average, underperform their matching firms. In fact, the performance changes of the parents over the testing period are not significantly correlated with the pre-spinoff performance of the subsidiaries nor with the performance changes of the subsidiaries over the testing period. Next, my findings are not inconsistent with the internal capital market hypothesis that capital allocation is improved by dismantling internal capital markets via spinoffs. I find that overall capital allocation is improved after the spinoff, consistent with the internal capital market hypothesis. However, the improvement is more pronounced among the firms with increased informativeness, suggesting that additional information in the stock price help managers with their allocation decisions. Finally, noting that spinoffs are not a random subsample of the population of firms, I adopt the Heckman's two-stage estimation procedure (Heckman (1979)) for the test of sample selection bias. The association between stock price informativeness and operating performance stays positive and significant after the self-

selection correction term is introduced. In sum, I find that the main results still hold, accounting for the alternative explanations.[5]

This paper is among the first studies on the role of information in the real sector. Related papers include Durnev, Morck, and Yeung (2004) and Chen, Goldstein, and Jiang (2005). Durnev, Morck, and Yeung find a positive association between investment efficiency and stock price informativeness. Their study differs from this paper in that their objective is to evaluate firm-specific return variation as the informativeness measure. In contrast, Chen, Goldstein, and Jiang share the goal of the present study, but they focus on investment sensitivity to stock price, whereas I start by examining operating performance and consider investment decisions as one of the managerial decisions contributing operating performance. Unlike the two papers, which examine the level of informativeness of a firm, my study explicitly measures the changes in informativeness over time and analyzes its impact. This approach allows a comparison of the operating performance of the same firm at two different levels of informativeness. Consequently, if firms with a higher level of informed trading were different in some ways from those with a lower level of informed trading, this approach would still produce unbiased results. The difference in methodology leads to the difference in data as well. The two papers use all firms available on CRSP and COMPUSTAT, whereas I utilize a sample of corporate spinoffs and take an event-study approach.

The remainder of this paper is organized as follows. Section 2 describes the spinoff sample, as well as three informativeness measures and an operating performance measure. Section 3 tests the association between price informativeness and operating performance. Section 4 investigates the

[5] Additionally, one might suspect a potential endogeniety problem: managers may trade with the knowledge regarding their future investment decisions, creating a spurious correlation between price informativeness and investment decisions. Chen, Goldstein, and Jiang (2005) investigate this possibility with a different set of data set and conclude that the informativeness-investment relation is not affected.

link between informativeness and investment decisions. Sections 5 and 6 present a number of sensitivity checks. Section 7 concludes.

II. Data and Methodology

A. Spinoff Sample

The spinoff sample in this study covers the firms that completed spinoffs between 1975 and 2001. The sample ends in 2001 because the tests require operating performance data for three years after spinoff distributions. The data used in Desai and Jain (1999) covering 155 spinoffs between 1975 and 1991 are used in this study.[6] Data from 1992 to 2001 are gathered from two sources: the Center for Research in Security Prices (CRSP) tapes, which assign distribution codes of 3762, 3763, and 3764 to spinoff firms and Security Data Company (SDC), which identifies spinoff cases based on news articles.[7] I then use news articles in Factiva to verify the spinoffs and identify their announcement dates and effective dates of distribution. This step yields a sample of 379 spinoffs between 1992 and 2001. To remain in my sample, a spinoff has to satisfy the following criteria[8]: (1) CRSP data for the parent firm are available for one year before the spinoff announcement and after the spinoff distribution; (2) COMPUSTAT data for the parent are available for at least two years after the spinoff; (3) the subsidiary starts trading publicly after the spinoff announcement is made; (4) the parent's SIC code is not between 6000 and 6500; (5) the parent is not simultaneously engaged in mergers or acquisitions; (6) the spinoff is a nontaxable transaction; and, (7) real estate investment trusts (REITs) and tracking stocks are excluded from the sample.

[6] I am extremely grateful to Hemang Desai for making his data available to me. See Desai and Jain (1999) for details regarding their data selection criteria.
[7] Distribution code 3763 refers to nontaxable spinoffs. Code 3762 refers to spinoffs taxable at the same rate as dividends, and 3764 refers to spinoffs taxable at the same rate as capital gains.
[8] The data selection criteria include the criteria applied by Desai and Jain to ensure the consistency between the later-period sample (1992-2001) and the sample used in Desai and Jain (1975-1991).

Based on these criteria, I drop 85 spinoffs from the sample because the parent firm does not have CRSP data for the required time period and 108 spinoffs because COMPUSTAT data are not available for the required period. Fifteen spinoffs are excluded in which subsidiaries start trading publicly before the spinoff announcements are made; for such firms, some of the informational benefit of spinoffs may be realized before the spinoffs are undertaken. Thus, they should be treated differently from the rest of the spinoffs. Nineteen spinoffs with SIC codes between 6000 and 6500 are removed. Also, six parents engaged in mergers or acquisitions simultaneously are eliminated. Mergers and acquisitions have an opposite effect to that of spinoffs in terms of stock price informativeness; thus, any impact of a spinoff on informed trading might be offset by that of a merger or an acquisition. I consult the Commerce Clearing House's Capital Changes Reporter to determine the tax status of the spinoffs and eliminate 27 taxable spinoffs. One REIT and 5 tracking stocks are excluded. The final sample consists of 268 parents and 287 subsidiaries.

Table 1 reports the distribution of spinoffs by effective date of distribution and three summary statistics for parent firms. Market value of a parent is measured at the end of the month of the spinoff distribution. Spinoffs are distributed without humps over the sample period although the frequency of spinoffs is in an increasing trend over time. The sample firms are spread across industries, covering 47 2-digit SIC codes (not reported). The mean (median) market value of parent firms is \$4,222.07 million (\$580.31 million). The mean (median) value of total assets of parent firms is \$5,177.72 million (\$840.70 million).[9] Total assets are the value at the end of first fiscal year after the spinoff distribution. Parent firms constitute 76% (median) of the combined firms in terms of total assets in the first fiscal year after the spinoff.

[9] Market value and total assets are reported in 1995 dollars.

B. Measures of Informativeness

Two types of informativeness measures are employed to gauge the changes in informativeness of stock price around the spinoff. The firm-specific return variation measures are calculated using daily stock prices: return variation unexplained by market return, which I call firm-specific return variation (MM), and return variation unexplained by market return and industry return, which I call firm-specific return variation (MI). These measures are obtained by regressing firm returns on market return (and industry return) and calculating the standard deviation of the regression residuals, where both market return and industry return are value-weighted. Industry is defined as all firms (excluding the sample firm) that have the same 3-digit SIC code as the sample firm. These measures are based on a relatively recent stream of studies, which suggest that higher firm-specific return variation indicates increased private information in stock prices. Roll (1988, p. 566) first proposes that the return variation unexplained by market return and industry return seems to imply "the existence of either private information or else occasional frenzy unrelated to concrete information." He adds that publicly available information events do not explain this unsystematic return variation. Following up on Roll (1988), Durnev et al. (2003, p.798) state that "the relative importance of the two preceding views is an empirical question." They show that firms with higher firm-specific return variation exhibit a stronger association between current returns and future earnings, which they conclude supports Roll's former interpretation that greater idiosyncratic variation implies more private information. Morck, Yeung, and Yu (2000) report greater firm-specific return variation in countries with better investor protection and suggest that strong property rights promote informed arbitrage, leading to the impounding of more firm-specific information. In addition, Durnev, Morck, and Yeung (2004) document that U.S. industries and firms exhibiting larger firm-specific return variation make more value-enhancing capital budgeting decisions. In the spinoff literature, Huson and MacKinnon (2003) use the return variation unexplained by market return to estimate the changes in informativeness around the spinoff and confirm that the return variation measures are consistent with the measures based on

intraday transactions data. As a caveat, it should be noted that the firm-specific return variation measure lacks a rigorous theoretical model.

To complement the firm specific return variation measure, hence, I introduce the relative effective bid-ask spread (REBA). The REBA is calculated as two times the absolute difference between the transaction price and the midpoint of the quoted bid and ask outstanding at the time of the trade, divided by the quote midpoint. To calculate the REBA, trades and quotes data from 1993 to 2001 are obtained from the NYSE Trades and Quotes (TAQ) database. In addition, trades and quotes data covering the NYSE and AMEX between 1983 and 1992 are obtained from the Institute for the Study of Security Markets (ISSM). The REBA is expected to be higher when there is more private information in the markets. It is a well established informativeness measure in the market microstructure literature. Glosten and Milgrom (1985) propose that a bid-ask spread is a function of the informational differences between insiders and the rest of the markets. A number of empirical studies utilize the bid-ask spread as an informativeness measure. For example, Venkatesh and Chiang (1986), in measuring information asymmetry prior to earnings and dividend announcements, use the bid-ask spread as a proxy for information asymmetry. Howe and Lin (1992) study the relationship between dividend yield and the level of information asymmetry, which they capture by the bid-ask spread.

For both informativeness measures, changes in informativeness capture the changes in the degree of informativeness from the pre-spinoff to the post-spinoff period. The pre-spinoff period is defined as the 250 trading days ending 50 days prior to the first public announcement of a spinoff. The post-spinoff period is defined as the 250 days beginning 50 days after the date of a spinoff distribution. For estimation purposes, I exclude the period between the announcement date and the distribution date. As a robustness check, shorter time period is applied: 40 days prior to the spinoff announcement for the "pre-spinoff" period and 60 days after the spinoff distribution

for the "post-spinoff" period. The qualitative results are same as those with 250 days as the estimation period and not reported here.

