Three essays on corporate restructuring

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ABSTRACT

The dissertation consists of three essays on corporate refocusing. The first essay (*Asymmetric Information and Conglomerate Discount: Evidence from Spinoffs*) investigates the information hypothesis using 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 the level of information asymmetry decreases slightly following the spinoff. We also find that the sample firms are valued at a substantial discount before the spinoff and the valuation discount is eliminated after the completion of the spinoff. The matching firms, however, do not trade a significant discount either pre- or post-spinoff, which 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.

The second essay (*Corporate Governance and Firm Refocusing*) studies a sample of multi-segment firms that choose to decrease the level of diversification through divestitures, tax-free spinoffs, or discontinued operations from 1993 to 2005. We find that, relative to their non-refocusing counterparts that are matched on a wide variety of characteristics, refocusing firms have more effective governance mechanisms such as fewer takeover defenses, smaller boards, more independent nominating committees, greater number of annual meetings, and lower dividend payout ratio, etc. Using multivariate probit analysis and controlling for

various governance factors, we find that the G-index (or Gov-10 which is a parsimonious index based on 10 provisions underlying the G-index) and whether a firm has an independent nominating committee appear to have the strongest impacts on its decision to refocus. We also document a significant decrease in the diversification discount and a significantly positive announcement return associated with refocusing. Firms that do refocus experience significantly greater value enhancements than their controls. The results suggest that agency issues are responsible for firms maintaining value-reducing diversification policies.

The third essay (*Insider Trading and Corporate Spinoffs*) examines insider trading before corporate spinoffs. We show a clear and almost monotonic increase (decrease) in the number of insider purchases and net purchases (sales) in the four quarters prior to the spinoff announcement. In addition, relative to the benchmark period, insider selling (net purchasing) is significantly lower (higher) in the three quarters prior to the announcement. We then examine whether insider trading has predictive power for spinoff announcement effects as well as changes in firm performance surrounding spinoffs. We stratify the sample based on insider trading activity within a quarter prior to the announcement day. Spinoffs with positive abnormal insider net purchases are classified as “abnormal net purchase sample” while the others are classified as “abnormal net sale sample”. We find that the announcement period excess returns for the abnormal net purchase group are significantly higher than those for the abnormal net sale group. Moreover, only the firms in the abnormal net purchase subgroup exhibit significant improvements in long-run stock market performance and operating performance around spinoffs. The results suggest that improving firm valuation is an important motive behind corporate spinoffs and it is possible to distinguish the quality of a spinoff firm on the basis of the insider trading behavior before the spinoff announcement.

CHAPTER 1

ASYMMETRIC INFORMATION AND CONGLOMERATE DISCOUNT: EVIDENCE FROM SPINOFFS

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 sell-offs, equity carve-outs, and corporate spinoffs lead to higher market valuations and stock returns.¹

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

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¹ In an asset sell-off, the parent privately negotiates the sale of the subsidiary to a third party, thereby transferring control of the relevant assets to another firm and raising cash for the parent without any issuance of public securities. In an equity carve-out, the parent typically retains a controlling interest in the subsidiary and raises funds through the public sale of unseasoned equity claims on the subsidiary's operations. In a spinoff, the parent transfers its ownership of the subsidiary to existing shareholders without any element of external financing (Slovin *et al.*, 1995).

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.

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 in the finance literature. 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. In the accounting literature, Bens and Monahan (2004) document a positive association between the excess value of diversification and disclosure quality. 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. 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 argument that firms increase excess value simply by spinning off low-valued divisions 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.

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 as²

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

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

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

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

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

---

² 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.

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.³ 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.⁴

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

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 assets of the parent firm and the spunoff unit computed at the end of the first full fiscal year following the spinoff.⁵

$$CERR_{post} = |w_{parent} * ERR_{parent} + w_{spunoff} * ERR_{spunoff}| \quad (5)$$

³ 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.

⁴ Other authors have used actual earnings (e.g. Capstaff *et al.*, 1995; Collins and Hopwood, 1980) or forecasted earnings (e.g. Bhaskar and Morris, 1984; Patz, 1989) as the deflator of the forecast error. However, there is a practical problem with using either actual or forecasted earnings as the deflator, when actual or forecasted earnings are zero or negative. In addition, as pointed out by Patz (1989), using forecasted earnings as the deflator implies measurement of a firm's ability to achieve a predicted result, rather than a predictor's ability to forecast an outcome. While we have used actual or forecasted earnings as the deflator as a robustness check, we do not report these results given the difficulty of making inferences. 23 (16) observations with nonpositive actual (forecasted) earnings are omitted when actual (forecasted) earnings are used as the deflator. The results are robust to deflation by actual or forecasted earnings.

⁵ We cannot perform the same combination for standard deviation of analysts' forecasts because it requires the covariance of forecasts between the parent firm and the spun-off subsidiary. Therefore, we do not use the standard deviation of forecasts as the proxy of information asymmetry.

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

$$\Delta ERR = CERR_{post} - ERR_{pre}. \quad (6)$$

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:

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

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.⁶ 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

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

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.

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

---

⁶ Following Desai and Jain (1999), we also use an alternative definition of r_{wt}^{post} and combine the returns of the parents and the subsidiaries in proportion of their market value of equity at the end of the month of ex-date. The results are not reported here as they are similar to those reported in Tables 3 – 8.

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

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

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 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:

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

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, *CPOSTDIV*, is equal to

$$(W_p)Abs[M/B_p - M/B_c] + (W_s)Abs[M/B_s - M/B_c] \quad (12)$$

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. 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.⁷

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⁷ Since several variables (e.g. asset, sales) are not normally distributed, we apply logarithm to the variables and perform the t-test. These results are not reported here, since they are qualitatively similar to those reported in the paper.

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 units 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. In addition, there is no significant difference in the level of information asymmetry between the two groups of firms post-spinoff.

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.⁸ 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.⁹ 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)

⁸ In unreported results, we examine the correlation between pre-spinoff information asymmetry and pre-spinoff excess value for sample firms. The relation is negative but not statistically significant.

⁹ Due to lack of data, the excess value of the spun-off subsidiary is unavailable prior to the spinoff.

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.¹⁰

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

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

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

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¹⁰ 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.

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.¹¹

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¹¹ Krishnaswami and Subramaniam (1999) report a significantly positive relation between the measures of information asymmetry and the anticipation-adjusted abnormal returns. We follow their method and use the anticipation-adjusted abnormal returns as the dependent variable in the regression. However, the coefficient of the information asymmetry measures is still insignificant. This is possibly due to the different samples used in the two studies. For example, their sample period is from 1979 to 1993 while ours is from 1981 to 2004. Their sample includes both multi-segment firms and single segment firms while ours focus on multi-segment firms.

5.5. Robustness

In Table 6 to 8, 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 5th and the 95th percentiles of their distributions and re-estimate models (1) through (3). Once again the results are unaffected.

