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Abstract

The existing literature argues that diversified firms may be undervalued due to the information asymmetry between a firm's management and the market. Splitting the firm's divisions into multiple business components is thought to facilitate the market valuation of each component more accurately. We investigate the *information hypothesis* from corporate spinoffs from 1981 through 2004. We use the post-spinoff data to reconstruct the diversified firm, assess the improvement in value at the combined firm level, and relate the value improvement to the change in the level of information asymmetry. We find that, prior to the spinoff, the sample firms have significantly higher levels of information asymmetry than their industry- and size-matched peers and that the level of information asymmetry decreases to a certain extent following the spinoff. We also find that the sample firms are valued at a substantial discount before the spinoff and that the valuation discount is eliminated after the completion of the spinoff. The matching firms, however, do not trade at a significant discount either pre- or post-spinoff. This is consistent with the view that only undervalued firms divest. More importantly, we find that the change in excess value around the spinoff is significantly and negatively related to the change in the level of information asymmetry. We conclude that information asymmetry is at least partly responsible for the diversification discount.

Key words: asymmetric information; diversified firms; conglomerate discount; spinoff.

JEL Classification: G14; G34

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1. Introduction

The substantive literature documents that diversified firms are valued at a discount relative to specialized firms in the same industries (Berger and Ofek, 1995; Lang and Stulz, 1994; Servaes, 1996; Lins and Servaes, 1999, etc.). This value discount appears to exist in both the US and other countries and is fairly robust over time (Servaes, 1996; Lins and Servaes, 1999; Khanna and Palepu, 2000; Lins and Servaes, 2002). Moreover, Comment and Jarrel (1995) document a trend toward corporate focus since the 1980s. John and Ofek (1995), Daley *et al.* (1997), Desai and Jain (1999), and Berger and Ofek (1999) report that focus-increasing divestitures such as asset sales, equity carve-outs, and corporate spinoffs lead to higher market valuations and stock returns.

Researchers have provided various reasons to explain the discount of diversified firms and the sources of gains around divestitures. One stream of research (e.g. Nanda and Narayanan, 1999) explains the undervaluation of diversified firms and the divestiture decisions of these firms in terms of asymmetric information between the market and the firm's management. This explanation draws theoretical support from Nanda and Narayanan (1999) who argue that diversified firms may be undervalued due to the unobservability of divisional cash flows to the market. Splitting the firm into separate business components will facilitate the market valuation of each component more accurately. Therefore, undervalued firms requiring external financing may find external equity capital too expensive and resort to divestitures to raise capital at a fair price. In the context of spinoffs in which no cash flow is generated, undervalued firms may first engage in spinoffs to get *correctly* valued and then approach the external capital market for funds (Krishnaswami and Subramaniam, 1999). If information asymmetry results in undervaluation of the diversified firm, we expect that 1) the pre-divestiture information asymmetry of the divesting firms should be higher compared to their non-divesting counterparts, 2) divestitures will reduce the level of information asymmetry and the valuation discount, and more importantly, 3) the change in firm value following the divestiture will be negatively related to the change in the level of information asymmetry.

The primary objective of this paper is to use corporate spinoffs to examine these predictions. Spinoffs facilitate the purpose of the test for two main reasons. Firstly, financial data are separately available for the post-spinoff parent firm and the spun-off unit. This allows us to combine the data of the parent and spunoff firms following the divestiture as if the firm were still a conglomerate and measure the changes in firm value and information asymmetry at the combined firm level. Secondly, changes in information asymmetry and firm value around spinoffs are well documented separately in the literature. Krishnaswami and Subramaniam (1999) find that, for firms that engage in spinoffs, information problems decrease significantly after the completion of spinoffs. Gilson *et al.* (2001) document significant improvements in the quantity and quality of analyst coverage for parent firms after focus-increasing stock breakups (spinoffs, equity carve-outs, and targeted stock offerings). Burch and Nanda (2003) and Ahn and Denis (2004) show that, on average, spinoffs achieve significant improvements in combined firm excess value. However, to the best of our knowledge, no prior studies have empirically examined the link between the change in asymmetric information and the change in firm value following spinoffs. This paper extends the literature by providing direct evidence on whether reductions in information asymmetry contribute to firm value improvements surrounding spinoffs.

Our sample consists of 126 spinoff events announced by multi-segment firms between 1981 and 2004. We gauge the benefit from the spinoff by measuring the change in combined firm excess value from the year prior to the announcement of the spinoff to the year following the completion of the spinoff. We employ three different proxies of information asymmetry: the analysts' forecast error, the market-adjusted residual standard deviation and the market-and-industry-adjusted residual standard deviation. We find that diversified firms that engage in spinoffs have significantly higher levels of information asymmetry than their industry- and size-matched counterparts prior to the spinoff. For firms that engage in spinoffs the level of information asymmetry decreases slightly after the completion of the spinoff while for their matching firms the level of information asymmetry increases slightly during the same period. We also find that the sample firms are valued at a substantial discount prior to the spinoff. Following the spinoff, the valuation discount is eliminated. The matching firms, however, do not trade at a significant discount in the pre-spinoff period. Nor do they experience an increase in firm value from the pre-spinoff to the post-spinoff period.

Using multivariate analysis and controlling for various factors, such as the pre-spinoff firm excess value, the change in total diversification, etc., we find that the change in excess value is significantly negatively related to the change in asymmetric information surrounding the spinoff. The results are robust to each proxy of asymmetric information and the inclusion of various definitions of control variables. We conclude that the diversification discount at least partially reflects a value loss due to information asymmetry.

For completeness, we also examine the three-day cumulative abnormal returns surrounding the announcement of spinoffs. As in previous studies, we document significant announcement period abnormal returns. However, we do not find a significant link between the announcement period abnormal returns and the level of information asymmetry prior to the spinoff or the change in the level of information asymmetry surrounding the spinoff.

The rest of the paper is organized as follows. Section 2 reviews the related research and develops the hypothesis to be tested. Section 3 presents measures of firm excess value and information asymmetry. Section 4 describes the sample selection procedure and provides descriptive statistics for the sample. The empirical analysis is contained in section 5. Section 6 concludes.

2. Related literature and hypothesis development

There is a vast and well-developed literature on the discount of diversified firms and on the sources of value gains around spinoffs. This diversification discount has two broad and non-mutually exclusive explanations. The first explanation says that diversification itself somehow destroys firm value. The negative impact of diversification is often described in terms of inefficient investment (Berger and Ofek, 1995; Lamont, 1997; Shin and Stulz, 1998; Rajan *et al.*, 2000; Lamont and Polk, 2002; Dittmar and Shivdasani, 2003; Ahn and Denis, 2004) and exacerbated agency problems (Denis *et al.*, 1997) within diversified firms. The second argues that diversification does not destroy value and the discount is an artifact of the endogeneity of the diversification decision (Campa and Kedia, 2002; Graham *et al.*, 2002; Hyland and Diltz, 2002), measurement errors (Chevalier, 2000; Whited, 2001) or selection bias (Villalonga, 2004). A variety of reasons has also been presented in the literature to explain the value gains to spinoffs. Among the most popular are improvements in corporate focus (Daley *et al.*, 1997; Desai and Jain, 1999), improvements in management incentives (Schipper and Smith, 1983), increase in investment efficiency (Ahn and Denis, 2004), relaxation of regulatory or tax constraints (Schipper and Smith, 1983), facilitation of a merger or takeover (Cusatis *et al.*, 1993), and elimination of cross subsidies, etc.

A growing literature provides an alternative explanation for the diversification discount and the gains to spinoffs based upon information asymmetries between inside managers and outside investors. Managers normally have an advantage over outside investors in predicting firm-specific events. This creates an informational gap between insiders of the firm and outsiders. The size of the information gap is likely to differ between diversified and focused firms. Diversified firms may be harder to value than focused firms if the accounting figures for diversified firms are less informative due to the aggregate nature of diversified firms' accounting reports (Hadlock *et al.*, 2001). Using samples of spinoffs or stock breakups, Krishnaswami and Subramaniam (1999) and Gilson *et al.* (2001) report empirical evidence consistent with this notion. Krishnaswami and Subramaniam (1999) find that, for firms that engage in spinoffs, information problems decrease significantly after the completion of spinoffs. These firms also raise more capital following spinoffs. Gilson *et al.* (2001) document significant improvements in the quantity and quality of analyst coverage for parent firms after focus-increasing stock breakups (spinoffs, equity carve-outs, and targeted stock offerings). These improvements seem to stem from the enhanced ability of industry specialists to utilize their expertise in forecasting the performance of pure plays.

Dunn and Nathan (1998) report lower analysts' forecast accuracy and higher inter-analyst disagreement as a company's unrelated diversification increases. In contrast to the above reasoning, Hadlock *et al.* (2001) develop an argument that diversification may alleviate asymmetric information problems based on the assumption that the errors outsiders make in valuing segment cash flows are not perfectly correlated with each other, which implies that the absolute value of the percentage error in the estimation of firm cash flows may be smaller for a diversified firm than for a focused firm. Consistent with this argument, they document a less negative market reaction to equity-issue announcements for diversified firms than for focused ones. Using information proxies derived from analysts' forecasts and abnormal returns associated with earnings announcements, Thomas (2002) finds that greater diversification is not associated with increased asymmetric information. In a similar vein, Clarke *et al.* (2004) show that diversified firms are not associated with greater asymmetric information than focused firms based on metrics drawn from the market microstructure literature. These results call into question the notion that corporate diversification would exacerbate information problems and result in a valuation discount.