In panel A of table 2, I report changes in the firm-specific return variation (MM), changes in the firm-specific return variation (MI), and changes in the REBA around the spinoff. Parent firms' prices become significantly more informative after the spinoff, consistent with Huson and MacKinnon (2003). The mean (median) change in firm-specific variation (MM) from the pre-spinoff to the post-spinoff period is 0.0036 (0.0026), which represents an increase of roughly 15% (12%) over the pre-spinoff period and is significantly different from zero at the 1% level.[10] Similarly, the second measure, the firm-specific return variation (MI) increases by 15% (12%). This is not surprising considering that the correlation coefficient between the two measures is .997 (table 2, panel B). The REBA, as the measure based on intraday transactions data, displays a similar pattern, but with a different magnitude. The REBA has 25% and 26% correlation with the two firm-specific return variation measures, respectively, both of which are significant at the 1% level. The mean (median) change in the REBA around the spinoff is 0.0042 (0.0010), which represents approximately a 32% (14%) increase from the pre-spinoff to the post-spinoff period and is significantly different from zero at the 1% level. These increased trading costs measured by REBA indicate that there is more informed trading following the spinoff. One implicit assumption made here as well as in Huson and MacKinnon is that pre-spinoff combined-firm stock prices are a good proxy for information production on the parent firm. As the parent constitutes about 76% of the combined firm, information production prior to the spinoff is likely to be concentrated on the parent firm, leading to the impounding of more private information regarding the parent in stock prices.

[10] While this finding is consistent with Huson and MacKinnon that informativeness increases following the spinoff, it should be noted that 36% of the sample firms (97 out of 267), an economically significant fraction, display decreased informativeness following the spinoff. However, this is irrelevant to this paper as the tests require *changes* in informativeness, not necessary an increase.

C. Measure of Operating Performance

Following Desai and Jain (1999), I use industry-adjusted return on assets (ROA) as the measure of operating performance. Industry-adjusted ROA is defined as ROA of a sample firm minus ROA of its matching firm. For each sample firm, I select one matching firm that has the same four-digit SIC code as the sample firm and is closest to it in size in the month of the spinoff distribution. Desai and Jain report performance improvement for focus-improving firms subsequent to the spinoff. By employing Desai and Jain's performance measure and making my performance measure comparable to theirs, I can test whether the performance changes associated with changes in informativeness are, in fact, attributed to focus improvement. Changes in operating performance are defined as ROA in the second or the third year minus ROA in the first year following the spinoff. The detailed timeline is illustrated in figure 1. Performance changes in this period provide a cleaner measure than those contemporaneous to changes in informativeness for two reasons. First, operating performance is expected to exhibit a delayed response to managers' decisions that reflect the additional information feedback from stock prices following the spinoff. Secondly, according to Desai and Jain, most of the improvement in performance attributable to corporate focus is realized by the first year after the spinoff. In that regard, measuring the performance staring after the spinoff allows a less noisy link between changes in informativeness and changes in performance.

In panel C of table 2, I report raw ROA and industry-adjusted ROA of parent firms from year +1 to year +3, where year 0 is defined as the year of a spinoff distribution. Raw ROA does not vary considerably over time. The mean (median) raw ROA in years +1, +2, and +3 are 0.1297 (0.1321), 0.1326 (0.1362), and 0.1238 (0.1243), respectively. Sample firms outperform their matching firms throughout the testing period of the three years. The mean (median) industry-adjusted ROA in years +1, +2, and +3 are 0.03781 (0.0150), 0.0551 (0.0211), and 0.0592

(0.0187), respectively, all of which are significantly different from zero at the 1% level. The results indicate that raw ROA increases (decreases) by 0.0029 (−0.0059) in the second (third) year relative to the first year while industry-adjusted ROA increases 0.0173 (0.0214) in the second (third) year. Evidently, changes in industry-adjusted ROA are more pronounced than changes in raw ROA, consistent with Desai and Jain. It also suggests that industry-adjusted ROA controls for the fluctuations caused by different industry characteristics.

III. Informativeness and Operating Performance

In this section, I test the hypothesis that changes in stock price informativeness around the spinoff are positively related to subsequent changes in operating performance of the parents. I estimate the following equation:

$$\Delta ROA_i(+1,t) = \beta_0 + \beta_1 \cdot \Delta Info_i(-1,+1) + \beta_2 \cdot X_i + \varepsilon_i ,$$

where $\Delta ROA_i(+1,\ t)$ is the proxy for changes in operating performance of parent firms and is obtained by measuring changes in industry-adjusted return on assets from the first fiscal year after the spinoff to the second year (t = 2) or the third year (t = 3). $\Delta Info_i(-1,+1)$ measures the changes in informativeness of stock prices of parent firms from the pre-spinoff to the post-spinoff period. Informativeness is measured by each of the informativeness measures described in the previous section. For all regressions, the main variables, informativeness and operating performance, are trimmed at the 1 % level to prevent outliers from influencing the results. X_i is a set of control variables. For regressions using the firm-specific return variation measures, changes in systematic stock return variations as well as the pre-spinoff systematic return variations are used as control variables. For all regressions, I control for the pre-spinoff level of

informativeness, changes in beta, changes in leverage, size, and 3-day excess return around spinoff announcements. The construction of the control variables is detailed in the Appendix. Changes in beta and changes in leverage measure changes from year –1 to year +1, comparable to changes in information measures. For the hypothesis to hold, β_1 must be greater than zero.

The regressions in table 3 yield a univariate analysis using each of the three informativeness measures. The first three regressions use changes in industry-adjusted ROA from year +1 to +2 as the dependent variable. All three regressions show the significant and positive relationship between changes in informativeness around the spinoff and subsequent changes in operating performance, consistent with the hypothesis. The coefficients of the three informativeness measures range between 2.00 and 2.56. Economically the results can be interpreted as follows: for a firm experiencing the mean change in informativeness around the spinoff, the industry-adjusted performance increases from 3.78% in the first year following the spinoff to 4.5% (5.43%) in the second (third) year when the firm-specific return variation measure is utilized. The magnitude on profitability is similar across all informativeness measures. The next three regressions use changes in industry-adjusted ROA from year +1 to +3 as the dependent variable. The coefficients of the informativeness measures remain positive and significant. The magnitude of the two firm-specific return measures is stronger, while that of the REBA is slightly weaker than in the first three regressions. For all informativeness measures, the statistical significance is higher than in the first three regressions, with two measures significant at the 5% level. It suggests that the informativeness measures are more predictive of long-run performance. This univariate association is well depicted in Figure 2. Sample firms are sorted into four quartiles based on the magnitude of changes in informativeness around the spinoff, with quartile 1 corresponding to the firms experiencing the least improvement in informativeness. Firms in quartile 1 display the least improvement in operating performance, whereas those in quartile 4 demonstrate the most improvement.

The results of multivariate regressions (table 4) are consistent with those of the univariate analysis. For all three informativeness measures, statistical significance is improved after control variables are introduced. The informativeness variables are significant at the 5% level for all six regressions. The coefficients of the two firm-specific return variation measures are 3.8634 and 4.7583, much higher than those in the univariate regressions. The coefficients of the REBA are similar to those in the univariate analysis. None of the control variables are consistently significant throughout the six regressions. The coefficient on the changes in systematic variation variable is negative throughout all four regressions using the firm-specific return variations as informativeness measures and statistically significant in regression 2. the systematic proportion of the variation appears to decrease as the unsystematic portion increases, producing a negative sign on the coefficient of the systematic variation. The pre-spinoff level of unsystematic and systematic variations does not explain the changes in performance at a significant level. Changes in beta are positively related to changes in performance throughout all six regressions. Especially, they are statistically significant at the 5% level when the REBA is used as the informativeness measure (regressions 3 and 6). Beta represents the sensitivity of a firm to macroeconomic changes. Those firms that become more sensitive to macroeconomic factors seem to improve the performance more. This is consistent with Chang and Yu (2005),which argue that more volatile firms benefit more from information production in the market. The changes in leverage and size variables are largely insignificant throughout all regressions. The coefficients of 3-day excess return around the spinoff announcement are insignificantly different from zero except in regression 6. Overall, the excess return variable appears to explain the performance changes in the third year relative to the first year better than the changes in the second year, suggesting that markets have some predictive power regarding the long-term firm performance at the time of spinoff announcements.

It should be noted that subsidiary firms are not testable given the design of the tests. The informativeness measure for subsidiaries cannot be constructed since their stock prices do not exist prior to the spinoff. Alternatively, pre-spinoff combined-firm measures can be compared with a value-weighted combination of post-spinoff parent and subsidiary measures. However, this approach is far from being accurate, as it implicitly assumes that informativeness is a linear function. This approach also requires sacrifice in sample size – data for a significant portion of the subsidiary firms are not available.