Second, a potential concern is that both the change in excess value and the change in forecast error are related to market price by construction. This creates the potential for a mechanically induced relationship between changes in excess value and changes in forecast error. To examine this possibility, 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

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

and the post-spinoff forecast error of the firm as

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

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

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

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

The change in the raw forecast error is defined as

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

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.

Third, 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.

Fourth, it is also interesting to examine whether the relation between value gains and the decrease in information asymmetry is more pronounced for high growth firms, large firms, or firms that are more diversified. We create three dummy variables, GROWTHD, LARGED, and DIVERSIFYD. GROWTHD is an indicator variable, which is 1 if the firm is high-growth, and 0 otherwise. A firm is classified as a high-growth firm if its pre-spinoff market to book ratio is above the median of the set of all sample firms. LARGED (DIVERSIFYD) is an indicator variable, which is 1 if the pre-spinoff asset value (entropy) of the firm is above the median of all firms. We then create nine interaction terms between each of the three information asymmetry measures and the three dummy variables and include them in models (1) – (3). In order to save space, we only report results for model (3). The interaction term is never significant. The results are similar for the other two models. Thus, there is no evidence that there are any cross section differences in the relation between value gains and decreases in asymmetric information.

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.

Sixth, another concern is that the higher firm value following spinoffs attracts more analyst coverage, which in turn leads to lower information asymmetry. In other words, the increase in firm value causes the decrease in information asymmetry rather than the other way around. To address this concern, we add the change in the number of analysts as one control variable in models (1) through (3). The pre-spinoff analyst coverage is that of the parent firm while the post-spinoff coverage is that of the combined firm. Our main results are unaffected while the coefficients on the change in the number of analysts are positive but not significant. We do not report these results here due to space limitations.

Seventh, given that Bens and Monahan (2004) document a positive relation between the excess value of diversification and disclosure quality, we also check whether firms that engage in spinoffs have a more transparent disclosure policy than other firms. Following Bens and Monahan (2004), we use a measure of segment information disaggregation, DISAGG, as the proxy of disclosure quality.¹² DISAGG is defined as the natural log of the ratio of the number of reported segments to the number of business units (e.g. two-digit SIC codes) in which the firm operates. We do not find significant differences in DISAGG between the sample and control firms.

Eighth, Krishnaswami and Subramaniam (1999) find that high growth firms, firms with higher levels of information asymmetry and unrelated diversification, and lower levels of internally generated cash have a higher likelihood of engaging in spinoffs. Following Krishnaswami and Subramaniam (1999), we estimate probit regressions to explain the incidence

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¹² We do not use Total Disclosure Score or TDS as the proxy of disclosure quality due to data availability.

of spinoffs. As shown in Table 7, all three measures of information asymmetry are significantly positively associated with the incidence of spinoffs at least at the 0.05 level, consistent with the notion that firms spinoff to mitigate information asymmetry. The unrelated entropy variable has a significant positive coefficient in models 2 and 3 at the 0.05 level, indicating that spinoffs happen more often in highly diversified firms. Finally, the coefficient of cash flow is negative and significant at least at the 0.1 level, suggesting that firms with low internally generated cash spinoff to mitigate information problems before approaching the external capital market for funds.

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):

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

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 8 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 spinoff unit was not a wholly owned subsidiary of the parent firm, or where the spinoff 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 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

Variables		Pre-spinoff	Post-spinoff			Changes	
		Parent	Parent	Spinoff	Combined	Parent Post - Pre	Combined Post - Pre
Spinoff size	Mean			0.259			
	Median			0.227			
Asset (\$mil)	Mean	4,818.647	4,445.118		5,532.129	-373.529 (-2.176)**	713.482 (3.980)***
	Median	2,018.034	1,932.500		2,482.643	-80.723 (-3.331)***	194.359 (5.669)***
	Std.dev.	7,263.855	7,127.389		8,358.281	1,926.619	2,012.225
Sales (\$mil)	Mean	5,066.647	4,099.066		5,541.066	-967.581 (-3.177)***	474.419 (2.209)**
	Median	2,216.740	1,556.221		2,454.503	-147.808 (-5.034)***	171.664 (4.717)***
	Std.dev.	7,499.213	6,021.819		8,330.212	3,419.089	2,411.281
Entropy	Mean	0.751	0.413		0.823	-0.339 (-10.288)***	0.071 (2.574)**
	Median	0.694	0.311		0.736	-0.297 (-7.913)***	0.039 (2.708)***
	Std.dev.	0.387	0.449		0.425	0.369	0.311
EBITSALE	Mean	0.090	0.065		0.066	-0.025 (-1.481)	-0.024 (-2.116)**
	Median	0.094	0.090		0.082	0.001 (0.057)	-0.002 (-2.200)**
	Std.dev.	0.124	0.183		0.125	0.193	0.127
CEXPSALE	Mean	0.073	0.094		0.079	0.021 (1.481)	0.006 (0.628)
	Median	0.053	0.046		0.079	-0.001 (-0.366)	-0.002 (-1.111)
	Std.dev.	0.070	0.194		0.146	0.161	0.115
Leverage	Mean	0.207	0.233		0.224	0.026 (1.773)*	0.016 (1.332)
	Median	0.189	0.203		0.211	0.007 (1.582)	0.006 (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	4,818.647	4,531.594	287.050 (1.421)
	Median	2,018.034	1,851.992	13.016 (2.139)**
	Std.dev.	7,263.855	7,197.049	2,267.622
Sales (\$mil)	Mean	5,066.647	4,405.749	660.898 (1.790)*
	Median	2,216.740	1,971.018	12.666 (1.260)
	Std.dev.	7,499.213	6,627.181	4,144.213
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 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 date 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
<i>ERR</i>	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