The above empirical studies, however, only focus on the relation between corporate diversification and asymmetric information. Missing from the debate is a direct link between asymmetric information and firm value. Nanda and Narayanan (1999) develop an information-based model to explain the undervaluation of multi-divisional firms and divestiture decisions of these firms. They introduce a cost to diversification based on asymmetric information between the market and the management. They assume that only management can observe the divisional cash flows of the firm. The market can observe only the firm's aggregate cash flows and not the divisional cash flows. Therefore, management will correctly place a greater weight on the more informative division's cash flows in updating its quality than they would on the remaining division's cash flows. The market, however, can only observe the aggregate cash flows and therefore rationally updates the overall quality of the firm as if each division were performing at an average level. In the scenario where the division with more informative cash flows performs well (poorly), the market will undervalue (overvalue) the successful division and overvalue (undervalue) the poorly performing division, leading to undervaluation (overvaluation) of the firm. Breaking up the firm into separate businesses will make it easier for the market to value it correctly. Therefore, undervalued firms requiring external financing may resort to divestitures to raise capital at a fair price while overvalued firms will resort to equity issues without separating its divisions. In the context of spinoffs in which no cash flow is generated, undervalued firms may first engage in spinoffs to get *correctly* valued and then approach the external capital market for funds.

Empirical work that directly relates the measures of information asymmetry to the value of the firm is sparse. Using two-stage least squares regression models to reduce the endogeneity problem between the diversification discount and information asymmetry, Kim *et al.* (2002) find that firms with larger information asymmetry have significantly lower firm value. Best *et al.* (2004) empirically examine the relation between the diversification discount and the level of information asymmetry for multi-segment and single-segment firms. They find that the diversification discount is significantly and positively related to information asymmetry, but a significant diversification discount still exists after controlling for differences in information asymmetry and other firm characteristics between diversified and nondiversified firms. Therefore, they conclude that the diversification discount cannot be explained by information asymmetry. If the discount of diversified firms is caused in part by information asymmetries between the market and the firm's management, and undervalued firms undertake divestitures to get a fair valuation as predicted by Nanda and Narayanan (1999)'s model, we expect the following hypotheses to hold.

Hypothesis 1. The pre-divestiture information asymmetry of the divesting firms should be higher compared to their non-divesting counterparts.

Hypothesis 2. Divestitures will reduce the level of information asymmetry and the diversification discount.

Hypothesis 3. Controlling for other factors, the increase in firm value following divestitures will be negatively related to the change in the level of information asymmetry.

3. Empirical design

Our empirical approach is to analyze the change in firm excess value and the degree of information asymmetry following the breakup of a conglomerate and to examine whether the change in information asymmetry is associated with the change in firm excess value. The primary advantage of this approach is that it does not rely on cross-sectional comparisons of the firm value and the level of information asymmetry across diversified and focused firms. Hence, it avoids the omitted variables problem that typically confounds inferences from this research (Dittmar and Shivdasani, 2003). Specifically, we use a sample of corporate spinoffs. Spinoffs facilitate the study of the valuation effects of information asymmetry for two main reasons. Firstly, changes in firm value and the level of information asymmetry around spinoffs are well documented in the literature (Krishnaswami and Subramaniam, 1999; Gilson *et al.*, 2001; Burch and Nanda, 2003; Ahn and Denis, 2004). Secondly, financial data are separately available for the surviving parent firm and the spunoff unit following the spinoff. This allows us to combine the post-spinoff data of the parent firm and the spunoff unit as if the spinoff had not occurred and to measure the benefit from the spinoff by examining changes in the combined firm's excess value and relate this benefit to changes in the combined firm's level of information asymmetry. Given this experimental design, it is difficult to attribute the diversification discount to just measurement error or selection bias. If there is a measurement error, it will be present in both the pre- and post-spinoff excess values and is unlikely to drive the change between the two. The selection bias is also unlikely to explain the results as all units included in measuring the pre-spinoff excess value are also included in gauging the post-spinoff excess value. Admittedly, since we use a specific sample of restructured firms, our findings may not be generalized to the entire population of diversified firms.

This paper is closely linked to Burch and Nanda (2003) and Ahn and Denis (2004). Burch and Nanda (2003) document that improvements in combined firm excess value following spinoffs are significantly associated with reductions in diversity in investment opportunities. Ahn and Denis (2004) find that increases in investment efficiency around spinoffs lead to corresponding increases in combined firm excess value. This study extends these two papers by providing direct evidence on another potential source of value creation around spinoffs. Although we do not explicitly examine changes in investment efficiency as in Burch and Nanda (2003) and Ahn and Denis (2004), our paper has implications for these studies because higher levels of information asymmetry makes it more difficult for investors to assess the efficiency of investment of the firm and hence may lead to lower firm values.

3.1. Measuring firm excess value

We measure the valuation effect of diversification using the excess value measure originally developed by Berger and Ofek (1995). Excess value is computed as the log of the ratio of a firm's value of total capital to the sum of the imputed value of its segments as stand-alone firms. Total capital is defined as the book value of debt plus the market value of common equity. Imputed values are calculated as the sales-weighted sum of the median ratio of total capital to sales for single segment firms in the same industry. Industry median ratios are based on the three-digit SIC level provided that there are at least five single-segment firms in the industry. If fewer than five single-segment firms match at the three-digit SIC level, the two digit-SIC level is examined and so on until the median ratio of the tightest SIC level with at least five observations is found. In cases where the sum of a firm's segment sales figures from the Compustat Business Segment Information database deviates from its total sales figures from the Compustat Industrial Annual database, the firm's imputed value is grossed up or down by the percentage deviation between the sum of segment sales and total sales. Specifically, the pre-spinoff excess value of the firm is defined as[1]

$$EV_{pre} = LN\left[\frac{V}{\sum_{i=1}^{n} Sales_i * \left(Ind_i(V/Sales)\right)}\right] \qquad (1)$$

where V equals a firm's total capital, defined as the book value of debt plus the market value of common equity, $Sales_i$ equals segment *i*'s value of sales, $Ind_i(V/Sales)$ is the ratio of total capital to sales for the median single-segment firm in segment *i*'s industry.

Following Burch and Nanda (2003), we compute the post-spinoff excess value using the combined values of the remaining parent firm and the spunoff unit. The post-spinoff excess value of the combined firm is defined as

[1] Following Berger and Ofek (1995), we define extreme excess values as those for which the firm's actual values are either more than four times imputed, or less than one-fourth imputed. Only four observations in our sample produce extreme pre- and post-spinoff excess values. Whether excluding these four observations or not does not alter the main results. Hence, we keep them in our sample.

$$CEV_{post} = LN\left[\frac{PV + SV}{\sum_{i=1}^{m} Sales_i * \left(Ind_i (V/Sales)\right) + \sum_{j=1}^{k} Sales_j * (Ind_j (V/Sales))}\right] \quad (2)$$

where PV (SV) is the total capital of the remaining parent firm (the spunoff unit) following the spinoff. *i*=1 to *m* represents the segments in the remaining parent firm and *j*=1 to *k* represents the segments in the spunoff unit. For this and other metrics in the study, pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. The change in the combined firm's excess value is defined as

$$\Delta EV = CEV_{post} - EV_{pre} \quad (3)$$

3.2. Measuring information asymmetry

We use three different measures of information asymmetry in the empirical analysis. Following Krishnaswami and Subramaniam (1999) and Thomas (2002), we use the forecast error in earnings as the first proxy of information asymmetry. This proxy is based on forecasts made within one year before actual earnings are released.[2] Similar to Thomas (2002), the pre-spinoff forecast error of the firm (ERR_{pre}) is defined as the absolute difference between actual earnings and the median forecasted earnings deflated by the stock price five days before the earnings announcement date.

$$ERR_{pre} = \frac{\left|ACTEARN - FOREEARN_{med}\right|}{PRICE} \quad (4)$$

Following the spinoff, we compute the forecast error of the combined firm $(CERR_{post})$ as the absolute value of the weighted average of the signed forecast errors of the remaining parent firm and the spunoff unit, where the weights are the assets of the parent firm or the spunoff unit relative to the sum of

[2] Elton *et al.* (1984) show that the errors in forecasts made very near the end of a forecasting period consists primarily of firm-specific factors rather than economy- or industry-wide factors. Krishnaswami and Subramaniam (1999) use forecasts made in the last month of the fiscal year while Thomas (2002) uses forecasts made in the month before actual earnings are released. However, many observations will be lost if only near end forecasts are used. Hence, we use forecasts made within one year before actual earnings are released.

assets of the parent firm and the spunoff unit computed at the end of the first full fiscal year following the spinoff.

$$CERR_{post} = \left| w_{parent} * ERR_{parent} + w_{spunoff} * ERR_{spunoff} \right| \tag{5}$$