One can consider, for the purpose of the tests, a sample involving different corporate events such as carve-outs and tracking stocks. A carve-out generates cash inflows to the parent firm, a profit from the sale of its subsidiary IPO. The cash inflows can be used to finance new projects, thus changing investments and profitability of the parent temporarily. Thus, it is crucial to disentangle the effect of the cash infusion on operating performance from the effect of changes in informativeness. Tracking stocks, on the other hand, affect the information environment of a firm without altering its organizational structure, providing a more attractive sample for the study.[11] A drawback of using tracking stocks is the small sample size. Previous studies on tracking stocks report only dozens of observations in the U.S. markets since the introduction of tracking stock.[12]

IV. Investment Efficiency

The tests so far establish evidence supporting the view that increased informativeness of the stock price leads to better operating performance. In this section, I focus on managerial decisions, a missing link connecting informativeness and performance. In particular, I examine whether

[11] Tracking stocks are launched to track the performance of a division of interest in a multidivisional firm, and holders of these stocks have limited voting rights and no claim on assets.
[12] Billett and Mauer (1998) identify 20 tracking stock transactions from 1980 through the first quarter of 1997. Similarly, Zuta (1997) uses a sample of 20 tracking stock transactions.

increased informativeness of stock price facilitates more efficient investment decisions. To evaluate managerial investment decisions, I rely on Q theory, which suggests that firms should invest more (less) as their investment opportunities increase (decrease). In other words, investment efficiency is evaluated in terms of the alignment between a firm's investment opportunity and its level of actual investment. If the stock price provides information feedback on managerial investment decisions, those firms with increased informative following the spinoff should align their investment with their investment opportunity better after the spinoff.

Matching firms' investments and investment opportunities are used as benchmarks to evaluate investment efficiency of sample firms. Sample firms are sorted into four subgroups based on their pre-spinoff investments and investment opportunities relative to those of their matching firms. Within each group, post-spinoff investments of information-increasing firms are compared with those of information-decreasing firms. Changes in informativeness are captured by changes in the firm-specific return variation (MM). Industry-adjusted investment is a sample firm's investment minus that of its matching firm. Tobin's average *Q* is used as a proxy for investment opportunities. Pre-spinoff *Q* and investments are averaged over the two years prior to the spinoff and post-spinoff values are averaged over the two years following the spinoff.[13] (See the Appendix for more detailed description of the variables.)

The full sample results (table 5) show that changes in industry-adjusted investment around the spinoff are overall insignificant. It appears that parent firms, on average, do not alter their investment behavior considerably. More intriguing is the results for the subgroups. Table 6 reports the mean and median values of pre-spinoff industry-adjusted investment, post-spinoff

[13] Using capital expenditure averaged over two-year period appears to be preferable to using a one-year value, as it reduces influences of lumpy capital expenditures specific to some year. Thus, I report the results based on two-year averages here. However, I also perform the same tests using one-year values. I construct pre-spinoff *Q* and investment using year –1 values and post-spinoff *Q* and investment using year +1 values. The results are qualitatively the same as those using two-year-average measures and are not reported here.

industry-adjusted investment, and changes in industry-adjusted investment around the spinoff for the four subgroups: (1) $Q > 0$ and $I > 0$; (2) $Q < 0$ and $I < 0$; (3) $Q > 0$ and $I < 0$; and (4) $Q < 0$ and $I > 0$. $Q > 0$ indicates that a sample firm's investment opportunity is higher than that of its matching firm, and $I > 0$ indicates that a sample firm's investment is higher than that of its matching firm. Group 1 comprises 48 firms that have both investment *(I)* and investment opportunities (Q) higher than their matching firms prior to the spinoff. Q theory suggests that they should continue to invest more than their matching firms to avoid inefficient investment. However, both information-increasing firms and information-decreasing firms cut down on their investment. The magnitude of reduction is much stronger with information-decreasing firms. Median change in investment for the information-increasing firms is –0.0140 while median change for the information-decreasing firms is –0.0252. Group 2 includes 73 firms that have both Q and I lower than those of their matching firms prior to the spinoff. Subsequent to the spinoff, both information-increasing firms and information-decreasing firms maintain their investment level lower than that of their matching firms, meeting the criteria for investment efficiency. The firms in Groups 3 and 4 demonstrate inefficient asset allocation before the spinoff. Group 3 comprises 47 firms that underinvest prior to the spinoff. Those firms with increased informativeness following the spinoff respond to their problem by investing significantly more relative to their matching firms after the spinoff, as Q theory suggests. On the other hand, those firms with decreased informativeness increase their investment by only an insignificant amount. The median change in investment for information-increasing firms is 0.0150 and the median change for information-decreasing firms is 0.0017. Group 4 shows similar results for the 55 firms that overinvest prior to the spinoff. In this group, information-increasing firms cut down on their investment heavily, ameliorating their overinvestment problem. By contrast, information-decreasing firms do not change their investment behavior significantly after the spinoff. The median change in investment for information-increasing firms is –0.0093, which is significant at the 1% level, while the median change for information-decreasing firms is 0.0004, which is

statistically insignificant. Information-increasing firms exhibit more improvement not only in the statistical sense but also in terms of the economic magnitude. Overall, those firms with increased informativeness following the spinoff appear to make better adjustments to resolve inefficient investment behavior after the spinoff, suggesting that investment decisions are one of the channels through which informative stock price can induce managers to improve operating performance.

As a caveat, it should be noted that even if we could not find any evidence relating informativeness to investment decisions, we should not dismiss the role of information in the real sector. Informativeness may affect operating performance through different routes that are not captured by the investment measures. Furthermore, my tests address only the quantitative aspect of investment decisions. The qualitative aspect of the decisions is not considered in this study.

V. Management Compensation

The post-spinoff stock price of a parent firm reflects its performance more accurately as it is no longer diluted by the performance of the spun-off division. Therefore, the managerial incentive becomes sharpened following the spinoff to the extent that his compensation is tied to the divisional performance. The stronger incentive may induce managers exert more efforts to produce higher profitability (Aron (1991)). Naturally, the next question is whether the increased firm performance established in section 3 was driven by the more sensitive compensation rather than by the increased informativeness.

In order to test the implication of managerial compensation, I construct two measures of compensation structure. First, stock-based compensation (SBC hereafter) is defined as the ratio of

the sum of restricted stock grants and option grants to total compensation.[14] SBC *directly* compensates CEOs for strong stock performance of the firm. Secondly, I construct pay-performance sensitivity (delta, hereafter) according to Jensen and Murphy (1990), which measures how responsive CEO's total compensation is to changes in stock performance. Some firms reward CEO with bonus or by increasing future salary permanently.[15] These indirect compensation schemes are captured by delta as it examines the total compensation rather than the stock compensation alone. Delta is defined as the estimated value of *b*, the coefficient of the following regression:

$$\Delta \text{ (CEO total compensation)}_t = a + b \cdot \Delta \text{ (shareholder wealth)}_t.$$

The change in shareholder wealth variable is defined as $r_t \cdot V_{t-1}$, where r_t is the inflation-adjusted rate of return on common stock realized in fiscal year *t*, and V_{t-1} is the firm value at the end of the previous year.

CEO compensation data are collected for the sample firms described in section 2. The data between 1992 and 2001 are acquired from ExecuComp. The data prior to 1992 are obtained from the firms' annual proxy statements.[16] Table 6 report the pre-spinoff and post-spinoff level of the two compensation measures, SBC and delta. Pre-spinoff (post-spinoff) compensation measures are the average compensation from year -4 through year 0 (year +1 through year +3). Stock-based

[14] Total compensation is the sum of salary, bonus, restricted stock grant, option grant, long-term incentive payouts, and all other payments.

[15] Garvey and Swan (2002) report that accounting-based bonus incentives are employed more by illiquid firms as a substitute to stock-based compensation.

[16] The record of the Security and Exchange Commission (SEC) filing goes back to as early as 1978. In 1992 the SEC began requiring that firms must disclose detailed information on executive compensation in their proxy statements including salary, bonus, stock options, restricted stock, and long-term incentive payouts. Without such requirement, pre-1992 proxy statements typically disclose only option grants in addition to the total compensation. Estimated values of restricted stock grants are included in total compensation.

compensation constitutes 23.5% (median) of total compensation prior to spinoff and 28% (median) post spinoff. The median change of 1.2% around the spinoff is statistically significant at the 1% level. This increase in SBC appears to be a combination of two effects: first, the stock price, on average, increase upon a spinoff, amplifying the value of stock proportion of the total CEO compensation; second, the post-spinoff stock price, which follows the divisional performance more closely, may invite firms to engage more in the equity-type payment. The magnitude of delta is fairly small. Manager's compensation changes 1 cent (19 cents) for every $1000 change in shareholder wealth prior to (post) spinoff. Delta does not have significant change around the spinoff. It should be noted that delta has smaller number of observations than SBC by 20-30%, which renders delta unreliable relative to SBC.[17]

Using these measures, I test the prediction by estimating the following equation:

$$\Delta ROA_i(+1,t) = \beta_0 + \beta_1 \cdot Comp_i + \beta_2 \cdot \Delta Info_i(-1,+1) + \beta_3 \cdot X_i + \varepsilon_i ,$$

where $Comp_i$ is the post-spinoff compensation measure. Each of the two measures, SBC and delta, is utilized, respectively. $\Delta ROA_i(+1,t)$ is the proxy for change in operating performance of parent firms around the spinoff. $\Delta Info_i(-1,+1)$ is the change in informativeness of stock prices of parent firms from the pre-spinoff to the post-spinoff period. Informativeness is measured by firm-specific return variation (MM). For all regressions, the main variables, compensation, informativeness, and operating performance, are trimmed at the 1 % level to prevent outliers from influencing the results. X_i is the set of control variables: pre-spinoff level of informativeness, changes in beta, changes in leverage, size, and 3-day excess return around spinoff announcements

[17] This loss of observations is unavoidable as the construction of firm-level delta requires a minimum of three observations. One year of missing data in any of compensation components or stock price, for instance, prevents regression analysis from producing post-spinoff delta.