Variables	Sample size		Pre-spinoff	Post-spinoff	Changes
			Parent	Combined	Combined Post - Pre
<i>ERR</i>	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
<i>EV</i>	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
<i>ERR</i>	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
<i>EV</i>	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 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}	$\Delta ENTROPY$	$\Delta INVQ$	$\Delta SIZE$
<i>Panel A: Information asymmetry variables</i>												
ΔERR	-0.287 (0.005)*** [93]											
$\Delta\sigma(\varepsilon)_{MA}$	-0.222 (0.012)** [126]	0.320 (0.002)*** [93]										
$\Delta\sigma(\varepsilon)_{MIA}$	-0.226 (0.011)** [126]	0.310 (0.002)*** [93]	0.998 (0.000)*** [126]									
<i>Panel B: Control variables</i>												
$TAKED$	0.040 (0.653) [126]	0.040 (0.703) [93]	-0.049 (0.582) [126]	-0.052 (0.564) [126]								
$REGD$	-0.031 (0.731) [126]	-0.027 (0.794) [93]	0.014 (0.878) [126]	0.013 (0.884) [126]	0.105 (0.241) [126]							
$FOCUSD$	0.043 (0.632) [124]	0.054 (0.611) [92]	0.187 (0.037)** [124]	0.193 (0.031)** [124]	-0.083 (0.361) [124]	0.141 (0.117) [124]						
$SPINSIZE$	0.114 (0.204) [126]	0.158 (0.130) [93]	0.091 (0.311) [126]	0.085 (0.342) [126]	0.002 (0.979) [126]	-0.017 (0.854) [126]	-0.021 (0.818) [124]					
EV_{pre}	-0.509 (0.000)*** [126]	0.063 (0.547) [93]	0.140 (0.117) [126]	0.126 (0.161) [126]	0.063 (0.482) [126]	0.031 (0.732) [126]	-0.040 (0.659) [124]	-0.030 (0.741) [126]				
$\Delta ENTROPY$	-0.186 (0.037)** [126]	0.173 (0.098)* [93]	0.060 (0.504) [126]	0.069 (0.441) [126]	0.105 (0.241) [126]	-0.041 (0.647) [126]	0.005 (0.959) [124]	-0.021 (0.814) [126]	0.056 (0.535) [126]			
$\Delta INVQ$	0.300 (0.001)*** [126]	0.095 (0.363) [93]	0.035 (0.697) [126]	0.031 (0.731) [126]	0.185 (0.038)** [126]	-0.007 (0.938) [126]	-0.035 (0.703) [124]	0.227 (0.011)** [126]	-0.066 (0.463) [126]	0.081 (0.367) [126]		
$\Delta SIZE$	0.119 (0.186) [126]	0.023 (0.829) [93]	-0.024 (0.786) [126]	-0.012 (0.894) [126]	0.289 (0.001)*** [126]	0.205 (0.021)** [126]	0.146 (0.106) [124]	-0.134 (0.135) [126]	-0.086 (0.338) [126]	0.061 (0.494) [126]	-0.118 (0.188) [126]	
$\Delta CEXPSALE$	0.125 (0.164) [126]	0.080 (0.444) [93]	0.031 (0.732) [126]	0.017 (0.851) [126]	-0.011 (0.906) [126]	0.054 (0.548) [126]	-0.034 (0.710) [124]	-0.041 (0.650) [126]	-0.078 (0.386) [126]	-0.044 (0.625) [126]	0.113 (0.206) [126]	0.011 (0.899) [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 analysts' forecast error. $\Delta \sigma(\varepsilon)_{MA}$ ($\Delta \sigma(\varepsilon)_{MLA}$) 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. Heteroskedasticity-consistent 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 (0.987)	0.065 (1.885)*	0.064 (1.862)*	0.044 (1.181)	0.067 (1.932)*	0.066 (1.907)*
Information asymmetry variables						
ΔERR	-0.949 (-3.137)***			-0.972 (-3.212)***		
$\Delta \sigma(\varepsilon)_{MA}$		-6.849 (-2.211)**			-6.759 (-2.188)**	
$\Delta \sigma(\varepsilon)_{MLA}$			-7.326 (-2.336)**			-7.269 (-2.324)**
Control variables						
EV_{pre}	-0.325 (-5.107)***	-0.356 (-6.123)***	-0.357 (-6.17)***	-0.323 (-5.056)***	-0.359 (-6.201)***	-0.36 (-6.245)***
$\Delta ENTROPY$	-0.234 (-2.288)**	-0.249 (-2.546)**	-0.247 (-2.524)**	-0.235 (-2.295)**	-0.253 (-2.593)**	-0.25 (-2.569)**
$\Delta INVQ$	0.927 (4.247)***	0.848 (4.156)***	0.848 (4.162)***	0.893 (4.115)***	0.865 (4.273)***	0.864 (4.278)***
$\Delta SIZE$	0.008 (2.311)**	0.006 (1.711)*	0.006 (1.738)*	0.007 (2.099)**	0.006 (1.732)*	0.006 (1.758)*
$\Delta CEXPSALE$	-0.954 (-1.196)	0.191 (0.722)	0.184 (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 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 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. GROWTHD is an indicator variable, which is 1 if the firm is high-growth, and 0 otherwise. A firm is classified as a high-growth firm if its pre-spinoff market to book ratio is above the median of the set of all sample firms. LARGED (DIVERSIFYD) is an indicator variable, which is 1 if the pre-spinoff asset value (entropy) of the firm is above the median of all firms. Models 1-3 report estimates from robust MM regressions. Models 4-5 use the change in the raw forecast error as the measure of information asymmetry. Models 6-8 use the asset-based excess value measure. Models 9-11 add three interaction terms for GROWTHD* $\Delta\sigma(\varepsilon)_{MIA}$, LARGED* $\Delta\sigma(\varepsilon)_{MIA}$, and DIVERSIFY* $\Delta\sigma(\varepsilon)_{MIA}$. 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.

Model	Robust MM Estimation			RAWERR		Asset-Based Excess Value			Interaction		
	1	2	3	4	5	6	7	8	9	10	11
Constant	0.038 (0.94)	0.061 (3.43)*	0.060 (3.32)*	0.058 (1.387)	0.016 (0.39)	0.140 (3.57)***	0.131 (4.13)***	0.131 (4.12)***	0.064 (1.86)*	0.063 (1.84)*	0.064 (1.86)*
ΔERR	-0.812 (6.05)**					-0.721 (-2.11)**					
$\Delta\sigma(\varepsilon)_{MA}$		-7.091 (5.98)**					-10.989 (-3.41)***				
$\Delta\sigma(\varepsilon)_{MIA}$			-7.573 (6.71)***					-11.412 (-3.48)***	-7.896 (-1.82)*	-6.087 (-1.70)*	-6.883 (-1.88)*
$\Delta RAWERR$				-0.249 (-1.804)*	-0.199 (-1.71)*						
EV_{pre}	-0.231 (11.44)**	-0.322 (32.60)***	-0.322 (33.19)***		-0.333 (-5.03)***				-0.358 (-6.15)***	-0.355 (-6.15)***	-0.356 (-6.08)***
$\Delta ENTROPY$	-0.131 (1.43)	-0.121 (1.61)	-0.120 (1.59)		-0.251 (-2.35)**	-0.259 (-2.25)***	-0.230 (-2.37)**	-2.229 (-2.35)**	-0.247 (-2.52)**	-0.259 (-2.64)**	-0.247 (-2.52)**
$\Delta INVQ$	0.868	0.628	0.621		0.883	1.009	1.024	1.030	0.853	0.899	0.856

	(14.87)***	(10.23)***	(10.14)***		(3.90)***	(3.88)***	(4.92)***	(4.96)***	(4.13)***	(4.30)***	(4.12)***
$\Delta SIZE$	0.008	0.005	0.005		0.008	-0.007	-0.007	-0.007	0.006	0.006	0.006
	(5.46)**	(1.99)	(2.08)		(2.36)**	(-1.77)*	(-2.19)**	(-2.16)***	(1.69)*	(1.80)*	(1.75)*
$\Delta CEXPSALE$	-0.752	0.321	0.315		-0.980	-0.374	-0.151	-0.164	0.181	0.173	0.178
	(0.89)	(1.82)	(1.77)		(-1.18)	(-0.44)	(-0.63)	(-0.69)	(0.68)	(0.66)	(0.67)
GROWTHD *											
$\Delta \sigma(\varepsilon)_{MIA}$									1.223		
									(0.19)		
LARGED *											
$\Delta \sigma(\varepsilon)_{MIA}$										-8.659	
										(-1.09)	
DIVERSIFYD *											
$\Delta \sigma(\varepsilon)_{MIA}$											-1.711
											(-0.24)
Adjusted R2	0.243	0.275	0.277	0.024	0.357	0.229	0.264	0.267	0.373	0.379	0.373
Sample size	93	126	126	93	93	83	116	116	126	126	126

Table 7 Probit regression estimation

This table reports probit estimates from the model of firms' propensity to spinoff, using a sample of 126 firms that completed spinoffs in the period 1981-2004 and a sample of 126 size- and industry-based matching firms that did not engage in spinoffs. The dependent variable takes the value 1 if the observation is a spinoff firm and 0 otherwise.