Here, w_{parent} $(w_{spunoff})$ is the ratio of book value of assets of the parent firm (the spunoff unit) to the sum of book value of assets of the parent firm and the spunoff unit following the spinoff. ERR_{parent} $(ERR_{spunoff})$ is the signed forecast error of the parent firm (spunoff unit) following the spinoff, where $ERR_{parent} = \frac{ACTEARN_{parent} - FOREEARN_{parent}}{PRICE_{parent}}$ and $ERR_{spunoff} = \frac{ACTEARN_{spunoff} - FOREEARN_{spunoff}}{PRICE_{spunoff}}$. Since median forecast is used, we require that a firm must have at least three forecasts within the specified period. The change in the combined firm's forecast error is defined as[3]

$$\Delta ERR = CERR_{post} - ERR_{pre}. \tag{6}$$

In general, analysts' forecast errors are expected to be larger when there is higher level of information asymmetry between managers and outsiders regarding firm earnings. Following Dierkens (1991) and Krishnaswami and Subramaniam (1999), we use the market-adjusted residual standard deviation of daily stock returns as the second measure of information asymmetry. As pointed out by Krishnaswami and Subramaniam (1999), this residual standard deviation variable captures the firm-specific uncertainty born by outsiders after removing from the uncertainty common to the firm's insiders and outsiders that is caused by market-wide factors influencing a firm's value. Generally, firms with higher information asymmetry about their value are expected to have higher residual standard deviation in their returns. This measure is obtained by regressing daily firm returns on value-weighted market returns and calculating the standard deviation of the regression residuals. Specifically, we estimate the following regressions for each firm:

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[3] In multivariate regression analysis, we apply the square root transformation of this variable to improve the model fit. In regression analysis and simple correlation analysis, the variable ΔERR is measured as $\sqrt{CERR_{post}}$ minus $\sqrt{ERR_{pre}}$.

$$
\begin{aligned}
r_{pt}^{pre} &= \alpha_p^{pre} + \beta_p^{pre} r_{mt}^{pre} + \varepsilon_{pt}^{pre} \\
r_{wt}^{post} &= \alpha_w^{post} + \beta_w^{post} r_{mt}^{post} + \varepsilon_{wt}^{post}
\end{aligned} \tag{7}
$$

where r_{pt}^{pre} is the daily return for the parent firm during the pre-spinoff period, r_{wt}^{post} is the daily weighted average return of the remaining parent firm and the spunoff unit during the post-spinoff period, where the weights are the respective book value of total assets of the parent firm or the spunoff unit relative to the combined assets of the parent firm and the spunoff unit as of the end of the first full fiscal year following the spinoff, and r_{mt} is the daily return of the value-weighted NYSE/AMEX/Nasdaq index. Pre-spinoff refers to the 250-day period ending 50 days prior to the spinoff announcement date. Post-spinoff refers to the 250-day period starting 50 days after the spinoff effective date.

We then obtain the market-adjusted standard deviation of the regression residuals for both the pre-spinoff and the post-spinoff period, $\sigma(\varepsilon^{post})_{MA}$ and $\sigma(\varepsilon^{pre})_{MA}$. The change in the combined firm's market-adjusted residual standard deviation is defined as

$$
\Delta\sigma(\varepsilon)_{MA} = \sigma(\varepsilon^{post})_{MA} - \sigma(\varepsilon^{pre})_{MA}\,. \tag{8}
$$

The third measure of information asymmetry is the market-and-industry-adjusted residual standard deviation of daily stock returns. As pointed out by Dierkens (1991), the market-adjusted residual standard deviation may overestimate the true measure of information asymmetry since it may contain uncertainty about industry developments that is shared by managers and investors. We gauge the market-and-industry-adjusted residual standard deviation by regressing daily firm returns on value-weighted market returns and industry returns and calculating the standard deviation of the regression residuals. Industry is defined as all firms (excluding all parent firms and spunoff units) that have the same 2-digit SIC code as the pre-spinoff parent firm.

$$
\begin{aligned}
r_{pt}^{pre} &= \alpha_p^{pre} + \beta_{pm}^{pre} r_{mt}^{pre} + \beta_{pi}^{pre} I_t^{pre} + \varepsilon_{pt}^{pre} \\
r_{wt}^{post} &= \alpha_w^{post} + \beta_{wm}^{post} r_{mt}^{post} + \beta_{wi}^{post} I_t^{post} + \varepsilon_{wt}^{post}
\end{aligned} \tag{9}
$$

where r_{pt}^{pre} is the daily return for the parent firm p in industry i during the pre-spinoff period and I_t^{pre} is the daily value-weighted industry return for industry i. The change in the combined firm's market-and-industry-adjusted residual standard deviation is defined as

$$\Delta\sigma(\varepsilon)_{MIA} = \sigma(\varepsilon^{post})_{MIA} - \sigma(\varepsilon^{pre})_{MIA} \tag{10}$$

3.3. Control variables

Most of the control variables are motivated by the prior diversification and spinoff literature as potential determinants of firm excess value and gains surrounding spinoffs. Cusatis et al. (1993) find that the post-spinoff abnormal performance of parents and spinoffs are confined to the subsample of firms that were acquired after the spinoff. We use an indicator variable to control for any valuation effect related to post-spinoff takeover activities. This takeover dummy $(TAKED)$ is set to 1 if either the parent firm or the spun-off unit was taken over or merged with other firms within three fiscal years following the spinoff. The variable is expected to be positively related to the change in excess value.

Schipper and Smith (1983) find that relaxing regulatory constraints is a motive for some firms to engage in spinoffs. We use an indicator variable to control for regulatory benefits from a spinoff. The regulation dummy $(REGD)$ takes the value of 1 if either the parent or the subsidiary is in a regulated industry based on two-digit SIC code (SIC 4800-4829, 4910-4949). $REGD$ is expected to be positively related to the change in excess value.

Daley *et al.* (1997) and Desai and Jain (1999) show that focus-increasing spinoffs result in higher stock market gains than non-focus-increasing spinoffs. Following Desai and Jain (1999), we use three alternative measures of increase in focus by including an indicator variable $(FOCUSD)$ for 1) whether the two-digit SIC code of the parent firm is different from that of the spunoff unit; 2) whether the parent firm's reported number of segments at the two-digit SIC level decreases or not, and 3) whether the parent firm's Herfindahl index measured at the two-digit SIC level decreases or not. The expected relation to the change in excess value is positive.

Hite and Owers (1983) and Miles and Rosenfeld (1983) find that announcement period gains are greater for large spinoffs than for small ones. We use the total assets of the divested unit measured relative to the sum of the assets of the parent and the divested unit computed at the end of the first full fiscal year following the spinoff to control for size related effects. We expect the coefficient of this variable $(SPINSIZE)$ to be positive.

Burch and Nanda (2003) show that changes in the combined firm's excess value are significantly greater for firms with negative pre-spinoff excess values than for firms with positive pre-spinoff excess values. This suggests that greater value improvements are realized where they are needed more, i.e., in firms that are trading at a discount (Burch and Nanda, 2003). Hence, we include EV_{pre} as a control variable and expect it to be negatively related to the change in excess value.

Burch and Nanda (2003) find that reductions in diversity lead to improvements in excess value. We control for changes in total diversification using the entropy measure from Jacquemin and Berry (1979). The entropy measure is calculated as:

$$ENTROPY = \sum_{i=1}^{n} P_i Ln(1/P_i) \qquad (11)$$

where P_i is the percentage of sales in segment *i* at the four–digit SIC level and the summation is over *n* four-digit industry segments where the firm operates. The entropy measure is calculated both prior to and following the spinoff, where the post-spinoff value is that of the combined firm. Larger values of $ENTROPY$ correspond to less concentration of sales among segments and hence greater total diversification. Changes in combined firm's entropy measure $(\Delta ENTROPY)$ are expected to be negatively related to changes in excess value. We also consider an alternative measure of diversity proposed by Burch and Nanda (2003) (Eq. (4) in their paper). The metric, which they call $CPOSTDIV$, is equal to

$$(W_P)Abs\left[M/B_P - M/B_C\right] + (W_S)Abs\left[M/B_S - M/B_C\right] \qquad (12)$$

where W_P (W_S) is the ratio of the post-spinoff parent firm's (the spun-off unit's) assets to the sum of the parent firm's and the spun-off unit's assets. M/B_P (M/B_S) is the post-spinoff market to book ratio of the parent firm (spunoff unit). M/B_C is the combined firm's market to book ratio, which is equal to the asset weighted average of M/B_P and M/B_S. This metric measures the diversity that is eliminated as a result of the spinoff and is expected to be positively related to changes in excess value.

Rajan et al. (2000) show that the excess value of a diversified firm is positively related to the inverse of equally weighted average Tobin's Q over segments in the firm. Ahn and Denis (2004) show that the change in excess value surrounding spinoffs is positively related to the change in the inverse of the firm's sales-weighted Q. Following Ahn and Denis (2004), we control for the change in the inverse of the firm's sales-weighted average of segment Q $(\Delta INVQ)$. The segment Q is proxied by the median Q of single-segment firms operating at the same three-digit SIC level as the segment whenever there are at least five single-segment firms with available data, and at the two-digit SIC level or one-digit level as needed. Q is defined as the market value of total assets divided by the book value of total assets and is a good proxy for investment opportunities (Rajan et al, 2000). Our measure of a firm's average Q is essentially the pure-play Q employed by Lang and Stulz (1994) but for the fact that in our computation of average Q we use the sales-weighted average, rather than the asset-weighted average. To the extent that the difference between a firm's pure-play Q and its Q represents the industry-adjusted diversification discount (Lang and Stulz, 1994), the change in the pure-play Q should be negatively related to the change in excess value. Since we use the change in the inverse of the average Q $(\Delta INVQ)$, we expect $\Delta INVQ$ to be positively related to the change in excess value.