(for more details on the control variables, please refer to the appendix.) Regression results are reported in table 7. Regressions 1 and 3 (2 and 4) utilize stock-based compensation (delta) as the compensation measure. Contrary to the prediction, all four regressions (Reg.1–Reg.4) suggest that the post-spinoff compensation is not related to the changes in firm performance at a significant level. The negative coefficients of compensation measures, though counter-intuitive, do not carry significant weight with the small *t*-statistics. The informativeness measures stay positive and significant, consistent with the previous findings on the relationship between informativeness and firm performance.

While the post-spinoff level of CEO compensation does not contribute to the changes in firm performance, it is still possible that the significant changes in stock-based compensation around the spinoff have something to do with the changes in performance. The following equation, therefore, utilize the changes in stock-based compensation around the spinoff as the compensation measure[18]:

$$\Delta ROA_i(+1,t) = \beta_0 + \beta_1 \cdot \Delta Comp_i + \beta_2 \cdot \Delta Info_i(-1,+1) + \beta_3 \cdot X_i + \varepsilon_i$$

The results are reported in table 8. Regressions 1 and 2 show that the changes in stock-based compensation around the spinoff are positively associated with the subsequent changes in firm performance. The coefficient of the compensation measure in regression 2 is significant at the 5% level, and that in regression 1 is also very close to being significant at the 10% level. The positive and significant coefficient of informativeness measures indicate that the compensation measure is not replacing the relationship that informativeness appears to have with firm performance.

[18] Changes in delta are not utilized for this regression analysis as delta displays little change around the spinoff.

VI. Sensitivity Checks

A. Corporate Focus Hypothesis

I explore corporate focus hypothesis that focus-improving firms achieve better operating performance after spinoffs by getting rid of unrelated divisions and concentrating on the division for which managerial skills and resources are well-suited. A focus-improving spinoff refers to a cross-industry spinoff in which a parent firm improves its focus by spinning off an unrelated division. For empirical purposes, I categorize a spinoff as focus-improving if the parent and subsidiary have different two-digit SIC codes.[19] Previous studies document that elimination of negative synergy between the divisions via divestitures such as asset sales and spinoffs is associated with an improvement in operating performance. John and Ofek (1995) find that asset sales lead to an improvement of operating performance relative to the year of asset sales for focus-improving sellers. Daley, Mehrotra, and Sivakumar (1997) and Desai and Jain (1999) report a significant improvement in post-spinoff industry-adjusted operating performance for the focus-improving parents.

I first compare the changes in operating performance of focus-improving and non-focus-improving spinoffs. Consistent with the previous studies, the results show (table 9, panel A) that focus-improving parents demonstrate a significant improvement in industry-adjusted operating performance relative to the first year after the spinoffs. The mean changes in performance from year +1 to +2 and year +1 to +3 are 0.0286 and 0.0318 and are significant at the 5% and 10% level, respectively. Non-focus-improving parents, on the contrary, do not exhibit significant changes in performance. The mean and median changes from year +1 to year +2 are barely above zero and mean and median changes from year +1 to +3 turn negative. Interestingly, the mean and

[19] If a firm spins off more than one subsidiary, and one subsidiary has the same two-digit SIC code as the parent and the others do not, the firm is excluded from the categorization.

median performance changes of focusing parents are not significantly different from those of non-focusing parents, implying that the focus improvement may not explain the changes in operating performance. The comparison between information-increasing firms and information-decreasing firms appears to explain the change in operating performance better (table 9, panel B). For instance, the mean (median) difference in operating performance from year +1 to year +2 between information-increasing firms and information-decreasing firms is 0.0535 (0.0173), more than twice the difference between focus-improving firms and non-focus-improving firms.[20]

The relative importance between the focus improvement and changes in informativeness is reassured in the regression results (table 9, panel C). The univariate analysis (regressions 1 and 4) does not find any significant association between focus and performance changes, where focus is an indicator variable that equals 1 for focus-improving spinoffs and 0 for non-focus-improving spinoffs. In regressions 2 and 5, I regress changes in operating performance on focus, changes in firm-specific return variation (MM), and a set of control variables. Whereas the focus variable is not significant, the changes in informativeness are positively and significantly related to performance change in the presence of corporate focus variable. Regressions 3 and 6 use changes in the REBA as an informativeness measure instead and find qualitatively same results as regressions 2 and 5. In conclusion, while focus-improving firms demonstrate some improvement in operating performance that non-focus-improving firms do not, the effect of the focus improvement is not statistically strong enough to explain the changes in operating performance, and the effect of informativeness on operating performance continues to prevail with the inclusion of corporate focus.

B. Subsidiary Performance Hypothesis

[20] The firm-specific return variation (MM) is utilized as an information measure. Using the REBA as an informativeness measure produces qualitatively same results.

I test whether the removal of poorly performing subsidiaries explains the subsequent performance improvement of the parents after the spinoff. I call this the subsidiary performance hypothesis. Evidently, some of the spinoffs are undertaken to eliminate poorly performing subsidiaries. For instance, American Express Co. unloaded several underperforming businesses by spinning off its subsidiary, Ameriprise Financial, Inc., in September, 2005, after which its share was expected to sell higher by 25% or more (BusinessWeek, 2005). Subsidiary financial data are obtained from COMPUSTAT. Pre-spinoff pro forma financial data are available for 157 subsidiaries. I focus on median values because mean values are driven by one extreme observation. Contrary to the prediction of the hypothesis, I find that the spun-off subsidiaries of the sample firms do not, on average, underperform their matching firms before or after the spinoff at the significant level (not reported). Median industry-adjusted performance of the subsidiaries is 0.0253, 0.0133, –0.0068, and –0.0061 in years –1, +1, +2, and +3, respectively. Although the performance turns negative in the second and the third years after the spinoff, none of the values is significantly different from zero. Moreover, the performance changes of the parents over the three-year post-spinoff testing period are not significantly correlated with the pre-spinoff performance of the subsidiaries nor with the performance changes of the subsidiaries over the testing period. These results indicate that the performance of the subsidiaries does not explain the subsequent performance changes of the parents.

C. Other concerns

In this sub-section, two more potential concerns are discussed. First, it has to be noted that the informativeness hypothesis and internal capital market hypothesis are not mutually exclusive. The internal capital market hypothesis proposes that capital allocation efficiency is improved by dismantling internal capital markets via spinoffs. After the spinoff, the parent is unable to ration or subsidize its spun-off subsidiary, which may improve or worsen its capital allocation efficiency. Previous studies provide evidence that spinoffs alter capital allocation. Gertner, Powers, and

Scharfstein (2002) find that subsidiaries' investment becomes more sensitive to their investment opportunities after the spinoff. Ahn and Denis (2004) examine the parents and subsidiaries at the segment level and conclude that investment efficiency of the segments is improved after the spinoff. Dittmar and Shivdasani (2003) report that asset sales lead to an improvement in investment efficiency for the remaining divisions. In fact, my previous findings that the firms that underinvested (overinvested) prior to the spinoff tend to increase (reduce) investment are consistent with the prediction of the internal capital market hypothesis.[21] However, this improvement in investment efficiency is primarily found among the information-increasing firms even though dismantling of internal capital markets applies to all sample firms. In other words, while the effect of dismantling internal capital market exists, increased stock price informativeness around the spinoff helps managers improve their capital allocation decisions even more.

Another concern on this study is that the lower stock price following the spinoff, rather than more information production, may have contributed to the higher firm-specific return variation and wider relative effective bid-ask spread. A simple regression analysis (not reported here) confirms this conjecture. However, I find that the changes in informativeness caused by price change itself, overall, are not related to the subsequent changes in firm performance.

[21] In table 5, I report a comparison of the investment efficiency of information-increasing firms and that of information-decreasing firms. The investment efficiency of the combination of these two groups of firms is not reported in the table.

D. Test of sample selection bias

Heckman's two-stage estimation procedure is applied to control for the characteristics that cause selection bias (Heckman(1979)). The hypothesis is that the set of firms that choose to spin off does not represent a random sample of firms. The first-stage PROBIT estimation identifies firm characteristics correlated with the spinoff decision. For the PROBIT estimation, I pool the sample firms and their matching firms and estimate the following equation.

$$
\begin{aligned}
D_i^* &= \gamma_0 + \gamma_1 \cdot F_i + \mu_i \\
D_i &= 1 \quad \text{if } D_i^* > 0 \\
D_i &= 0 \quad \text{if } D_i^* < 0,
\end{aligned}
$$

where F_i is a set of firm characteristics that may affect the decision to spin off. $D_i = 1$ if a firm chooses to spin off and 0 otherwise. D_i^* is an unobservable variable. If $D_i^* > 0$, a firm decides to spin off. The variables employed in the first-stage estimation are Tobin's average *Q*, investment level, year −1 ROA, year −2 ROA, year −3 ROA, standard deviation of three ROAs, the number of segments in a firm, pre-spinoff level of systematic and unsystematic stock return variation, leverage, and size. The construction of the firm characteristics variables is described in the Appendix. The likelihood of a spinoff is captured by a variable called Lambda, which is, in turn, introduced as the correction term for self-selection in the second-stage OLS estimation as follows:

$$
\Delta ROA_i(+1,t) = \beta_0 + \beta_1 \cdot \Delta Info_i(-1,+1) + \beta_2 \cdot X_i + \beta_3 \cdot \hat{\lambda}_i + \eta_i ,
$$

where $\hat{\lambda}_i$ is the estimated value of λ_i and

$$\lambda_i = \frac{\phi(Z_i)}{\Phi(-Z_i)},$$

where ϕ and Φ are the density and distribution function for a standard normal variable, respectively, and

$$Z_i = -\frac{\gamma_0 + \gamma_1 \cdot F_i}{\sigma_\mu}.$$

If any of the firm characteristics variables described above is attributable to the spinoff decision and is correlated with informativeness and operating performance then β_3 must be significant. Furthermore, if the established relationship between informed trading and firm performance were, in fact, driven by the firm characteristics, the inclusion of $\hat{\lambda}_i$ would reduce the statistical significance of β_1.