All values are measured at the latest fiscal year-end prior to the spinoff announcement date. *ERR* is the analysts' forecast error and is measured as the absolute difference between actual earnings and the median forecast

deflated by the stock price five days before the earnings announcement date. $\sigma(\varepsilon)_{MA}$ ($\sigma(\varepsilon)_{MIA}$) is the market-adjusted (market-and-industry-adjusted) residual standard deviation and 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. UENTROPY is the unrelated

entropy and is measured as 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 two-digit SIC level and the summation is over n two-digit industry segments where the firm operates. CFA is cash flow generated from all operating activities and is measured as a ratio relative to the total assets of the firm. GROWTH is an indicator variable, which is 1 if the firm is high-growth and 0 otherwise. A firm is classified as a high-growth firm if its market to book ratio is above the median of the set of all sample and matching firms. 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
Constant	-0.436 (-1.81)**	-0.613 (-2.34)**	-0.631 (-2.44)**
<i>ERR</i>	3.453 (2.17)**		
$\sigma(\varepsilon)_{MA}$		22.560 (2.72)***	
$\sigma(\varepsilon)_{MIA}$			24.086 (2.86)***
<i>UENTROPY</i>	0.307 (1.21)	0.495 (2.18)**	0.492 (2.17)**
<i>CFA</i>	-0.582 (-1.71)*	-0.826 (-2.03)**	-0.827 (-2.03)**
<i>GROWTH</i>	0.145 (0.71)	-0.206 (-1.27)	-0.205 (-1.27)
Pseudor R ²	0.028	0.035	0.038
Sample size	186	252	252

Table 8 Panel regression estimation

This table reports the results of regression equation (19) as given in the text. The equation is estimated for the pre-spinoff (year -1) and the post-spinoff year (year +1). The dependent variable (EV) is the firm excess value. ERR is the analysts' 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 date 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. $ENTROPY$ 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 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 (0.60)	0.281 (1.28)	0.280 (1.28)	-0.999 (-3.18)***	-0.599 (-1.76)*	-0.610 (-1.81)*
ERR	-1.055 (-2.74)***			-1.101 (-3.74)***		
$\sigma(\varepsilon)_{MA}$		-9.613 (-3.31)***			-9.410 (-3.82)***	
$\sigma(\varepsilon)_{MIA}$			-9.946 (-3.42)***			-9.687 (-3.85)***
$ENTROPY$				-0.214 (-1.90)*	-0.290 (-2.89)***	-0.287 (-2.86)***
$INVQ$				1.013 (5.74)***	0.975 (5.56)***	0.973 (5.55)***
$SIZE$				0.010 (3.32)***	0.008 (3.00)***	0.008 (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

CHAPTER 2

CORPORATE GOVERNANCE AND FIRM REFOCUSING

1. Introduction

After a spate of high-profile financial scandals including Enron and Worldcom, etc., corporate governance has recently attracted much attention. A series of recent studies by Gompers *et al.* (2003), Bebchuk *et al.* (2005), and Cremers and Nair (2005), etc. focus on one important governance mechanism, namely the market for corporate control. They use various indices constructed from the 24 IRRC anti-takeover provisions (ATPs) as proxies of external governance and document a negative relation between the level of anti-takeover indices and both firm value and stockholder returns. Brown and Caylor (2006) extend the above studies by examining 51 ISS provisions representing both external and internal governance and find that both external and internal governance are linked to firm value. Yet, it still remains unclear how these governance provisions affect, rather than reflect, value. We fill this void in the literature by directly examining the impact of a firm's ATPs and other corporate control mechanisms on its decision to refocus and identifying one specific channel through which governance mechanisms affect shareholder value.

A large body of empirical work on diversification has documented that diversified firms trade 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) and focus-increasing divestitures such as asset sales, equity carve-outs, and corporate spinoffs lead to higher market valuations and stock returns (John and Ofek, 1995; Daley *et al.*, 1997; Desai and Jain, 1999; Berger and Ofek, 1999). If diversification is value-destroying, then an important question to ask is: why undervalued firms remain diversified? One stream of literature argues that managers may extract private benefits from diversification at the expense of shareholders. Diversification may benefit managers because it brings growth which increases managers' power, prestige, and compensation (Jensen, 1986; Stulz, 1990; Smith and Watts, 1992), reduces managers'

undiversifiable “employment risk” (Amihud and Lev, 1981), and helps entrench managers (Shleifer and Vishny, 1989). Consequently, managers may maintain a diversification strategy even if doing so reduces shareholder wealth. If agency issues are responsible for firms maintaining value-destroying diversification strategies, then we expect to find that firms with better corporate governance will be more likely to refocus when diversification is destroying value.¹³

The primary objective of this paper is to use refocusing events (divestitures, tax-free spinoffs, and discontinued operations) to examine these predictions. Our sample consists of 148 refocusing events completed by multi-segment firms between 1993 and 2005. The empirical tests investigate whether refocusing firms have more effective corporate governance than their non-refocusing counterparts. We implement the propensity score matching method to select a matched sample of control observations that are comparable to refocusing firms not just in size and industry, but also in a wider range of non-governance characteristics in which the two groups differ. It is these firms that we expect are able to improve value by refocusing. But they choose not to do so. We find that, in the year prior to the refocusing, both the sample and control firms are valued at a substantial discount, confirming the prediction that value destruction drives refocusing. Moreover, the difference in the valuation discount is insignificant between the two groups.