Following Denis *et al.* (2002) and Lins and Servaes (1999), we also control for the change in firm size $(\Delta SIZE)$, measured as the change in the square root of the firm's total assets, and the change in the firm's investment levels $(\Delta CEXPSALE)$, measured as the change in the firm's ratio of capital expenditure to sales.

4. Data sources and descriptive statistics

4.1. Data sources and requirements

The sample is obtained from the SDC Mergers and Acquisitions Database which identifies spinoffs from news articles. We first search the database for all spinoffs completed by firms listed on the NYSE/AMEX/Nasdaq between 1981 and 2004. Spinoffs involving a Real Estate Investment Trust are excluded. This results in an initial sample of 527 spinoffs. We then impose the following data requirements in order for a spinoff to remain in our sample:

1) We verify that the transaction is actually a spinoff by checking news articles in Factiva and Lexis-Nexis. A precise announcement date and effective date for the spinoff must be available from either Factiva or Lexis-Nexis. 7 transactions are lost due to lack of an announcement date or effective date or both. Transactions involving tracking stock, equity carve-outs or distributions of common stock in other publicly traded firms that are not subsidiaries of the parent firm do not constitute spinoffs and are dropped, resulting in a loss of 39 transactions;
2) The data must be available on the Compustat Annual Industrial database, the Compustat Business Segment Information database, the CRSP database or the IBES database for at least one full fiscal year before the spinoff announcement date for the parent firm and one full fiscal year following the spinoff effective date for both the remaining parent firm and the spunoff unit. Imposing the data availability criteria results in a reduction of 114 spinoffs;
3) 118 spinoffs are excluded because they involve firms with segments operating in the financial industry (SIC 6000-6999);
4) 20 spinoffs are removed because the spunoff unit was not a wholly owned subsidiary of the parent firm;
5) 16 spinoffs are eliminated where the subsidiary was trading prior to the spinoff announcement date.
6) 31 spinoffs that were taxable and 8 spinoffs involving ADRs are eliminated.
7) Another 47 spinoffs are dropped because they were conducted by single-segment firms.

8) Finally, 1 spinoff is lost because the firm engaged in multiple spinoffs between the announcement and the effective date.

The final sample consists of 126 separate spinoff events by 118 parent firms. Eight parent firms have two spinoffs separated by multiple years. 93 spinoffs have complete IBES data. Table 1 reports the frequency of spinoffs by announcement year. To control for firm-specific characteristics such as size and industry classification in the empirical tests, we select a matching firm for each parent firm in our sample. For each sample firm, we find a matching firm by searching through the list of all multi-segment firms with data available on the Compustat Annual Industrial database, the Compustat Business Segment Information database, the CRSP database, and the IBES database if the sample firm has complete IBES data. The matches exclude all parents and subsidiaries in the sample and must not have engaged in spinoffs between the pre-spinoff and the post-spinoff year of the sample firm. From this list of possible matches, we select the firm in the same two-digit SIC code and is closest in size to the sample firm (measured as the book value of total assets at the latest fiscal year-end prior to the spinoff announcement). To obtain a reasonable tradeoff between industry and size matching, we impose the condition that the size of the matching firm must be within 75% of the size of the sample firm. If no matches are found at the two-digit level, we search for a match at the one-digit level. In our sample, 117 firms have matching firms at the two-digit level and 9 firms at the one-digit level.

4.2. Data description

Panel A of Table 2 provides summary statistics of the sample firms. The pre-spinoff data are computed at the latest fiscal year-end prior to the spinoff announcement date. The post-spinoff data are measured at the end of the first full fiscal year following the spinoff effective date. The spinoff size numbers show that the average (median) subsidiary represents 25.9% (22.7%) of the post-spinoff combined firm's assets. The parent firm's assets and sales decrease significantly following the spinoff while the combined firm's assets and sales increase significantly. The spinoffs result in the parent firm's entropy measure decreasing from a pre-spinoff mean (median) of 0.751 (0.694) to a post-spinoff mean (median) of 0.413 (0.311). The combined firm, however, experiences an average (median) increase of 0.071 (0.039) in entropy. These changes are all statistically significant at least at the 0.05 level. Therefore, while there is some evidence that the combined firm becomes more diversified after the spinoffs, possibly due to internal growth or acquisitions, the bottom-line is that the parent firm becomes considerably more focused following the spinoff. The ratio of EBIT to sales of the combined firm declines following the spinoff, mainly due to a significant increase in the combined firm's sales. No significant changes are observed in the combined firm's ratio of capital expenditure to sales and the leverage ratio.

Panel of B of Table 2 summarizes the differences in the financial characteristics between the sample and the matching firms before the announcement of the spinoff. On average, the sample and the matching firms are quite similar with respect to size, the level of diversification, profitability, investment rates, and the leverage ratio.

5. Empirical analysis

5.1. Univariate analysis

Panel A of Table 3 reports the differences in the information asymmetry variables between the sample and the matching firms prior to the announcement of the spinoff. If information asymmetry is an important motive for firms to engage in spinoffs, we should observe higher levels of information asymmetry for the sample firms than for the matching firms prior to the spinoff. The findings are consistent with our hypothesis. The mean (median) forecast error for the sample firms is 0.0130 (0.0024), which is more than two times that of the matching firms. The differences between the two groups are significant at the 0.1 level for the mean and at the 0.05 level for the median. The results are more pronounced for the other two measures of information asymmetry, for which the differences across the two groups are all significant at the 0.01 level.

If the break up of a diversified firm into separate unites improves the accuracy of information processing about each unit's profitability and operating efficiency, the level of information asymmetry should decrease following the break up. Panel B of Table 3 reports summary statistics of the information asymmetry variables for the sample firms measured before and after the spinoff. Post-spinoff values are computed as if the spun-off unit was still a division within the parent firm. Overall, the measures of information asymmetry decrease slightly after the spinoff but only the median changes in the market-adjust and the market-and-industry-adjusted residual standard deviation are significant at the 0.05 level. This contrasts with a slight increase in the level of information asymmetry for the matching firms during the same period as reported in Panel C of Table 3.

Panel B of Table 3 also reports the excess value of the sample firms measured before and after the spinoff. Consistent with the diversification literature, we find that the parent firms trade at a substantial discount relative to their single segment peers prior to the spinoff. The mean (median) excess value of the parent firms is -0.1111 (-0.1491) prior to the spinoff. Both the mean and the median are significantly different from 0 at the 0.05 level. Following completion of the spinoff, the diversification discount is eliminated. The mean (median) excess value of the post-spinoff combined firms is -0.0061 (-0.0152). Neither the mean nor the median is significantly different from 0. Moreover, the firm-by-firm change in excess value has a mean (median) of 0.1049 (0.1363). The mean and median changes are significant at the 0.01 level. Therefore, on average, spinoffs lead to significant firm value improvements. These findings are consistent with the view that diversified firms are undervalued and the value is unlocked through divestitures. It should be noted that not all spinoffs result in an increase in the combined firm's excess value. In fact, in 46 cases (36.51%), there is a decrease. In untabulated results, we find that the post-spinoff parent firms trade at an insignificant average (medium) premium of 0.0253 (0.0182). The spun-off units, however, have a significant negative mean (median) excess value of -0.1137 (-0.1738). This implies that the sample firms tend to divest low-valued subsidiaries. In Panel C of Table 3, we also report the pre- and the post-spinoff excess value for the matching firms. The matching firms are traded at a statistically insignificant average (median) discount of -0.0814 (-0.0391) in the pre-spinoff period. This is possibly the reason why these firms did not engage in spinoffs since firms divest only when they are undervalued by the market (Nanda and Narayanan, 1997). Nor do the matching firms experience an increase in firm value from the pre-spinoff to the post-spinoff period.

5.2. Simple correlation coefficients

If information asymmetry results in undervaluation of the diversified firm, and if firms undertake spinoffs to reduce information asymmetry, then improvements in firm value surrounding a spinoff should be negatively related to changes in the level of information asymmetry. Panel A of Table 4 presents the Pearson correlation coefficients for changes in firm excess value and changes in the three measures of information asymmetry. Consistent with our hypothesis, changes in firm excess value are negatively correlated with changes in each information asymmetry variable at the 0.05 level of significance or better. Additionally, each of the pairwise correlations among the three information asymmetry variables is positive and significant at the 0.01 level.

Panel B of Table 4 reports the correlations of changes in firm excess value with control variables and the correlations of the control variables with each other. Consistent with our predictions, changes in firm excess value are negatively correlated with the pre-spinoff parent excess value at the 0.01 level of significance, negatively correlated with changes in the combined firm's entropy measure at the 0.05 level of significance, and positively correlated with changes in the inverse of Tobin's Q at the 0.01 level of significance. With these three exceptions, changes in firm excess value are uncorrelated with the control variables. However, even though the control variables are individually insignificantly correlated with changes in firm excess value, they may be jointly significant in multiple regressions, to which we now turn[4].