In table 10, I report the two-stage estimation results. Several firm-characteristics variables are predictive of the spinoff decision. ROAs in year -3 and year -2 are significantly lower for sample firms, indicating that firms that perform worse are more likely to spin off. This is consistent with the prediction of Chang and Yu (2004) that firms with lower ROAs and higher standard deviations of ROAs are more likely to spin off. Chang and Yu suggest that as a firm matures and more competitors enter into its business, driving down the profit and increasing risks, it tends to become focused, since additional information is more valuable when the firm faces low profit and high volatility. Firm-specific variation is significantly lower for the sample firms, implying that their stock prices prior to the spinoff are not as informative as those of matching firms. Less informative stock prices may provide an incentive for a firm to spin off in order to achieve more informed trading. The number of segments is significantly higher for sample firms. This can be interpreted in two ways. First, the level of informativeness may be captured by the number of

segments. It is harder to interpret the signals contained in the stock price of multi-segment firms than those of single-segment firms, since the signals for all segments of a firm are pooled into a single stock price. Accordingly, reducing the number of segments via a spinoff would help managers understand the signals sent by informed traders. Another explanation is based on the assumption that there exists an optimal number of segments for a firm in an industry. If a firm has more segments than the optimal level, it may undertake a spinoff to become leaner. Both explanations predict a positive relation between the number-of-segments variable and the likelihood of a spinoff, consistent with the results. Tobin's *Q* is higher for sample firms, although not significant. This is consistent with the findings documented in the diversification literature. Lang and Stulz (1994), Hyland (1997), and Villalonga (2004) find that firms that diversify tend to be in low *Q* industries. Having little growth prospect in their own businesses, the firms are looking to take over other firms with greater investment opportunities. Conversely, firms with high Tobin's *Q* may be looking to spin off so that they can improve focus on the business with greater investment opportunities.

Panel B of Table 10 reports the results of the second-stage OLS regressions. Regressions 1 and 3 use the firm-specific return variation (MM) as the informativeness measure and regressions 2 and 4 utilize the REBA as the informativeness measure.[22] Lambda, representing the likelihood of a spinoff, has different signs in the two regressions where Lambda is significant. It appears that the firm characteristics, while differentiating sample firms from their matching firms, have only a minimal effect on the association between performance and informativeness. The effect of informativeness becomes, in fact, stronger in three of the four regressions once firm characteristics correlated with the spinoff decision are taken into account. In particular, the coefficient of changes in firm-specific return variation is higher by 25% (15%) in the second (third) year after the spinoff than in the previous OLS regressions and is significant at the 1%

[22] The firm-specific return variation (MI) is excluded from the analysis from this point on as it is highly correlated with the firm-specific return variation (MM), resulting in similar results.

level. Interestingly, excess return around spinoff announcements becomes highly significant, indicating that announcement-period market reactions are predictive of the subsequent operating performance. The fact that both changes in informativeness and excess return are significant implies that the two are complementary measures, capturing different aspects of informed trading. The rest of the control variables display similar patterns to those in the previous regressions. In sum, once the self-selection correction term is introduced, the relationship between price informativeness and operating performance is even stronger, supporting the initial results on the informativeness-performance relation.

VI. Conclusion

In this study, I investigate the impact of stock price informativeness on a firm's managerial decisions and operating performance using a sample of corporate spinoffs. I find a strong, positive association between changes in informativeness of stock prices around the spinoff and changes in operating performance of parent firms from the first year after the spinoff to the second or the third year. The effect of informativeness is still present after a correction term for sample selection bias is introduced. Furthermore, those firms with increased informativeness make better adjustments to achieve investment efficiency following the spinoff, suggesting that investment decisions serve as a channel through which informative stock price contribute to operating performance. Finally, I explore alternative scenarios under which firm performance is affected. The effect of stock price informativeness stays significant, taking into consideration the effect of changes in CEO compensation, of changes in corporate focus, of the dismantling of internal capital markets, and of the removal of poorly performing subsidiaries. I conclude that information contents of the stock price contribute to the managers' decision-making process, ultimately affecting the firm performance. My findings provide one of the first pieces of evidence

supporting the view that information production in capital markets not only plays a role in financial sector but also contributes to the real sector.

REFERENCES

Aron, D, 1991, Using the capital as a monitor: corporate spinoffs in an agency framework, RAND Journal of Economics 22, 505–518.

Ahn, S., and D. Denis, 2004, Internal capital markets and investment policy: Evidence from corporate spinoffs, *Journal of Financial Economics* 71, 489–516.

Billett, Matthew T., and David C. Mauer, 1998, Diversification and the value of internal capital markets: The case of tracking stock, working paper.

Boot, A., and A. Thakor, 1997, Financial system architecture, *Review of Financial Studies* 10, 693–733.

Chang, C., and X. Yu, 2004, Investment opportunities, liquidity premium, and conglomerate mergers, *Journal of Business* 77, 45–74.

Chen, Qi, Itay Goldstein, and Wei Jiang, 2005, Price informativeness and investment sensitivity to stock price, working paper.

Daley, L., V. Mehrotra, and R. Sivakumar, 1997, Corporate focus and value creation: Evidence from spinoffs, *Journal of Financial Economics* 45, 257–281.

Desai, H., and P. Jain, 1999, Firm performance and focus: Long-run stock market performance following spinoffs, *Journal of Financial Economics* 54, 75–101.

Dittmar, Amy, and Anil Shivdasani, 2003, Divestitures and Divisional Investment Policies, *Journal of Finance* 58, 2711-2743.

Durnev, Art, Randall Morck, and Bernard Yeung, 2004, Value-enhancing capital budgeting and firm-specific stock return variation, *Journal of Finance* 59, 65–105.

Durnev, Art, Randall Morck, Bernard Yeung, and Paul Zarowin, 2003, Does greater firm-specific return variation mean more or less informed stock pricing? *Journal of Accounting Research* 41, 797–836.

Gertner, R., E. Powers, and D. Scharfstein, 2002, Learning about internal capital markets from corporate spin-offs, *Journal of Finance* 57, 2479–2506.

Glosten, Lawrence R., and Paul R. Milgrom, 1985, Bid, ask and transaction prices in a specialist market with heterogeneously informed traders, *Journal of Financial Economics* 14, 71-100.

Goldman, E., 2005, The impact of organizational form on information collection and the value of the firm, *Journal of Business* 78, 817-839.

Habib, M., D. Johnsen, and N. Naik, 1997, Spinoffs and information, *Journal of Financial Intermediation* 6, 153–176.

Heckman, James, 1979, Sample selection bias as a specification error, *Econometrica* 47, 153-62.

Holmstrom, Bengt, and Jean Tirole, 1993, Market liquidity and performance monitoring, *Journal of Political Economy*, Vol. 101, 678-709.

Howe, John S., and Ji-Chai Lin, 1992, Dividend policy and the bid-ask spread: An empirical analysis, *Journal of Financial Research* 15, 1-10.

Huson, M. R., and G. MacKinnon, 2003, Corporate spinoffs and information asymmetry between investors, *Journal of Corporate Finance* 9, 481–503.

Hyland, David C., and J. David Diltz, 2002, Why firms diversify, An empirical examination, *Financial Management* 31, 5-35.

John, Kose, and Eli Ofek, 1995, Asset sales and increase in focus, *Journal of Financial Economics* 37, 105-126.

Lang, Larry H.P., and Rene M. Stulz, 1994, Tobin's *q*, corporate diversification, and firm performance, *Journal of Political Economy* 102, 646-657.

Morck, R., B. Yeung, and W. Yu, 2000, The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215–260.

Business Week, 2005, Life without AmEx, September 26, 92-93.

Roll, Richard, 1988, R^2, *Journal of Finance* 43, 541-566.

Subrahmanyam, A., and S. Titman, 1999, The going-public decision and the development of financial markets, *Journal of Finance* 54, 1045–1082.

Venkatesh, P. C., and R. Chiang, 1986, Information asymmetry and the dealer's bid-ask spread: A case study of earnings and dividend announcements, *Journal of Finance* 41, 1089-1102.

Villalonga, Belen, 2004, Does diversification cause the "diversification discount"?, *Financial Management* 33, 5-27.

Zuta, S., 1997, Diversification discount and targeted stock: Theory and empirical evidence, Working paper (New York University, NY).

Table I
Summary Statistics

Panel A reports the distribution of 268 spinoffs by year. Panel B reports three summary statistics for parent companies. Market value of a parent is measured at the end of the month of spinoff distribution. Total assets are the value at the end of first fiscal year after spinoff distribution. Relative size of parent is calculated as the total assets of the parent in year +1 divided by sum of total assets of parent and that of subsidiary in year +1. Missing values were generated for subsidiaries whose COMPUSTAT data were unavailable.