Next, we compare the governance characteristics for the refocusing and control samples in the year prior to the refocusing events. We use the G-index compiled by Gompers *et al.* (2003) from the IRRC publications as our proxy of external governance. Consistent with the agency

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¹³ Chemmanur and Yan (2004) provide a rationale why strong governance needs to complement costly refocusing to be effective. They study a setting where a firm has two divisions. They argue that a spinoff increases the chance of loss of control to a potential rival as a spinoff eliminates managers’ ability to use their superiority in one division to compensate for their inferiority in another division. It also reduces managers’ ability to use firm size strategically against potential takeovers. This, in turn, motivates the incumbent to either to work harder at managing the firm or to relinquish control of one of the firms resulting from the spinoff. They demonstrate that, in many situations, incumbent management is better off relinquishing control of the spun-off firm to a capable division manager at the time of the spinoff.

hypothesis, we find that refocusing firms have significantly lower G-index as compared to their matched peers, indicating that refocusing firms are less protected against takeovers and hence have higher quality of external governance. In further analysis, we look inside the box of the 24 provisions comprising the G-Index and identify 10 provisions the incidence of which is significantly different across the two groups. We construct a parsimonious index Gov-10 based on the 10 provisions and find that Gov-10 fully drives the relation between the G-index and the incidence of refocusing. We also examine a fairly comprehensive set of internal governance mechanisms, including board characteristics, CEO characteristics, compensation structure, ownership structure, and financing characteristics. We find that, in general, refocusing firms have characteristics associated with more effective internal control as compared to their matched counterparts. Relative to non-refocusers, refocusers have smaller boards, more independent nominating committees, greater number of annual meetings, and lower dividend payout ratio. Executives in refocusing firms receive significantly higher percentage of total compensation that is option-based as compared to their counterparts in non-refocusing firms. And a significantly larger fraction of refocusers have annual option-based compensation plans for non-employee directors than non-refocusers. Using multivariate probit analysis and controlling for various governance factors, we find that the G-index (or Gov-10) and whether a firm has an independent nominating committee appear to have the strongest impacts on its decision to refocus.

Finally, to confirm that refocusing is value-enhancing, we examine the change in firm value from the year prior to the refocusing to the year following the refocusing for both the refocusing and control firms. We find a significant decrease in the diversification discount as well as a significantly positive announcement return associated with refocusing. We also find that firms that do refocus experience significantly greater value enhancements than their

matching firms. These results suggest that agency issues are important in determining whether firms choose to reverse value-reducing diversification policies.

While much of the recent corporate governance research examines the effect of ATPs on overall firm value, we contribute to the literature by identifying a clear channel through which these provisions work. Our results suggest that, by reducing the disciplinary role of a takeover threat and allowing managers to maintain a value-reducing diversification policy without the fear of losing corporate control, ATPs adversely affect firm value in magnitudes that are economically significant. To the best of our knowledge, we are the first researchers to examine the link between ATPs and a firm's refocusing decision. We also investigate a comprehensive set of internal governance mechanisms. This addition is important since different governance mechanisms may serve as either complements or substitutes in controlling agency problems and hence can not be evaluated in isolation.

The rest of the paper is organized as follows. Section 2 reviews the related research and develops the hypothesis to be tested. Section 3 describes the sample selection procedure and the propensity matching algorithm. Section 4 presents univariate comparisons of governance characteristics in refocusing and control firms. Section 5 reports results of multivariate analysis. Section 6 examines changes in firm value and announcement returns around refocusing. Section 7 describes the robustness tests. Section 8 concludes.

2. Related literature and hypothesis development

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). 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. One stream of literature explains the value loss from diversification in terms of agency conflicts between shareholders and managers. Agency problems arise within a firm whenever managers have incentives to pursue their own interests at shareholder expense (Agrawal and Knoeber, 1996). Agency theory suggests that managers can extract private benefits from diversification because diversification brings growth which increases managers' power, prestige, and compensation (Jensen, 1986; Stulz, 1990; Smith and Watts, 1992), reduces managers' undiversifiable "employment risk" (Amihud and Lev, 1981), and helps entrench managers (Shleifer and Vishny, 1989). Consequently, managers may maintain a diversification strategy even if doing so reduces shareholder wealth. In the US, the primary corporate governance mechanisms that help mitigate the agency problems are the market for corporate control and the internal control system headed by the board of directors. The strength of these mechanisms depends on securities regulation, corporate law, corporate bylaws, charter provisions, and other rules (Gompers *et al.*, 2003).

Supporting the agency cost explanation for corporate diversification, Denis *et al.* (1997) find that firms with lower levels of diversification have characteristics previously hypothesized to be associated with better corporate governance, such as greater managerial equity ownership and greater equity ownership of outside blockholders. They also document a strong relation between decreases in diversification and market-disciplinary events, indicating that managers

usually had to be pressured into undertaking the restructuring. Berger and Ofek (1999) also find evidence that most of the refocusings were preceded by events of external pressure. Further, they show that CEO options granted increase the likelihood of refocusing. Hyland and Diltz (2002) find that, compared to non-diversifying counterparts, diversifying firms have more cash on hand, spend less on R&D, and give top executives larger salary increases, indicating that firms diversify primarily as a result of agency considerations. In a similar vein, Ahn and Walker (2006) document that diversified firms with more effective corporate governance, characterized by greater ownership by outside board members, more heterogeneous boards, and fewer board members, have a higher probability of engaging in a spinoff, in comparison to a set of peer firms. Further, the firms that do spinoff exhibit significantly greater value improvements than their matched firm peers. In contrast, Anderson *et al.* (2000) find no compelling evidence that differences in governance structure can explain the decision to diversify or the value loss from diversification. Additionally, they document no significant difference in the overall quality of corporate governance between diversified and focused firms. Although, relative to focused firms, diversified firms have lower CEO ownership and lower sensitivity of CEO compensation to firm performance, they employ alternative governance mechanisms to reduce agency problems such as greater fraction of outsiders on the board of directors. Therefore, the authors conclude that agency costs do not provide a complete explanation for the magnitude and persistence of the diversification discount. Yang (2005) also finds no significant evidence that corporate governance affects a firm's decision to divest or diversify.

Overall, the impact of agency issues on a firm's diversification strategies is unclear given the mixed nature of the empirical results. In order to extend the literature, we examine the association between a firm's choice to refocus and a comprehensive set of external and internal governance mechanisms. Examination of just a few governance characteristics in isolation

ignores the fact that other characteristics not measured may serve as complements or substitutes (Core *et al.*, 1999). By incorporating a firm's vulnerability to takeovers, board characteristics, CEO characteristics, compensation structure, ownership structure, and financing characteristics into the analysis, this paper represents the most complete investigation to date of the impact of corporate governance on a firm's decision to reverse value-reducing diversification policies. If agency problems are responsible for firms maintaining value-destroying diversification strategies, then we expect to find that firms with better corporate governance will be more likely to refocus when diversification is destroying value.

3. Sample and data description

The research design examines whether the quality of corporate governance of the sets of diversified firms that choose to refocus is better than that of the sets of diversified firms that have similar non-governance characteristics but do not refocus. Accordingly, we use two different samples of firms: one sample of refocusing firms and one control sample of non-refocusing firms. In this section we describe the construction of each sample and the matching algorithm.