5.3. Multivariate analysis

In this section, we confirm our univariate results that relate the change in firm excess value and the change in the level of information asymmetry around spinoffs using multivariate regression analysis. The regression is of the form

[4] We note that several pairwise correlations among the control variables are significant. For example, $\Delta SIZE$ is positively correlated with $TAKED$ and $REGD$ at the 0.05 and the 0.01 level, respectively. This highlights the need for our analysis to take into account the possible multicollinearity problems in multivariate regression analysis.

$$\Delta EV_i = \alpha + \beta_1 \Delta IA_i + \beta_2 \bullet Z_i + \varepsilon_i \quad (13)$$

where ΔEV_i is the change in firm excess value, ΔIA_i is the change in the proxy of information asymmetry, and Z_i is a list of control variables discussed previously. Table 5 presents the main results of this paper on whether the change in information asymmetry surrounding the spinoff is negatively related to the change in firm excess value. Information asymmetry is measured by the forecast error (ΔERR), the market-adjusted residual standard deviation $(\Delta\sigma(\varepsilon)_{MA})$ and the market-and-industry-adjusted residual standard deviation $(\Delta\sigma(\varepsilon)_{MIA})$ in models (1) through (3) and models (4) through (6), respectively. Models (4) through (6) only include the control variables that are statistically significant at least at the 0.1 level.

The results show strong support for our principal hypothesis that the change in firm value is negatively related to the change in information asymmetry around spinoffs regardless of which measure of information asymmetry is employed. All three information asymmetry variables are significant with negative sign. When information asymmetry is measured by ΔERR, the coefficient is -0.949 and significant at the 0.01 level in model 1, and it is -0.972 and significant at the 0.01 level in model 3. When information asymmetry is proxied by $\Delta\sigma(\varepsilon)_{MA}$, the coefficient is -6.849 and significant at the 0.05 level in model 2, and it is -6.759 and significant at the 0.05 level in model 5. When we measure information asymmetry by $\Delta\sigma(\varepsilon)_{MIA}$, the coefficient is -7.326 and significant at the 0.05 level in model 3, and it is -7.269 and significant at the 0.05 level in model 6. We also compute the economic impact of the information asymmetry variables. We measure the economic impact of an information variable as the improvement in firm excess value when we decrease the variable by one standard deviation. Consider the standard deviation of $\Delta\sigma(\varepsilon)_{MA}$, which is 0.0099. The coefficient in model 2 on $\Delta\sigma(\varepsilon)_{MA}$ implies that when we decrease $\Delta\sigma(\varepsilon)_{MA}$ by one standard deviation ΔEV increases by 0.0669. This increase represents approximately 64.6% of the average change in excess value for the sample. A similar exercise using model 3 implies that a one standard deviation decrease in $\Delta\sigma(\varepsilon)_{MIA}$ results in an implied change in excess value of 0.0711, or approximately 67.7% of the average change in excess value for the sample.

We now turn to a brief discussion of the control variables employed. In all six models we include the pre-spinoff parent excess value (EV_{pre}), the change in entropy $(\Delta ENTROPY)$, and the change in the inverse of Tobin's Q $(\Delta INVQ)$, because, as the univariate analysis indicates, these variables are significantly correlated with the change in firm value surrounding spinoffs (ΔEV). Consistent with the univariate results, all regressions show that EV_{pre} is negatively and significantly related to ΔEV at the 0.01 level of significance (t-statistics range from -6.245 to -5.056). This implies that greater value improvements occur where they are more needed, that is, in firms that are trading at a larger discount. A one standard deviation decrease in EV_{pre} increases ΔEV by 0.1711 to 0.1906.

$\Delta ENTROPY$ is significantly negatively related to ΔEV at the 0.05 level in all six regressions (t-statistics range from -2.593 to -2.288). This indicates that an increase in diversity reduces the value of the firm. A one standard deviation increase in diversity reduces the excess value of a firm by 0.0728 to 0.0787. In unreported results, we try an alternative measure of diversity proposed by Burch and Nanda (2003) $(CPOSTDIV)$. $CPOSTDIV$ has the expected positive sign but is not significant in any regression. $\Delta INVQ$ is significantly and positively related to ΔEV at the 0.01 level in all regressions (t-statistics range from 4.115 to 4.278).

To control for possible size effect, we also include the change in firm size $(\Delta SIZE)$ in all six models. Berger and Ofek (1995) find that the excess value is significantly positively related to firm size. Consistent with their results, we find a positive relation between the change in excess value and the change in firm size. This variable is significant at the 0.05 level in models (1) and (4) and at the 0.1 level in the remaining models. In models (1) through (3), we control for the change in the ratio of capital expenditure to sales $(\Delta CEXPSALE)$. This variable is not significant and the results are qualitatively unchanged whether we leave out $\Delta CEXPSALE$. In untabulated results, we also add in the relative size of the spinoff (*SPINSIZE*), the takeover dummy (*TAKED*), the regulation dummy (*REGD*), and the focus dummy (*FOCUSD*). These variables are correlated with one or more of the major control variables mentioned above. Hence, we do not include them in the main results. However, these variables are not significant as well.

Overall, these findings are consistent with the conjecture that the improvement in firm value following the spinoff is negatively related to the change in the level of information asymmetry.

5.4. Announcement returns and information asymmetry

For completeness, we also examine abnormal returns around spinoff announcements and relate information asymmetry and abnormal returns using regression analysis. We compute cumulative abnormal returns from -1 to +1 days surrounding the announcement of spinoffs. The abnormal return is estimated using the value-weighted NYSE/AMEX/Nasdaq index return and the market model with parameters estimated over days -250 to -50 relative to the announcement date. The three-day announcement period abnormal returns have a mean of 3.87 % and a median of 3.16%. Both the mean and the median are significant at the 0.01 level. The magnitudes are similar to those reported in previous studies. For example, Desai and Jain (1999) report a three-day announcement period abnormal return of 3.84%.

We estimate various regression models of the announcement period abnormal returns on the level of information asymmetry prior to the spinoff or the change in the level of information asymmetry surrounding the spinoff. If information asymmetry results in undervaluation, then firms with higher levels of information asymmetry prior to the spinoff and firms with greater reductions in the level of information asymmetry surrounding the spinoff should exhibit higher abnormal returns upon the announcement. We find that the announcement period abnormal returns are positively related to the pre-spinoff level of information asymmetry and negatively related to the change in the level of information asymmetry around the spinoff as predicted. However, these relations are not statistically significant.

5.5. Robustness

In Table 6 and 7, we report the results of a battery of sensitivity and robustness checks. First, to avoid potential problems with outliers, we perform robust MM regressions and re-estimate models (1) through (3). This yields results qualitatively similar to those reported in Table 5. The three information asymmetry variables remain significant at the 0.05 level or better. In untabulated results we also try to winsorize all the variables we compute at the 5^{st} and the 95^{th} percentiles of their distributions and re-estimate models (1) through (3). Once again the results are unaffected.

Second, although the Breusch-Pagan test shows little evidence of heteroskedasticity, we employ the heteroskedasticity-consistent standard error estimator (HC3) as a double-checking of our inferences since both MacKinnon and White (1985) and Long and Ervin (2000) recommend that it may be wise to use HC3 even in the absence of detected heteroskedasticity. Our inferences are unchanged. The significance level drops for ΔERR but this variable is still significant at the 0.05 level. The other two information asymmetry variables remain significant at the 0.05 level.

Third, we consider an alternative construction of the forecast error variable. Instead of deflating the forecast error by the stock price, we use the raw forecast error. The pre-spinoff forecast error of the firm is modified as

$$RAWERR_{pre} = \left| ACTEARN - FOREEARN_{MED} \right| \quad (14)$$

qnd the post-spinoff forecast error of the firm as

$$RAWCERR_{post} = \left| w_{parent} * RAWERR_{parent} + w_{spunoff} * RAWERR_{spun} \right| \quad (15)$$

where w_{parent} $(w_{spunoff})$ are defined as above, and $RAWERR_{parent}$ $(RAWERR_{spunoff})$ are measured as

$$RAWERR_{parent} = \left| ACTEARN_{parent} - FOREEARN_{parent} \right| \quad (16)$$

$$RAWERR_{spunoff} = \left| ACTEARN_{spunoff} - FOREEARN_{spunoff} \right| \quad (17)$$

The change in the raw forecast error is defined as

$$\Delta RAWERR = \sqrt{RAWCERR_{post}} - \sqrt{RAWERR_{pre}} \quad (18)$$

In untabulated results we find that the raw forecast error drops from a pre-spinoff mean (median) of 0.1981 (0.0800) to a post-spinoff mean (median) of 0.1138 (0.0443). The mean and the median changes are significant at the 0.05 and 0.01 level, respectively. The regression results in Table 6 show that the change in the raw forecast error is negatively related to the change in excess value at the 0.1 level of significance.

Fourth, we use the asset-based excess value measure instead of the sales-based excess value measure and re-estimate models (1) to (3). The pre-spinoff excess value is excluded since it is highly correlated with the information variables. Due to missing segment asset values, the sample size reduces to 83 for the model that employs ΔERR as the measure of information asymmetry and 126 for the two models that use $\Delta\sigma(\varepsilon)_{MIA}$ and $\Delta\sigma(\varepsilon)_{MA}$ as the proxies of information asymmetry. As shown in Table 6, the information variables still remain significant at the 0.05 level or better.

Fifth, we exclude those cases in which the spinoff event was preceded by an equity carve-out and re-estimate models (1)-(3). This results in the exclusion of 15 observations. The results are largely unaffected. Due to space constraints, they are not reported.