Panel A: Distribution of Spinoff by Year

Year	Number	Year	Number
1975	3	1989	9
1976	2	1990	8
1977	1	1991	8
1978	1	1992	10
1979	3	1993	15
1980	7	1994	12
1981	9	1995	13
1982	8	1996	14
1983	8	1997	22
1984	12	1998	10
1985	10	1999	18
1986	6	2000	22
1987	8	2001	17
1988	12	Total	268

Panel B: Summary Statistics for Parent Firms

	N	Mean	Median
Market value (Million 1995 $)	268	4222.07	580.31
Total assets (Million 1995 $)	268	5177.72	840.70
Relative size of parents	226	0.7067	0.7634

Table II
Changes in Informativeness and Operating Performance around Spinoffs

Panel A reports changes in the firm-specific return variation (both MM and MI), and changes in the relative effective bid-ask spread (REBA) around spinoffs. Firm-specific return variation is calculated by regressing firm return on market return (and industry return) and calculating the standard deviation of the regression residuals. Industry return is value-weighted return of all firms (excluding sample firms) that have same 3-digit SIC code as the sample firm. REBA is calculated as two times the absolute difference between the transaction price and the midpoint of the quoted bid and ask outstanding at the time of the trade, divided by the quote midpoint. Quotes were lagged 5 seconds to mitigate nonsynchronous recording of trades and quotes. The pre-spinoff period for the informativeness measures is the 250 trading days ending 50 days prior to the first public announcement of spinoffs, and the post-spinoff period is the 250 days beginning 50 days after the dates of spinoff distribution. Panel B reports correlation among the informativeness measures. Panel C reports raw ROA and industry-adjusted ROA of parent firms from year +1 to year +3, where year 0 is defined as the year of spinoff distribution. Industry-adjusted ROA is obtained by subtracting matching firm ROA from the sample firm ROA, where the matching firm is the firm that has the same four-digit SIC code as the sample firm and is closest to it in market value of equity in the month of spinoff. Sample sizes vary because some firms do not have matching firms.

Panel A: Changes in Informativeness around Spinoffs

	N	Mean	Median	St.dev.
Firm-specific return variation (MM)				
Pre-spinoff	268	0.0244	0.0218	0.0128
Post-spinoff	267	0.0280	0.0242	0.0157
Changes	267	0.0036***	0.0026***	0.0127
Firm-specific return variation (MI)				
Pre-spinoff	266	0.0241	0.0213	0.0128
Post-spinoff	265	0.0277	0.0236	0.0158
Changes	264	0.0036***	0.0026***	0.0127
REBA				
Pre-spinoff	205	0.0133	0.0074	0.0263
Post-spinoff	214	0.0179	0.0106	0.0206
Changes	205	0.0042**	0.0010***	0.0261

Panel B: Correlation among Information Measures

	Firm-specific return variation (MI)	REBA
Firm-specific return variation (MM)	0.9971***	0.2492***
Firm-specific return variation (MI)		0.2601***

Panel C: Operating Performance of Parent Firms from Year +1 to Year +3

	ROA			Industry-adjusted ROA		
	N	Mean	Median	*N*	Mean	Median
Year +1	268	0.1297	0.1321	246	0.0378***	0.0150***
Year +2	267	0.1326	0.1362	239	0.0551***	0.0211***
Year +3	252	0.1238	0.1243	204	0.0592***	0.0187***

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level.

Table III
Regression Results: Univariate Analysis

This table reports Ordinary Least Squares regression estimation results using each of the three informativeness measures. The firm-specific return variation (MM) is utilized in regressions 1 and 4. The firm-specific return variation (MI) is utilized in regressions 2 and 5. The relative effective bid-ask spread (REBA) is used for regressions 3 and 6. The pre-spinoff period is defined as the 250 trading days ending 50 days prior to the first public announcement of a spinoff and the post-spinoff period is defined as the 250 days beginning 50 days after the date of spinoff distribution. The dependent variables are changes in industry-adjusted ROA of parent firms from year +1 to +2 and from year +1 to year +3, where year 0 is defined as the year of spinoff distribution. Sample sizes vary because of missing COMPUSTAT data or missing Trades and Quotes data. *t*-statistics are in parentheses. White's heteroskedasticity-consistent standard errors are utilized for all regressions.

	Δ ROA (+1,+2)			Δ ROA (+1,+3)		
	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6
Intercept	0.0077	0.0077	0.0074	0.0043	0.0039	–0.0060
	(1.18)	(1.19)	(0.81)	(0.38)	(0.35)	(–0.44)
Δ Firm-specific return variation (MM)	2.3962*			3.8713**		
	(1.69)			(1.95)		
Δ Firm-specific return variation (MI)		2.5554*			3.9847*	
		(1.73)			(1.90)	
Δ REBA			2.0030**			1.7795**
			(2.03)			(2.29)
N	232	230	178	196	194	153
Adj. R2	0.0306	0.0336	0.0408	0.0453	0.0465	0.0283

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level.

Table IV
Regression Results: Multivariate Analysis

This table reports multivariate analysis results. The dependent variables are changes in industry-adjusted ROA of parent firms from year +1 to +2 and from year +1 to year +3, where year 0 is defined as the year of spinoff distribution. Control variables include systematic return variation (for first two information measures only), change in leverage from year −1 to year +1, change in beta (a coefficient of market return variable in market model regression), size (log of total assets in the first fiscal year after spinoff distributions), and 3-day excess return around spinoff announcements. Leverage is calculated by dividing total debt by total assets, where total debt is the sum of long-term debt and debt in current liabilities. Excess return is calculated using market model and value-weighted market returns. Sample sizes vary because of missing COMPUSTAT data or missing Trades and Quotes data. *t*-statistics are in parentheses. White's heteroskedasticity-consistent standard errors are utilized for all regressions.

	Δ ROA (+1,+2)			Δ ROA (+1,+3)		
	Reg. 1 (MM)	Reg. 2 (MI)	Reg. 3 (REBA)	Reg. 4 (MM)	Reg. 5 (MI)	Reg. 6 (REBA)
Intercept	−0.0794	−0.0834	0.0622	−0.0214	−0.0160	0.0728
	(−1.20)	(−1.17)	(0.95)	(−0.30)	(−0.21)	(0.78)
Δ Informativeness of stock price	3.8634**	4.1078**	2.2127**	4.5795**	4.7583**	1.7455**
	(2.11)	(2.16)	(2.18)	(2.22)	(2.24)	(2.23)
Pre-spinoff Informativeness	2.5421	2.5487	−0.3525	1.6042	1.4095	−3.0214
	(1.43)	(1.38)	(−0.51)	(1.09)	(0.91)	(−1.17)
Δ Systematic variation	−1.9223	−2.0189*		−1.5878	−1.3796	
	(−1.45)	(−1.67)		(−0.84)	(−0.90)	
Pre-spinoff systematic variation	−0.6779	−0.3661		0.2685	0.6542	
	(−0.42)	(−0.45)		(0.10)	(0.53)	
Δ Beta	0.0194	0.0194	0.0469**	0.0295	0.0304	0.0558**
	(1.17)	(1.19)	(2.31)	(1.47)	(1.56)	(2.4)
Δ Leverage	0.0346	0.0326	−0.1225**	0.0750	0.0746	−0.1087
	(0.48)	(0.45)	(−2.11)	(0.84)	(0.85)	(−1.47)
Size	0.0042	0.0048	−0.0065	−0.0034	−0.0038	−0.0085
	(0.84)	(0.86)	(−0.78)	(−0.46)	(−0.48)	(−0.81)
Excess return	−0.0375	−0.0389	−0.0324	0.1334	0.1246	0.3868*
	(−0.19)	(−0.19)	(−0.13)	(0.73)	(0.67)	(1.70)
N	208	207	159	175	174	136
Adj. R2	0.1141	0.1202	0.1383	0.1216	0.1224	0.1782

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level

Table V
Industry-adjusted Investments around Spinoffs

This table reports mean and median pre-spinoff and post-spinoff industry-adjusted investments as well as change in investments around the spinoff. Investment level is reported for the full sample and four subgroups, which are formed based on the firms' pre-spinoff levels of industry-adjusted investment opportunities (Q) and industry-adjusted investment (I). Within each subgroup, industry-adjusted investments of information-increasing firms and information-decreasing firms are compared. Industry-adjusted investment is defined as the sample firm's investment minus its matching firm's investment. Investment is capital expenditure divided by sales. Q is Tobin's average Q, which is defined as market value of total assets divided by book value of total assets, where market value of total assets is book value of total assets plus market value of common equity minus book value of common equity minus deferred taxes. $\Delta Info$ is changes in the informativeness around the spinoff, and the information measure utilized here is the firm-specific return variation (MM). Pre-spinoff values are averaged over year –1 and year –2. Post-spinoff values are averaged over year +1 and year +2.