3.1. Refocusing sample

Our sample begins with all multi-segment firms jointly covered by the Compustat Annual Industrial database, the Compustat Business Segment Information database, and the Investor Responsibility Research Centre Governance database (IRRC) from 1993 to 2005. The sample starts in 1993 because it coincides with the beginning of the SEC's EDGAR database, where we can access the company annual reports and proxy statements. The initial sample is restricted to those single class firms that report a decrease in the number of business segments during the period and have no segments in the financial services industry (SIC 6000 to 6999) or in the

regulated utilities industry (SIC 4900 to 4999). We exclude firms with dual class common stock because, as Gompers *et al.* (2003) point out, it is difficult to compare the governance structures of these firms with those of single class firms due to the wide variety of voting and ownership differences across these firms. The selection process results in an initial sample of 510 decreases in reported number of segments. To identify actual organizational changes, we examine annual reports and related news stories in Factiva or Lexis/Nexis. We verify that the divested assets belong to the dropped segments. Following Denis *et al.* (1997), we classify refocusing events as: divestitures, tax-free spinoffs, or discontinued operations. Of the 510 decreases in reported number of segments, 241 are associated with divestitures, 42 are associated with tax-free spinoffs, 16 are associated with discontinued operations, and 10 are associated with a mixture of the above events. Therefore, 309 of the 510 decreases in reported number of segments are classified as real decreases in diversification. Of the 201 remaining cases, 185 simply involve reporting changes. In another 16 cases, there are 1 exchange offer, 2 taxable spinoffs, 1 splitoff, 1 equity carve-out, and 2 incompleting divestitures. Finally, in 9 cases, it is unable to identify the source of the change in number of segments.

Then we apply the following sample selection criteria. We remove 33 refocusing events associated with a major restructuring where the firm divests or changes more than 50% of the three-digit SIC codes of its retained segments. We omit 27 observations for which no IBES data are available because some of our data analysis requires information on analysts' earnings forecasts. We drop 93 observations where firms are not covered by the IRRC Directors database, the Compustat Executive Compensation database, or the CDA/Spectrum Institutional Holdings database because we need information from these databases to construct proxies for internal corporate governance quality. Finally, 8 firms divest segments in two consecutive years. We consolidate these transactions, resulting in a loss of 8 observations. The final sample consists of

148 refocusing events by 138 firms, of which 119 are divestitures, 16 are tax-free spinoffs, 9 are discontinued operations, and 4 are mixtures of the events. Table 1 summarizes our sampling procedure.

3.2. Control sample

Our empirical tests compare the governance of refocusing firms to that of non-refocusing counterparts. Therefore, we need a control sample of non-refocusing firms. We extract the pool of potential control firms from those 1993-2005 observations of multi-segment firms that are covered by the Compustat Annual Industrial database, the Compustat Business Segment Information database, the Compustat Executive Compensation database, the IRRC Governance database, the IRRC Directors database, the CDA/Spectrum Institutional Holdings database, and the IBES database. We then delete any firms with financial services segments or regulated utilities segments. Further, we omit firms with dual class common stock. Next, we delete any observations that enter our initial sample of 510 decreases in reported number of segments. Finally, we discard any firm-year observations with missing data. These criteria yield a total of 1436 firm-year observations from 412 firms.

3.3. Propensity score matching algorithm

Our goal is to examine whether refocusing firms have better corporate governance than their non-refocusing peers. However, observed refocusing firms are not selected at random from the population of diversified firms. That is, the firms that choose to refocus have non-governance characteristics that differ systematically from those of their counterparts that do not refocus. Therefore, it is important to control for these characteristics when ascertaining whether firms that choose to refocus are better governed. In this section, we implement the propensity score

matching method to identify a subset of control firms that are most comparable to the sample firms based on non-governance characteristics. It is these firms that we expect are able to enhance value by refocusing. But they choose not to do so. The point of using propensity score is that it reduces the dimensionality problem of matching on a large set of variables and allows a flexible method for matching on more than two characteristics (Dehejia and Wahba, 2002). Given that there are many possible reasons why firms choose to refocus, partial matches based on only one or two characteristics may not yield the most comparable control group. By matching on the propensity score, maximum comparability between the treated and control groups can be attained (Villalonga, 2004).

We model a firm's propensity to refocus as a function of the non-governance characteristics of the firm, its industry, and its macroeconomic environment. The variables are motivated by the prior divestiture and spinoff literature as potential determinants of the refocusing decision. Ahn and Denis (2004) provide evidence that, on average, investment efficiency and firm value increase significantly following spinoffs. Dittmar and Shivdasani (2003) show that divestitures are associated with a significant reduction in the diversification discount and a substantial improvement in the efficiency of segment investment. Therefore, we include firm excess value and a measure of investment efficiency as two explanatory variables. Lower levels of these variables should prompt refocusing. Following Berger and Ofek (1995), we compute excess value based on sales multipliers as the natural 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 two-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 two-digit SIC level, the one-digit SIC level is examined. 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 excess value is defined as

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

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 Ahn and Denis (2003), we use the sales-based relative value added by allocation (RVA) as the measure of investment efficiency. RVA is defined as

$$RVA = \frac{\sum_{j=1}^n S_j (q_j - \bar{q}) \left(\frac{I_j}{S_j} - \left(\frac{I}{S} \right)_j^{ss} - \sum_{j=1}^n w_j \left(\frac{I_j}{S_j} - \left(\frac{I}{S} \right)_j^{ss} \right) \right)}{TS} \quad (2)$$

where S_j is the sales of segment j , q_j is the median Tobin's q for single-segment firms operating in the same two-digit SIC industry as segment j where q is defined as the market value of total assets divided by the book value of total assets, $\bar{q}$ is the sales-weighted average q of the firm, I_j is the capital expenditures of segment j , $\left(\frac{I}{S} \right)_j^{ss}$ is the ratio of capital expenditure to sales of the median single-segment firm operating in the same two-digit SIC industry as firm j , w_j is the ratio of the sales of segment j to the firm's total sales, and TS is the firm's total sales.¹⁴

¹⁴ It is pointed out that RVA may be affected by corporate governance. Calculating propensity based on RVA may create matching firms with similar level of governance and therefore should bias against finding support for our hypothesis. However, we do not think this is a big concern here. Firstly, RVA is not a significant variable in estimating propensity score (see Panel A of

Krishnaswami and Subramaniam (1999) show that high-growth firms, and firms with low levels of liquidity and high levels of information asymmetry and unrelated diversification have a higher likelihood of engaging in spinoffs. Therefore, we include variables that proxy for growth opportunities, liquidity, information asymmetry, and unrelated diversification. As in Krishnaswami and Subramaniam (1999), we use the ratio of the market value of assets to the book value of assets (MB) as a proxy for growth opportunities. Market value is defined as the book value of debt plus the market value of common equity. We measure liquidity as the ratio of cash flow to total sales (CFS), where cash flow is defined as net income plus depreciation. We use the forecast error in earnings (ERR) as the proxy of information asymmetry. This proxy is based on forecasts made within one year before actual earnings are released and is defined as the absolute difference between actual earnings and the median forecasted earnings deflated by the median forecasted earnings.

$$ERR = \left| \frac{ACTEARN - FOREEARN_{med}}{FOREEARN_{med}} \right| \quad (3)$$

We measure unrelated diversification using the unrelated entropy measure from Jacquemin and Berry (1979). The unrelated entropy measure is calculated as:

$$UENTROPY = \sum_{i=1}^n P_i \ln(1/P_i) \quad (4)$$

where P_i is the percentage of sales in segment i at the two-digit SIC level and the summation is over n two-digit industry segments where the firm operates.