In the final robustness check, we consider an alternative construction of the regression model. Instead of estimating cross-sectional regressions, we estimate panel regressions which include firm fixed effects and year dummies. We estimate the following model for the pre-spinoff (year -1) and the post-spinoff year (year +1):

$$EV_{it} = \beta_{0i} + \beta_1 IA_{it} + \beta_2 \bullet Z_{it} + \sum_i \nu_t * Year_t + \varepsilon_{it} \quad (19)$$

where EV_{it} is the excess value of firm *i* in period *t*. IA_{it} is the measure of information asymmetry of firm *i* in period *t*. Z_{it} is a list of control variables. $Year_t$ is the year dummy variable. And β_{0i} is the firm-specific intercept term which captures firm fixed effects. If information asymmetry results in undervaluation of the firm, we should observe a negative relation between the excess value and the measure of information asymmetry. The results in Table 7 are consistent with the conjecture. All three measures of information asymmetry are significantly and negatively related to the excess value at the 0.05 level or better.

In sum, our results survive a battery of robustness checks. We believe that we have presented persuasive evidence that improvements in firm value following spinoffs are associated with decreases in the level of information asymmetry.

6. Conclusion

A large number of studies document that diversified firms trade at a discount relative to specialized firms in the same industries and that increasing corporate focus lead to higher market valuations and stock returns. Yet, the interpretation of the diversification discount remains controversial. One group of literature explains the value discount and the divestiture decisions of diversified firms based on asymmetric information between the market and the firm's management. This explanation draws theoretical support from the model of Nanda and Narayanan (1999). They claim that diversified firms may be undervalued due to unobservability of divisional cash flows to the market. Breaking up the firm into separate business components will make it easier for the market to value each component correctly. Hence, undervalued firms requiring external financing may resort to divestitures to raise capital at a fair price. The predictions from their model are 1) the pre-divestiture information asymmetry of the divesting firms should be higher compared to their non-divesting counterparts, 2) divestitures will reduce the level of information asymmetry and the valuation discount, and more importantly, 3) the change in firm value following the divestiture will be negatively related to the change in the level of information asymmetry. In this paper, we empirically examine these predictions using a sample of corporate spinoffs. Spinoffs provide a particularly useful setting for the purpose of our test due to separate availability of financial data for the post-spinoff parent firm and the spunoff unit. This allows us to combine the data of the parent firm and the spinoff following the divestiture as if the firm were still a conglomerate and measure aggregate changes in firm value and the level of information asymmetry.

We find that, prior to the spinoff, the sample firms have significantly higher levels of information asymmetry than their industry- and size-matched counterparts. For the sample firms the level of information asymmetry decreases slightly after the completion of the spinoff while for the matching firms the level of information asymmetry increases during the same period. We also find that the sample firms trade at a substantial discount prior to the spinoff. Following the spinoff, the valuation discount is eliminated. The matching firms, however, are not valued at a significant discount in the pre-spinoff period. Nor do they experience an increase in firm value from the pre-spinoff to the post-spinoff period. Most importantly, we find that the change in aggregate value surrounding the spinoff is significantly negatively related to the change in the level of information asymmetry. The results suggest that information asymmetry is at least partly responsible for the diversification discount.

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Table 1 Distribution of Spinoffs

Distribution of 126 spinoffs by year of announcement. Spinoffs are identified from the SDC Mergers and Acquisitions Database. The sample is restricted to those multi-segment firms with financial data on the Compustat Annual Industrial database, the Compustat Business Segment Information database, the CRSP database or the IBES database The sample excludes cases where the spinoff was taxable, involved ADRs, involved firms with segments operating in the financial industry (SIC 6000-6999), where the spunoff unit was not a wholly owned subsidiary of the parent firm, or where the spunoff unit was trading prior to the spinoff announcement date.

Year	Number	Year	Number
1981	0	1993	5
1982	1	1994	4
1983	2	1995	12
1984	3	1996	8
1985	7	1997	4
1986	4	1998	6
1987	8	1999	8
1988	7	2000	14
1989	3	2001	4
1990	10	2002	4
1991	2	2003	4
1992	5	2004	1
		Total	126

Table 2 Descriptive Statistics

Summary statistics of selected financial characteristics for a sample of 126 firms that completed spinoffs in the period 1981-2004 and for a sample of 126 size- and industry-based matching firms that did not engage in spinoffs. Pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. Post-spinoff combined values are computed as if the spun-off unit(s) was still a division within the parent firm. Spinoff size is the spun-off firm's post-spinoff assets divided by the sum of the parent and spinoff assets. Entropy is measured as $\sum_{i=1}^{n} P_i Ln(1/P_i)$, where P_i is the percentage of sales in segment *i* at the four–digit SIC level and the summation is over *n* four-digit industry segments where the firm operates. EBITSALE is the ratio of earnings before interest and tax to sales. CEXPSALE is the ratio of capital expenditure to sales. Leverage ratio is defined as long-term debt divided by total assets. T-statistics for the change in mean and Z-statistics from the Wilcoxon signed ranks test for the change in median are reported in parenthesis. *, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

Panel A: Summary statistics for sample firms before and after spinoffs

		Pre-spinoff	Post-spinoff			Changes	
Variables		Parent	Parent	Spinoff	Combined	Parent Post - Pre	Combined Post - Pre
Spinoff size	Mean			0.259			
	Median			0.227			
Asset ($mil)	Mean	4818.647	4445.118		5532.129	-373.529	713.482
						(-2.176)**	(3.980)***
	Median	2018.034	1932.500		2482.643	-80.723	194.359
						(-3.331)***	(5.669)***
	Std.dev.	7263.855	7127.389		8358.281	1926.619	2012.225
Sales ($mil)	Mean	5066.647	4099.066		5541.066	-967.581	474.419
						(-3.177)***	(2.209)**
	Median	2216.740	1556.221		2454.503	-147.808	171.664
						(-5.034)***	(4.717)***
	Std.dev.	7499.213	6021.819		8330.212	3419.089	2411.281
Entropy	Mean	0.751	0.413		0.823	-0.339	0.071
						(-10.288)***	(2.574)**
	Median	0.694	0.311		0.736	-0.297	0.039
						(-7.913)***	(2.708)***
	Std.dev.	0.387	0.449		0.425	0.369	0.311
EBITSALE	Mean	0.090	0.065		0.066	-0.025	-0.024
						(-1.481)	(-2.116)**
	Median	0.094	0.090		0.082	0.001	-0.002
						(0.057)	(-2.200)**
	Std.dev.	0.124	0.183		0.125	0.193	0.127
CEXPSALE	Mean	0.073	0.094		0.079	0.021	0.006
						(1.481)	(0.628)
	Median	0.053	0.046		0.079	-0.001	-0.002
						(-0.366)	(-1.111)
	Std.dev.	0.070	0.194		0.146	0.161	0.115
Leverage	Mean	0.207	0.233		0.224	0.026	0.016
						(1.773)*	(1.332)
	Median	0.189	0.203		0.211	0.007	0.006
						(1.582)	(1.232)
	Std.dev.	0.131	0.197		0.165	0.162	0.137

Table 2 Continued

Panel B: Summary statistics for sample and matching firms before spinoffs

Variables		Sample firms	Matching firms	Difference
Asset ($mil)	Mean	4818.647	4531.594	287.050
				(1.421)
	Median	2018.034	1851.992	13.016
				(2.139)**
	Std.dev.	7263.855	7197.049	2267.622
Sales ($mil)	Mean	5066.647	4405.749	660.898
				(1.790)*
	Median	2216.740	1971.018	12.666
				(1.260)
	Std.dev.	7499.213	6627.181	4144.213
Entropy	Mean	0.751	0.703	0.049
				(1.073)
	Median	0.694	0.685	0.020
				(1.021)
	Std.dev.	0.387	0.416	0.509
EBITSALE	Mean	0.090	0.091	-0.000
				(-0.010)
	Median	0.094	0.093	-0.014
				(1.175)
	Std.dev.	0.124	0.183	0.212
CEXPSALE	Mean	0.073	0.088	-0.015
				(-0.515)
	Median	0.053	0.051	0.007
				(1.813)*
	Std.dev.	0.070	0.328	0.325
Leverage	Mean	0.207	0.197	0.010
				(0.606)
	Median	0.189	0.185	0.005
				(-0.533)
	Std.dev.	0.131	0.131	0.184

Table 3 Information asymmetry and firm excess value surrounding spinoffs

Summary statistics of the information asymmetry variables and firm excess value for a sample of 126 firms that completed spinoffs in the period 1981-2004 and for a sample of 126 size- and industry-based matching firms that did not engage in spinoffs. Pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. Post-spinoff values are computed as if the spun-off unit(s) was still a division within the parent firm. ERR is earnings forecast error. The pre-spinoff parent firm's forecast error is the absolute difference between actual earnings and the median forecast deflated by the stock price five days before the earnings announcement date. The post-spinoff combined firm's forecast error is the absolute value of the weighted average of the signed forecast errors of the parent firm and the spun-off unit, where the weights are the assets of the parent or the spun-off unit relative to the sum of assets of the parent and the spun-off unit computed at the end of the first full fiscal year following the spinoff. $\sigma(\varepsilon)_{MA}$ is the market-adjusted residual standard deviation and $\sigma(\varepsilon)_{MIA}$ is the market-and-industry-adjusted residual standard deviation. The pre-spinoff parent firm's $\sigma(\varepsilon)_{MA}$ ($\sigma(\varepsilon)_{MIA}$) is obtained by regressing daily firm returns on value-weighted market (market and industry) returns over the 250-day period ending 50 days prior to the spinoff announcement date and calculating the standard deviation of the regression residuals. The post-spinoff combined firm's $\sigma(\varepsilon)_{MA}$ ($\sigma(\varepsilon)_{MIA}$) is obtained by regressing weighted average returns of the parent firm and the spun-off unit over the 250-day period starting 50 days after the spinoff effective and calculating the standard deviation of the regression residuals. The weights are the respective total assets of the parent firm or the spunoff unit relative to the combined assets of the parent firm and the spunoff unit computed at the end of the first full fiscal year following the spinoff. EV is excess value and is measured as the log of the ratio of a firm's value of total capital (the book value of debt plus the market value of common equity) to the sum of the imputed value of its segments as stand-alone firms. T-statistics for the change in mean and Z-statistics from the Wilcoxon signed ranks test for the change in median are reported in parentheses. Sample sizes vary due to missing IBES data. *, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