	Full	(1) $Q > 0, I > 0$		(2) $Q < 0, I < 0$		(3) $Q > 0, I < 0$		(4) $Q < 0, I > 0$	
	sample	$\Delta Info > 0$	$\Delta Info < 0$	$\Delta Info > 0$	$\Delta Info < 0$	$\Delta Info > 0$	$\Delta Info < 0$	$\Delta Info > 0$	$\Delta Info < 0$
Pre-spinoff									
Mean	–0.0220*	0.0647***	0.0820**	–0.1173***	–0.0940**	–0.1000***	–0.0800***	0.0572***	0.0900***
Median	–0.0019*	0.0262***	0.0348***	–0.0405***	–0.0472***	–0.0616***	–0.0496***	0.0258***	0.0425***
Post-spinoff									
Mean	–0.0292	0.0489	0.0651**	–0.0691***	–0.2517	–0.0434***	–0.0648*	0.0262**	0.0875
Median	–0.0088**	0.0163	0.0127*	–0.0327***	–0.0143**	–0.0344***	–0.0269**	0.0188**	0.0347*
Changes									
Mean	–0.0073	–0.0159	–0.0169	0.0483*	–0.1577	0.0566**	0.0153	–0.0311**	–0.0025
Median	–0.0014	–0.0140*	–0.0252**	0.0071*	0.0117*	0.0150*	0.0017	–0.0093***	0.0004
N	223	30	18	47	26	30	17	29	26

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level.

Table VI
Summary Statistics: Measures of Compensation Structure

SBC is the stock-based compensation. Pre-spinoff (post-spinoff) SBC is the average of year -4 through year 0 (year +1 through year +3). Change in SBC is post-spinoff SBC minus pre-spinoff SBC. Pre-spinoff and post-spinoff stockholding and ownership are calculated in the same way. Delta measures how responsive CEO compensation is to the firm's stock performance and is obtained by estimating the coefficient in the following regression: Δ (CEO total compensation)$_t$ = a + b·Δ (shareholder wealth)$_t$.

	N	Mean	Min	Q1	Median	Q3	Max
SBC							
pre-spinoff	198	0.25776	0	0.03437	0.23518	0.40468	0.88141
post spinoff	212	0.29689	0	0.03896	0.27950	0.49642	0.97163
changes	196	0.04292***	-0.47932	-0.06801	0.01211***	0.15693	0.75574
Delta							
pre-spinoff	155	0.00166	-0.02285	-0.00059	0.00001	0.00091	0.09311
post spinoff	174	-0.00443	-0.56250	-0.00108	0.00019	0.00191	0.18851
changes	135	-0.00916*	-0.61647	-0.00325	-0.00001	0.00227	0.05846

* Significant at the 0.10 level; *** Significant at the 0.01 level.

Table VII
Regressions: Compensation Structure and Operating Performance

The dependent variables are changes in industry-adjusted ROA of parent firms from year +1 to +2 and from year +1 to year +3, where year 0 is defined as the year of spinoff distribution. Post-spinoff stock-based compensation (SBC) and delta are used as compensation measures. Informativeness measure utilized is firm-specific return variation (MM). Control variables include changes in informativeness of stock price, pre-spinoff level of informativeness, changes in systematic variation, pre-spinoff level of systematic variation, change in leverage from year −1 to year +1, change in beta (a coefficient of market return variable in market model regression), size (log of total assets in the first fiscal year after spinoff distributions), and 3-day excess return around spinoff announcements. *t*-statistics are in parentheses. White's heteroskedasticity-consistent standard errors are utilized for all regressions.

Panel B: Multivariate Analysis

	Δ ROA (+1,+2)		Δ ROA (+1,+3)	
	Reg. 1 (SBC)	Reg. 2 (delta)	Reg. 3 (SBC)	Reg. 4 (delta)
Intercept	-0.0409	-0.0060	-0.0301	0.0488
	(-0.83)	(-0.14)	(-0.40)	(0.51)
Compensation	-0.0024	-0.5122	-0.0337	-0.3035
	(-0.08)	(-1.00)	(-0.80)	(-0.69)
Δ Informativeness	3.6459*	4.3428**	3.8337*	4.5818*
	(1.91)	(2.09)	(1.89)	(1.93)
Pre-spinoff Informativeness	2.7848*	3.3393**	2.9516*	2.1558
	(1.72)	(2.23)	(1.88)	(1.29)
Δ Systematic variation	-2.4383*	-2.0805	-2.0498	-1.8186
	(-1.84)	(-1.62)	(-1.01)	(-0.87)
Pre-spinoff systematic variation	-2.6695*	-2.0182	-2.9616	-1.9542
	(-1.65)	(-1.27)	(-1.14)	(-0.73)
Δ Beta	0.0562	0.0072	0.0740	0.0833
	(0.71)	(0.09)	(0.86)	(0.84)
Δ Leverage	0.0147	0.0059	0.0285	0.0188
	(0.90)	(0.41)	(1.06)	(0.65)
Size	0.0006	-0.0057	-0.0014	-0.0117
	(0.12)	(-1.21)	(-0.18)	(-1.14)
Excess return	-0.1347	-0.1575	0.0886	0.0884
	(-0.79)	(-0.73)	(0.46)	(0.32)
N	170	140	146	122
Adj. R2	0.0828	0.1363	0.045	0.0525

* Significant at the 0.10 level; ** Significant at the 0.05 level.

Table VIII
Regressions: changes in stock-based compensation and firm performance

The dependent variables are changes in industry-adjusted ROA of parent firms from year +1 to +2 and from year +1 to year +3, where year 0 is defined as the year of spinoff distribution. The compensation measure is the changes in stock-based compensation around the spinoff. Informativeness measure utilized is firm-specific return variation (MM). Control variables include changes in informativeness of stock price, pre-spinoff level of informativeness, changes in systematic variation, pre-spinoff level of systematic variation, change in leverage from year −1 to year +1, change in beta (a coefficient of market return variable in market model regression), size (log of total assets in the first fiscal year after spinoff distributions), and 3-day excess return around spinoff announcements. *t*-statistics are in parentheses. White's heteroskedasticity-consistent standard errors are utilized for all regressions.

	Reg. 1 Δ ROA (+1,+2)	Reg. 2 Δ ROA (+1,+3)
Intercept	-0.0341	-0.0396
	(-0.76)	(-0.52)
Δ Compensation	0.0549	0.1117**
	(1.63)	(2.11)
Δ Informativeness	3.5098*	4.3211*
	(1.74)	(1.89)
Pre-spinoff Informativeness	3.1890*	3.6136**
	(1.85)	(2.02)
Δ Systematic variation	-2.2956	-1.9126
	(-1.61)	(-0.98)
Pre-spinoff systematic variation	-2.5439	-3.0436
	(-1.53)	(-1.17)
Δ Beta	0.0390	0.0646
	(0.49)	(0.72)
Δ Leverage	0.0155	0.0218
	(0.90)	(0.73)
Size	-0.0018	-0.0042
	(-0.42)	(-0.52)
Excess return	-0.1137	0.1130
	(-0.51)	(0.42)
N	158	133
Adj. R2	0.137	0.0502

* Significant at the 0.10 level; ** Significant at the 0.05 level.

Table IX
Corporate Focus and Spinoffs

Panel A reports changes in the industry-adjusted ROA from year +1 to year +2 and from year +1 to year +3 for focus-improving and non-focus-improving spinoffs. A spinoff is focus-improving if the parent and subsidiary have different two-digit SIC codes. A firm is excluded from the categorization if it spins off more than one subsidiary and one subsidiary has the same two-digit SIC code as the parent and the other s do not. The last row reports the difference in performance between focus-improving parents and non-focus-improving parents. Panel B presents changes in the industry-adjusted ROA for information-increasing and information-decreasing spinoffs. Two informativeness measures are used for the comparison: changes in the firm-specific return variation (MM) and changes in the relative effective bid-ask spread (REBA). Panel C reports regression results. The dependent variables are ROA (+1, +2) and ROA (+1, +3). Focus is an indicator variable that equals 1 for focus-improving spinoffs and 0 for non-focus-improving spinoffs. Regressions 2 and 5 employ the firm-specific return variation (MM) and regressions 3 and 6 use the REBA as the informativeness measure, respectively. *t*-statistics are in parentheses. White's heteroskedasticity-consistent standard errors are utilized for all regressions.

Panel A: Changes in Industry-adjusted ROA and Corporate Focus

	ROA(+1,+2)			ROA(+1,+3)		
	N	Mean	Median	*N*	Mean	Median
Focus-improving	141	0.0286**	0.0035*	127	0.0318*	0.0093
Non-focus-improving	86	0.0052	0.0004	67	–0.0170	–0.0051
Difference		0.0234	0.0031		0.0488*	0.0144

Panel B: Changes in Industry-adjusted ROA and Informativeness

	ROA(+1,+2)			ROA(+1,+3)		
	N	Mean	Median	*N*	Mean	Median
Firm-specific return variation (MM) as the information measure						
Information-increasing	152	0.0364**	0.0105**	129	0.0306	0.0101
Information-decreasing	89	–0.0171	–0.0068*	77	–0.0194	–0.0098
Difference		0.0535***	0.0173***		0.0500*	0.0199**
REBA as the information measure						
Information-increasing	113	0.0335	0.0014	97	0.0258	0.0093
Information-decreasing	71	–0.0096	–0.0002	55	–0.0328	–0.0098
Difference		0.0431**	0.0016*		0.0586**	0.0191*