Colak and Whited (2006) show that large firms and firms with large market shares are more likely to refocus. We follow them in measuring firm size as the log of total assets (LOGAT) and market share as the ratio of firm sales to two-digit industry sales (MSHARE).

Table 2). Secondly, we find strong support for our hypothesis even when RVA is included in the first stage probit estimation. From another perspective, it shows the robustness of our results. In unreported results, we exclude RVA in the first stage probit estimation and replicate all the following tests. Our main results are unaffected.

Next, we consider industry characteristics. Colak and Whited (2006) find that higher industry sales growth increases the likelihood of spinoff. Accordingly, we include industry sales growth (ISGROW) as an explanatory variable, where industry is defined at the two-digit SIC level. As in Colak and Whited (2006), we measure this variable contemporaneously, that is, in the year of the refocusing to capture an unanticipated change in industry prospects.

Finally, we add macroeconomic characteristics. Campa and Kedia (2002) document that extreme macroeconomic conditions reduce the probability of refocusing. Specifically, they find that firms are more likely to operate in multiple segments when in a recession or when GDP growth rates are high. Following Campa and Kedia (2002), we include real growth rates of GDP (GDP) and the number of contractionary months in the year of refocusing (CONTRAC) as two explanatory variables.

The data for these variables are obtained from several sources: IBES for analysts' earnings forecasts, Bureau of Economic Analysis (BEA) for GDP growth rates, National Bureau of Economic Research (NBER) for business cycles, and Compustat for all other variables. Except where noted, all variables are measured in the year prior to refocusing.

Panel A of Table 2 reports the results of the probit regression. Several firm-characteristics variables are predictive of the refocusing decision, namely excess value, cash flow, the earnings forecast error, the unrelated entropy, and the total assets. Excess value is significantly negatively associated with the incidence of refocusing ($p\text{-value}=0.048$), which is consistent with the view that firms refocus in order to enhance aggregate value. The coefficient of cash flow is negative and significant ($p\text{-value}=0.001$), suggesting that firms with low internally generated cash divest divisions to raise funds or to mitigate information problems before approaching the external capital market for funds in the case of a spinoff (Krishnaswami and Subramaniam, 1999). The earnings forecast error has a significant positive impact ($p\text{-value}=0.033$), consistent with the

notion that firms refocus to mitigate information asymmetry. The unrelated entropy variable also has a significant positive coefficient ($p\text{-value}=0.000$), indicating that refocusing happens more often in highly diversified firms. Finally, the positive impact of total assets ($p\text{-value}=0.026$) suggests that large firms have a higher incidence of refocusing. RVA, the market to book ratio, and the market share are not significant. Further, none of the industry or the macroeconomic characteristics is significant. Altogether, our results suggest that only firm-specific characteristics affect a firm's propensity to refocus.

Next, we estimate propensity scores, the predicted values from the model, for each observation included in the regression. We use single-nearest-neighbor matching to select a subset of control firms that are most comparable to the sample firms. Specifically, for each sample firm, we select a single control firm that has the closest propensity score in the same year. The matching is done with replacements, that is, a control firm may be matched more than once, which is beneficial in terms of bias reduction (Dehejia and Wahba, 2002). Panel B of Table 2 reports mean characteristics for the sample and control firms for each variable entering the propensity score and results of paired t-tests of differences in means. We note that refocusing firms have a significant negative mean excess value of -0.382 ($p\text{-value}=0.000$), confirming the prediction that value destruction drives refocusing. The mean excess value for the matched control firms is -0.400 ($p\text{-value}=0.000$). The difference in mean value destruction between the refocusers and non-refocusers is insignificant at the 0.1 level. Further, none of the other characteristics are significantly different between the two samples. Therefore, we conclude that the refocusing and control groups are sufficiently comparable based on non-governance characteristics.

4. Univariate analysis

In this section, we describe the corporate governance variables and conduct univariate comparisons of the governance characteristics between refocusing firms and matched control firms. For refocusing firms, all the governance variables are measured in the fiscal year prior to the refocusing. For control firms, the variables are measured in the same fiscal year as their respective matched refocusing firms.

4.1. External governance

In the US, the takeover market is the primary source of external governance that helps mitigate the manager-shareholder conflict of interest. If publicly traded firms are being managed in a suboptimal fashion, then an active takeover market will work to correct this problem by transferring control of these firms into the hands of more competent managers. However, poorly performing firms can resist takeovers by adopting antitakeover provisions (ATPs) in their charters. As documented by Bebchuk *et al.* (2002, 2003), ATPs such as effective staggered boards substantially decrease the odds that a hostile bidder will gain control of the target and thereby considerably increase the insulation of target managers from a hostile takeover. In other words, by reducing the disciplinary role of a takeover threat, ATPs undermine the ability of the takeover market to provide managers with the proper incentives to maximize shareholder value. A series of recent studies by Gompers *et al.* (2003), Bebchuk *et al.* (2005), and Cremers and Nair (2005), etc. have documented a link between corporate valuation and the takeover vulnerability. In an important and influential paper, Gompers *et al.* (2003) construct a “Governance Index” from 24 ATPs in five categories: tactics for delaying hostile bidders, voting rights, director/officer protection, other takeover defenses, and state laws. The G-Index is created by adding one point if the firm has a specific provision in place and zero otherwise. Thus the values

range from 0 to 24, with higher values indicating greater management entrenchment and weaker shareholder rights. Gompers *et al.* (2003) find that firms with high G have lower firm value, lower long-run stock returns, and poorer operating performance. Bebchuk *et al.* (2005) extend Gompers *et al.* (2003)'s study by creating an "Entrenchment Index" comprising 6 of the 24 provisions in the G-Index. They show that firms with higher levels of the entrenchment index are associated with lower values and stock returns. More importantly, they find that the parsimonious index fully drives the relation between G-Index and both firm value and stock returns. Cremers and Nair (2005) further develop a narrower takeover index that accounts for only 3 of the 24 provisions and show that the level of the three-factor index is negatively associated with equity returns. Although the negative correlation between firm value and various indices of ATPs is well documented in the literature, much less is understood about how these provisions affect, rather than reflect, value. In this paper, we directly examine the impact of a firm's ATPs on its decision to refocus and identify one specific channel through which these provisions affect shareholder value. We expect to find that managers at firms with more ATPs are less likely to shed divisions despite substantial firm value discount since they are less likely to be disciplined by the takeover market. To the best of our knowledge, we are the first researchers to examine the link between a firm's anti-takeover provisions and its decision to refocus.

Following Gompers *et al.* (2003), we employ the G-Index from the IRRC Governance database as our proxy of external governance. Moreover, we look inside the box of the 24 provisions comprising the G-Index to identify which of them are responsible for the correlation between G-index and the refocusing decision. The IRRC data is not updated every year and is available only for the years 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006. For years

between updates, we follow the common practice of using the previously available data (e.g. assuming that 1994 has 1993 values, and 1996 has 1995 values, etc.).