Panel A:. Level of pre-spinoff information asymmetry for sample and matching firms

Variables	Sample size		Sample firms	Matching firms	Difference
ERR	93	Mean	0.0130	0.0054	0.0076
					(1.840)*
	93	Median	0.0024	0.0012	0.0004
					(2.113)**
	93	Std. dev.	0.0408	0.0130	0.0397
$\sigma(\varepsilon)_{MA}$	126	Mean	0.0219	0.0190	0.0029
					(3.087)***
	126	Median	0.0190	0.0160	0.0015
					(3.252)***
	126	Std. dev.	0.0117	0.0090	0.0105
$\sigma(\varepsilon)_{MIA}$	126	Mean	0.0215	0.0185	0.0031
					(3.428)***
	126	Median	0.0189	0.0159	0.0021
					(3.787)***
	126	Std. dev.	0.0114	0.0089	0.0101

Panel B: Level of information asymmetry and excess value for sample firms before and after the spinoff

			Pre-spinoff	Post-spinoff	Changes
Variables	Sample size		Parent	Combined	Combined Post - Pre
ERR	93	Mean	0.0130	0.0138	0.0009
					(0.156)
	93	Median	0.0024	0.0018	-0.0001
					(-0.033)
	93	Std.dev.	0.0408	0.0361	0.0532
$\sigma(\varepsilon)_{MA}$	126	Mean	0.0219	0.0209	-0.0010
					(-1.081)
	126	Median	0.0190	0.0177	-0.0016
					(-2.003)**
	126	Std.dev.	0.0117	0.0117	0.0099
$\sigma(\varepsilon)_{MIA}$	126	Mean	0.0215	0.0206	-0.0009
					(-1.079)
	126	Median	0.0189	0.0175	-0.0013
					(-2.076)**
	126	Std.dev.	0.0114	0.0116	0.0097
EV	126	Mean	-0.1111	-0.0061	0.1049
					(2.764)***
	126	Median	-0.1491	-0.0152	0.1363
					(2.950)***
	126	Std.dev.	0.5296	0.4821	0.4261

Table 3 Continued

Panel C: Level of information asymmetry and excess value for matching firms before and after the spinoff

Variables	Sample size		Pre-spinoff	Post-spinoff	Changes Post - Pre
ERR	93	Mean	0.0054	0.0179	0.0125
					(2.014)**
	93	Median	0.0012	0.0017	0.0002
					(1.776)*
	93	Std.dev.	0.0130	0.0614	0.0600
$\sigma(\varepsilon)_{MA}$	126	Mean	0.0190	0.0206	0.0016
					(1.748)*
	126	Median	0.0160	0.0174	0.0008
					(1.634)
	126	Std.dev.	0.0090	0.0115	0.0101
$\sigma(\varepsilon)_{MIA}$	126	Mean	0.0185	0.0199	0.0014
					(1.592)
	126	Median	0.0159	0.0161	0.0005
					(1.323)
	126	Std.dev.	0.0089	0.0116	0.0100
EV	93	Mean	-0.0814	-0.0694	0.0121
					(0.245)
	93	Median	-0.0391	-0.0564	0.0156
					(0.189)
	93	Std.dev.	0.6135	0.5300	0.5527

Table 4. Pearson correlation coefficients of combined firm's excess value change and information asymmetry change with each other and with control variables

ΔEV is the change in excess value. For this and other metrics, pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. Post-spinoff values are computed as if the spun-off unit was still a division within the parent firm. ΔERR is the change in the square root of the analysts' forecast error. $\Delta\sigma(\varepsilon)_{MA}$ ($\Delta\sigma(\varepsilon)_{MIA}$) is the change in the market-adjusted (market-and-industry-adjusted) residual standard deviation. $TAKED$ is an indicator variable and is set to 1 if either the parent or the spinoff is taken over or merged with other firms within three fiscal years following the spinoff. $REGD$ is a dummy variable and is set to 1 if either the parent or the subsidiary is in a regulated industry based on the two-digit SIC code (SIC 4800-4829, 4910-4949). $FOCUSD$ is an indicator variable and is set to 1 if the two-digit SIC code of the parent firm is different from that of the spunoff unit. A firm is excluded if it spinoffs more than one subsidiary at one time and one subsidiary has the same two-digit SIC code as the parent while the other does not, resulting in a loss of two observations. EV_{pre} is the parent pre-spinoff excess value. $SPINSIZE$ is the spinoff firm's post-spinoff assets divided by the sum of the parent and spinoff assets. $\Delta ENTROPY$ is the change in the combined firm's entropy measure. $\Delta INVQ$ is the change in the inverse of the firm's sales-weighted average of segment Tobin's Q. The segment Q is proxied by the median Q of single-segment firms operating at the same three-digit SIC level as the segment whenever there are at least five single-segment firms with available data, and at the two-digit SIC level or one-digit level as needed. Q is measured as the market value of total assets divided by the book value of total assets. $\Delta SIZE$ is the change in the square root of the firm's total assets. $\Delta CEXPSALE$ is the change in the ratio of capital expenditure to sales. P-values are reported in parentheses. Sample sizes are included in brackets. Sample sizes vary due to missing IBES data. *, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

	ΔEV	ΔERR	$\Delta\sigma(\varepsilon)_{MA}$	$\Delta\sigma(\varepsilon)_{MIA}$	$TAKED$	$REGD$	$FOCUSD$	$SPINSIZE$	EV_{pre}	$\Delta ENTROPY$	$\Delta INVQ$	$\Delta SIZE$
Panel A:. Information asymmetry variables												
ΔERR	-0.287											
	(0.005)***											
	[93]											
$\Delta\sigma(\varepsilon)_{MA}$	-0.222	0.320										
	(0.012)**	(0.002)***										
	[126]	[93]										
$\Delta\sigma(\varepsilon)_{MIA}$	-0.226	0.310	0.998									
	(0.011)**	(0.002)***	(0.000)***									
	[126]	[93]	[126]									
Panel B: Control variables												
$TAKED$	0.040	0.040	-0.049	-0.052								
	(0.653)	(0.703)	(0.582)	(0.564)								
	[126]	[93]	[126]	[126]								
$REGD$	-0.031	-0.027	0.014	0.013	0.105							
	(0.731)	(0.794)	(0.878)	(0.884)	(0.241)							
	[126]	[93]	[126]	[126]	[126]							
$FOCUSD$	0.043	0.054	0.187	0.193	-0.083	0.141						
	(0.632)	(0.611)	(0.037)**	(0.031)**	(0.361)	(0.117)						
	[124]	[92]	[124]	[124]	[124]	[124]						
$SPINSIZE$	0.114	0.158	0.091	0.085	0.002	-0.017	-0.021					
	(0.204)	(0.130)	(0.311)	(0.342)	(0.979)	(0.854)	(0.818)					
	[126]	[93]	[126]	[126]	[126]	[126]	[124]					
EV_{pre}	-0.509	0.063	0.140	0.126	0.063	0.031	-0.040	-0.030				
	(0.000)***	(0.547)	(0.117)	(0.161)	(0.482)	(0.732)	(0.659)	(0.741)				
	[126]	[93]	[126]	[126]	[126]	[126]	[124]	[126]				
$\Delta ENTROPY$	-0.186	0.173	0.060	0.069	0.105	-0.041	0.005	-0.021	0.056			
	(0.037)**	(0.098)*	(0.504)	(0.441)	(0.241)	(0.647)	(0.959)	(0.814)	(0.535)			
	[126]	[93]	[126]	[126]	[126]	[126]	[124]	[126]	[126]			
$\Delta INVQ$	0.300	0.095	0.035	0.031	0.185	-0.007	-0.035	0.227	-0.066	0.081		
	(0.001)***	(0.363)	(0.697)	(0.731)	(0.038)**	(0.938)	(0.703)	(0.011)**	(0.463)	(0.367)		
	[126]	[93]	[126]	[126]	[126]	[126]	[124]	[126]	[126]	[126]		
$\Delta SIZE$	0.119	0.023	-0.024	-0.012	0.289	0.205	0.146	-0.134	-0.086	0.061	-0.118	
	(0.186)	(0.829)	(0.786)	(0.894)	(0.001)***	(0.021)**	(0.106)	(0.135)	(0.338)	(0.494)	(0.188)	
	[126]	[93]	[126]	[126]	[126]	[126]	[124]	[126]	[126]	[126]	[126]	
$\Delta CEXPSALE$	0.125	0.080	0.031	0.017	-0.011	0.054	-0.034	-0.041	-0.078	-0.044	0.113	0.011
	(0.164)	(0.444)	(0.732)	(0.851)	(0.906)	(0.548)	(0.710)	(0.650)	(0.386)	(0.625)	(0.206)	(0.899)
	[126]	[93]	[126]	[126]	[126]	[126]	[124]	[126]	[126]	[126]	[126]	[126]