Panel C: Regression Results

	Δ ROA (+1,+2)			Δ ROA (+1,+3)		
	Reg. 1	Reg. 2 (MM)	Reg. 3 (REBA)	Reg. 4	Reg. 5 (MM)	Reg. 6 (REBA)
Intercept	0.0225	−0.0756	0.0778	0.0112	−0.0017	0.1142
	(1.22)	(−1.22)	(1.02)	(0.51)	(−0.02)	(0.99)
Focus	−0.0070	−0.0019	0.0012	0.0125	−0.0042	−0.0049
	(−0.34)	(−0.11)	(0.06)	(0.45)	(−0.17)	(−0.17)
Δ Informativeness		3.9216**	2.1352**		4.2946**	1.3943**
		(2.18)	(1.94)		(2.04)	(2.08)
Pre-spinoff informativeness		2.6385	−0.7797		1.4064	−4.6427
		(1.45)	(−0.65)		(0.89)	(−1.46)
Δ Systematic variation		−2.0085			−1.6267	
		(−1.49)			(−0.86)	
Pre-spinoff sys. variation		−0.7761			0.1690	
		(−0.47)			(0.06)	
Δ Beta		0.0201	0.0483**		0.0300	0.0594**
		(1.19)	(2.35)		(1.46)	(2.40)
Δ Leverage		0.0236	−0.1221**		0.0562	−0.1124
		(0.33)	(−2.10)		(0.61)	(−1.46)
Size		0.0039	−0.0079		−0.0047	−0.0116
		(0.75)	(−0.92)		(−0.61)	(−1.03)
Excess return		−0.0557	−0.0448		0.1517	0.4085*
		(−0.27)	(−0.18)		(0.81)	(1.77)
N	218	199	153	184	168	132
Adj. R2	0.0006	0.1158	0.1373	0.0010	0.1145	0.1830

* Significant at the 0.10 level; ** Significance at the 0.05 level; *** Significance at the 0.01 level.

Table X
Heckman's Two-stage Estimation

This table reports results of Heckman's two-stage estimation. Sample firms and matching firms are pooled to construct data for the first-stage estimation. Tobin's *Q* is defined as market value of total assets divided by book value of total assets, where market value of total assets is book value of total assets plus market value of common equity minus book value of common equity minus deferred taxes. Investment level is calculated by dividing capital expenditure by sales. Sample sizes vary because of missing COMPUSTAT data. *t*-statistics are in parentheses.

Panel A: First-stage PROBIT Estimation

	Coefficient	*z*-statistic	*P*>|*z*|
Constant	1.1558	2.45	0.01
St. Dev. of ROAs	–3.7841	–1.28	0.20
Tobin's *Q*	0.1050	1.28	0.20
Investment level	0.1845	0.30	0.76
Firm-specific variation	–13.3277	–1.76	0.08
Systematic variation	7.6178	0.44	0.66
ROA year –3	–2.8195	–2.33	0.02
ROA year –2	–5.4948	–3.49	0.00
ROA year –1	–1.1826	–0.95	0.34
Number of segments	0.2986	5.25	0.00
Leverage	–0.7583	–1.20	0.23
Size	–0.1199	–2.18	0.03
N			327
Wald Statistic			31.85

Panel B: Second-stage OLS Estimation

	Δ ROA (+1,+2)		Δ ROA (+1,+3)	
	Reg. 1 (MM)	Reg. 2 (REBA)	Reg. 3 (MM)	Reg. 4 (REBA)
Intercept	–0.1068*	–0.0009	0.0221	0.1319*
	(–1.74)	(–0.02)	(0.26)	(1.65)
Lambda	–0.0096	0.0336**	–0.0772***	–0.0343
	(–0.49)	(1.96)	(–2.98)	(–1.34)
Δ Informativeness of stock price	5.1242***	1.4451**	5.3907***	1.3522*
	(4.20)	(2.45)	(3.35)	(1.87)
Pre-spinoff Informativeness	2.8686***	–1.2183	1.709	–4.0403**
	(2.59)	(–1.22)	(1.13)	(–2.40)
Δ Systematic variation	–1.5607		–1.2107	
	(–0.78)		(–0.47)	
Pre-spinoff systematic variation	0.0696		1.0283	
	(0.03)		(0.28)	
Δ Beta	0.0018	0.027**	0.0105	0.0409**
	(0.12)	(2.35)	(0.54)	(2.16)
Δ Leverage	0.0377	–0.0346	0.0863	–0.0795
	(0.61)	(–0.63)	(1.06)	(–0.99)
Size	0.0059	–0.0021	–0.0055	–0.0141*
	(0.92)	(–0.36)	(–0.62)	(–1.64)
Excess return	0.3110**	0.5133***	0.2639	0.6636***
	(2.15)	(3.77)	(1.33)	(3.31)

Figure I
Sequence of Events

Change in informativeness is post-spinoff informativeness minus pre-spinoff informativeness. ROA (+1, +2) and ROA (+1, +3) are changes in operating performance and are measured by ROA for year +2 minus ROA year +1 and ROA year +3 minus ROA year +1, respectively.

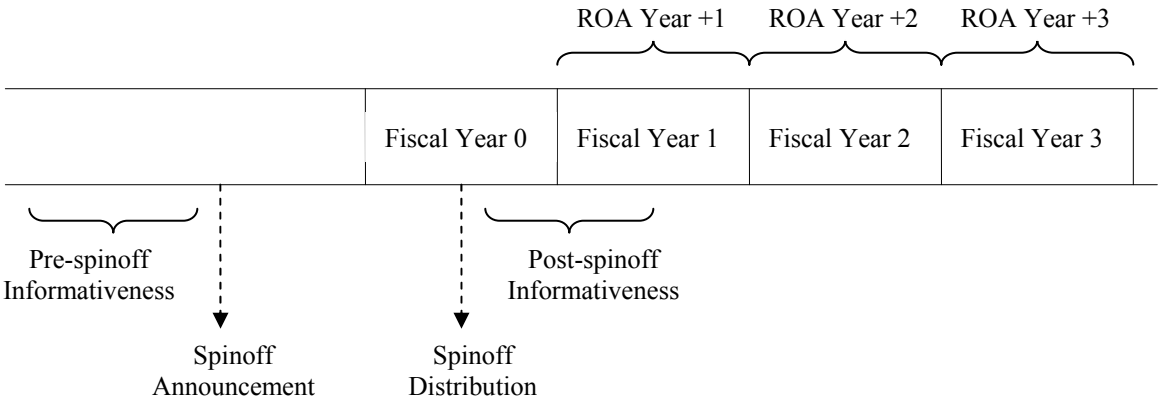
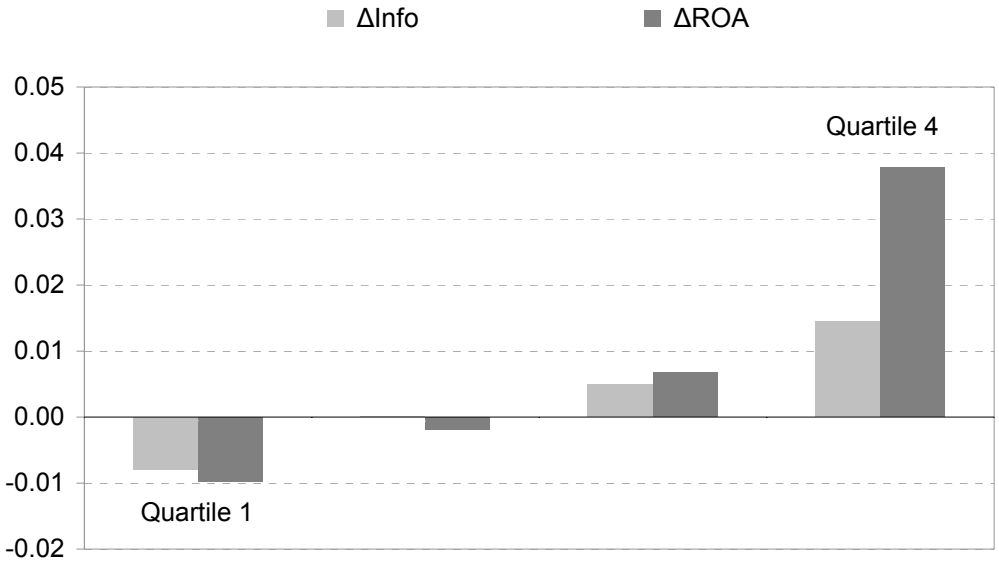


Figure II
Performance Changes for Quartiles sorted by Changes in Informativeness

Figure 2 shows median changes in informativeness around the spinoff and median changes in industry-adjusted operating performance from year +1 to year +3 for each quartile. Sample firms are sorted into four quartiles based on the magnitude of changes in informativeness, with quartile 1 corresponding to the firms experiencing the least improvement in informativeness around the spinoff. The firm-specific return variation (MM) is utilized as the informativeness measure.



Appendix

A1: Variable Description

Variable	Measure
Systematic Variation	Standard deviation of the return variations explained by market return (and industry return)
Beta	Coefficient of the market return variable in market model regressions
Leverage	Total debt divided by total assets, where total debt is the sum of long-term debt and debt in current liabilities.
Size	Log of the total assets of a parent firm at the end of the month of the spinoff distribution
Excess Return	3-day announcement period abnormal return (estimated using market model and value-weighted market return)
Return on asset (ROA)	Operating cash flow (COMPUSTAT annual data item #13) divided by total assets (COMPUSTAT annual data item #6)
Tobin's Average Q	Market value of total assets divided by book value of total assets, where market value of total assets is book value of total assets plus market value of common equity minus book value of common equity minus deferred taxes.
Investments (I)	Capital expenditure divided by sales (Capital expenditure divided by total assets is also used as a measure of investment. Test results are similar to those using capital expenditure divided by sales and are not reported here.)