Table 5 OLS regressions on the combined firm's excess value change

This table reports the results of regression equation (13) as given in the text. The dependent variable (ΔEV) is the change in the combined firm excess value. For this and other metrics, pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. ΔERR is the change in the square root of analysts' forecast error. $\Delta\sigma(\varepsilon)_{MA}$ $(\Delta\sigma(\varepsilon)_{MIA})$ is the change in the market-adjusted (market-and-industry-adjusted) residual standard deviation. EV_{pre} is the parent pre-spinoff excess value. $\Delta ENTROPY$ is the change in the combined firm's entropy measure. $\Delta INVQ$ is the change in the inverse of the firm's sales-weighted average of segment Tobin's Q. The segment Q is proxied by the median Q of single-segment firms operating at the same three-digit SIC level as the segment whenever there are at least five single-segment firms with available data, and at the two-digit SIC level or one-digit level as needed. Q is measured as the market value of total assets divided by the book value of total assets. $\Delta SIZE$ is the change in the square root of the firm's total assets. $\Delta CEXPSALE$ is the change in the ratio of capital expenditure to sales. T-values are reported in parentheses. Sample sizes vary due to missing IBES data. *, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

Model	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.037	0.065	0.064	0.044	0.067	0.066
	(0.987)	(1.885)*	(1.862)*	(1.181)	(1.932)*	(1.907)*
Information asymmetry variables						
ΔERR	-0.949			-0.972		
	(-3.137)***			(-3.212)***		
$\Delta\sigma(\varepsilon)_{MA}$		-6.849			-6.759	
		(-2.211)**			(-2.188)**	
$\Delta\sigma(\varepsilon)_{MIA}$			-7.326			-7.269
			(-2.336)**			(-2.324)**
Control variables						
EV_{pre}	-0.325	-0.356	-0.357	-0.323	-0.359	-0.36
	(-5.107)***	(-6.123)***	(-6.17)***	(-5.056)***	(-6.201)***	(-6.245)***
$\Delta ENTROPY$	-0.234	-0.249	-0.247	-0.235	-0.253	-0.25
	(-2.288)**	(-2.546)**	(-2.524)**	(-2.295)**	(-2.593)**	(-2.569)**
$\Delta INVQ$	0.927	0.848	0.848	0.893	0.865	0.864
	(4.247)***	(4.156)***	(4.162)***	(4.115)***	(4.273)***	(4.278)***
$\Delta SIZE$	0.008	0.006	0.006	0.007	0.006	0.006
	(2.311)**	(1.711)*	(1.738)*	(2.099)**	(1.732)*	(1.758)*
$\Delta CEXPSALE$	-0.954	0.191	0.184			
	(-1.196)	(0.722)	(0.695)			
Adjusted R^2	0.403	0.375	0.378	0.400	0.378	0.381
Sample size	93	126	126	93	126	126

Table 6 Robustness checks on regression models

The dependent variable (ΔEV) is the change in the combined firm excess value. For this and other metrics, pre-spinoff values are measured at the latest fiscal year-end prior to the spinoff announcement date. Post-spinoff values are measured at the end of the first full fiscal year following the spinoff effective date. ΔERR is the change in the square root of the analysts' forecast error. $\Delta\sigma(\varepsilon)_{MA}$ $(\Delta\sigma(\varepsilon)_{MIA})$ is the change in the market-adjusted (market-and-industry-adjusted) residual standard deviation. $\Delta RAWERR$ is the change in the square root of the raw forecast error. EV_{pre} is the parent pre-spinoff excess value. $\Delta ENTROPY$ is the change in the combined firm's entropy measure. $\Delta INVQ$ is the change in the inverse of the firm's sales-weighted average of segment Tobin's Q. The segment Q is proxied by the median Q of single-segment firms operating at the same three-digit SIC level as the segment whenever there are at least five single-segment firms with available data, and at the two-digit SIC level or one-digit level as needed. Q is measured as the market value of total assets divided by the book value of total assets. $\Delta SIZE$ is the change in the square root of the firm's total assets. $\Delta CEXPSALE$ is the change in the ratio of capital expenditure to sales. Models 1-3 report estimates from robust MM regressions. Models 4-6 report heteroskedasticity-consistent estimates of t-values. Models 7-8 use the change in the raw forecast error as the measure of information asymmetry. Models 9-11 use the asset-based excess value measure. Chi-square statistics (T-statistics) are reported in parentheses for models 1-3 (4-11). Sample sizes vary due to missing IBES data or missing Compustat segment asset data. *, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

	Robust MM Estimation			Heteroskedasticity-consistent Estimator (HC3)			RAWERR		Asset-Based Excess Value		
Model	1	2	3	4	5	6	7	8	9	10	11
Constant	0.038	0.061	0.060	0.037	0.065	0.064	0.058	0.016	0.140	0.131	0.131
	(0.94)	(3.43)*	(3.32)*	(0.88)	(1.76)*	(1.73)*	(1.387)	(0.39)	(3.568)***	(4.131)***	(4.120)***
ΔERR	-0.812			-0.949					-0.721		
	(6.05)**			(-2.07)**					(-2.106)**		
$\Delta\sigma(\varepsilon)_{MA}$		-7.091			-6.849					-10.989	
		(5.98)**			(-2.37)**					(-3.407)***	
$\Delta\sigma(\varepsilon)_{MIA}$			-7.573			-7.326					-11.412
			(6.71)***			(-2.49)**					(-3.476)***
$\Delta RAWERR$							-0.249	-0.199			
							(-1.804)*	(-1.71)*			
EV_{pre}	-0.231	-0.322	-0.322	-0.325	-0.356	-0.357		-0.333			
	(11.44)**	(32.60)***	(33.19)***	(-3.53)***	(-5.37)***	(-5.44)***		(-5.03)***			
$\Delta ENTROPY$	-0.131	-0.121	-0.120	-0.234	-0.249	-0.247		-0.251	-0.259	-0.230	-2.229
	(1.43)	(1.61)	(1.59)	(-1.69)*	(-2.14)**	(-2.13)**		(-2.35)**	(-2.252)***	(-2.367)**	(-2.351)**
$\Delta INVQ$	0.868	0.628	0.621	0.927	0.848	0.848		0.883	1.009	1.024	1.030
	(14.87)***	(10.23)***	(10.14)***	(3.88)***	(3.63)***	(3.63)***		(3.90)***	(3.875)***	(4.920)***	(4.956)***
$\Delta SIZE$	0.008	0.005	0.005	0.008	0.006	0.006		0.008	-0.007	-0.007	-0.007
	(5.46)**	(1.99)	(2.08)	(1.97)*	(1.61)	(1.65)		(2.36)**	(-1.771)*	(-2.190)**	(-2.159)***
$\Delta CEXPSALE$	-0.752	0.321	0.315	-0.954	0.191	0.184		-0.980	-0.374	-0.151	-0.164
	(0.89)	(1.82)	(1.77)	(-1.35)	(0.21)	(0.20)		(-1.18)	(-0.442)	(-0.632)	(-0.689)
Adjusted R^2	0.243	0.275	0.277	0.403	0.375	0.378	0.024	0.357	0.229	0.264	0.267
Sample size	93	126	126	93	126	126	93	93	83	116	116

Table 7 Panel regression estimation

This table reports the results of regression equation (19) as given in the text. The dependent variable (EV) is the firm excess value. ERR is the square root of the analysts' forecast error. $\sigma(\varepsilon)_{MA}$ $(\sigma(\varepsilon)_{MIA})$ is the market-adjusted (market-and-industry-adjusted) residual standard deviation. $ENTROPY$ is the entropy measure. $INVQ$ is the inverse of the firm's sales-weighted average of segment Tobin's Q. The segment Q is proxied by the median Q of single-segment firms operating at the same three-digit SIC level as the segment whenever there are at least five single-segment firms with available data, and at the two-digit SIC level or one-digit level as needed. Q is measured as the market value of total assets divided by the book value of total assets. $SIZE$ is the square root of the firm's total assets. The regressions include firm fixed effects and year dummy variables. Coefficients for firm dummies and year dummies are not reported. Heteroskedasticity-consistent estimates of t-values (HC3) are reported in parentheses. Sample sizes vary due to missing IBES data.*, ** and *** indicate significance of the test statistics at the 0.1, 0.05 and 0.01 levels, respectively.

Model	1	2	3	4	5	6
Constant	0.118	0.281	0.280	-0.999	-0.599	-0.610
	(0.60)	(1.28)	(1.28)	(-3.18)***	(-1.76)*	(-1.81)*
ERR	-1.055			-1.101		
	(-2.74)***			(-3.74)***		
$\sigma(\varepsilon)_{MA}$		-9.613			-9.410	
		(-3.31)***			(-3.82)***	
$\sigma(\varepsilon)_{MIA}$			-9.946			-9.687
			(-3.42)***			(-3.85)***
$ENTROPY$				-0.214	-0.290	-0.287
				(-1.90)*	(-2.89)***	(-2.86)***
$INVQ$				1.013	0.975	0.973
				(5.74)***	(5.56)***	(5.55)***
$SIZE$				0.010	0.008	0.008
				(3.32)***	(3.00)***	(3.04)***
Adjusted R^2	0.853	0.834	0.834	0.882	0.862	0.862
Sample size	93	126	126	93	126	126