Panel A of Table 3 reports univariate statistics for G-index for refocusing firms and control firms. The results are consistent with the agency hypothesis. The average (median) G-Index for the refocusing firms is 9.824 (10), which is approximately one point less than that of the controls. The paired t-test of the difference in the means across the sample and control firms and the Wilcoxon's signed rank test for the difference in the median indicate that the G-Index of the two groups are significantly different from each other at the 0.01 significance level (p-value=0.004 for the mean and 0.009 for the median). These results suggest that refocusing firms are less protected against takeovers and hence have higher quality of external governance as compared to their matched firm peers. Panel B of Table 3 provides summary statistics about the incidence of the 24 provisions comprising the G-Index for refocusing firms and matching firms. Relative to their matched counterparts, refocusing firms have significantly lower incidence of 9 provisions-classified board (p-value=0.026), compensation plans (p-value=0.051), indemnification (p-value=0.016), liability (p-value=0.018), control-share cash-out (p-value=0.096), golden parachutes (p-value=0.059), fair price (p-value=0.031), supermajority (p-value=0.015), and director's duties (p-value=0.010), of which 3 are included in Bebchuk *et al.* (2005)'s six-factor "Entrenchment Index" and 1 is included in Cremers and Nair (2005)'s three-factor takeover index.¹⁵ Further, refocusing firms have significantly higher incidence of 1 provision-charter (p-value=0.014). The incidence of the other 14 provisions is insignificantly different between the two groups. We then form two sub-indices: Gov-10 and Gov-14, which are based on the 10 provisions/the other 14 provisions the incidence of which is significantly/not significantly different between the two samples. Accordingly, each firm will have a Gov-10

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¹⁵ For a detailed description of the ATPs comprising the G-Index, the six-factor "Entrenchment Index", and the three-factor takeover index, please refer to Gompers *et al.* (2003), Bebchuk *et al.* (2005), and Cremers and Nair (2005).

score between 0 and 10 and a Gov-14 score between 0 and 14. Panel A of Table 3 shows that the mean and median Gov-10 are significantly lower for the refocusing firms as compared to the matching firms while Gov-14 index is insignificantly different between the two groups. Panel C of Table 3 presents the correlation matrix of the incidence of refocusing (REFOCUS), G-Index, Gov-10 index, and Gov-14. REFOCUS is an indicator variable set to 1 for refocusing firms and 0 otherwise. The results show that the likelihood of refocusing is significantly negatively related to the G-Index (correlation = -0.167 and $p\text{-value}=0.004$) and Gov-10 (correlation = -0.247 and $p\text{-value}=0.000$) and insignificantly related to Gov-14 (correlation = 0.002 and $p\text{-value}=0.969$). The results support the prediction that firms with more ATPs are less likely to refocus even if they are valued at a substantial discount because managers at these firms are less likely to be disciplined by the takeover threat. The results are also consistent with prior findings that only a small subset of ATPs is related to firm valuation. A more detailed analysis of why this small subset of provisions is effective and how they interact is beyond the scope of this paper.

4.2. Internal governance

If external governance is inadequate, then firms are left to depend on internal governance mechanisms to play a significant role in realigning the interests of managers and shareholders. As pointed out by Pound (1992), internal and external control mechanisms can be viewed as substitutes if internal governance mechanisms evolve to offset changes in external governance. In other words, a firm with strong internal control and a large number of ATPs would then have a similar quality of corporate governance as a firm with weak internal control but a small number of ATPs. Therefore, simply observing fewer ATPs in refocusing firms than in their matched peers is not enough evidence to determine whether refocusing firms are better governed. In this section, we compare the internal governance variables between the two groups. The attributes of

internal control that we investigate are broadly divided into five categories, namely board characteristics, CEO characteristics, compensation structure, ownership structure, and financing characteristics.

4.2.1. Board characteristics

As pointed out by Jensen (1993), the board of directors is at the apex of the internal control systems and has the final responsibility for the functioning of the firm. The primary responsibilities of the board are to hire, fire, and compensate the CEO, and to provide high-level counsel (Jensen, 1993). Panel A of Table 4 provides a comparison of board characteristics between refocusing and control firms starting with board size. Yermack (1996) presents evidence that smaller boards are more effective monitors than larger boards by documenting an inverse relation between firm value and board size. Our results show that the mean and median size of the board for refocusing firms is smaller relative to that for controls (p -value=0.094 for the mean and 0.073 for the median). On average, the refocusing firms have 0.500 fewer directors.

Next, we examine board independence. Prior studies have provided mixed evidence regarding the association between board composition, specifically the percentage of independent directors on the board, and overall firm performance (Bhagat and Black, 1999; Hermalin and Weisbach, 2003). As shown in Panel A of Table 4, there is no significant difference in the proportion of inside, affiliated, and independent directors between the sample and control groups. Nor is there any difference in the proportion of firms with a majority independent board (MINDBOARD) across the two groups, where a majority independent board is defined as one with more than 50% independent directors. IRRC considers those who are full-time employees of the firm as inside directors. Affiliated directors are designated as those who are former employees; employees of a service provider, supplier, or customer; recipients of charitable funds;

interlocks; and family members of a director or executive. Those who have no significant connections with the firm are classified as independent directors.

Klein (1998) presents evidence that, although there is little association between firm performance and overall board composition, strong ties do exist between firm performance and composition of board committees. In this paper, we examine the structure of three key committees of the board: the audit committee, the compensation committee, and the nominating committee. The primary role of the three committees is to act as independent monitors. Therefore, we expect that the monitoring capability of a board is increasing in the existence and independence of these committees. We create three dummy variables to measure the independence of these committees: AUDITIND, COMPIND, and NOMIND, which are set to 1 if all audit/compensation/nominating committee members are independent directors and 0 otherwise. If the board does not have an audit/compensation/nominating committee, the dummy variable is set to 0. In unreported results we find that all 296 firms included in the study have audit and compensation committees. 84.46% of the sample firms and 79.73% of the control firms have nominating committees. The results in Panel A of Table 4 show that a significantly higher proportion of refocusing firms have independent nominating committees as compared to their matched peers (p -value=0.002). However, there is no significant difference in the proportion of firms with independent audit and compensation committees between the two groups.

Jensen (1993) recommends separating the positions of the CEO and chairman in order to make the board more effective. Bhagat and Bolton (2006) present evidence that CEO-Chair separation is significantly related to firm operating performance. Accordingly, we include a dummy variable NOCEOCHR which equals 1 if the CEO is not the chairman of the board and 0 otherwise. We also include two other variables to measure the independence of the board: NOINLOCK, which equals 1 if there are no interlocked directors on the board and 0 otherwise,

and NOEMPCHR, which equals 1 if the chairman is not an insider. The results in Table 4 show no significant differences in these three variables between the two groups.

Next, we examine the number of boards the directors are serving on. Holding multiple directorships can provide valuable experience and reputational benefits for directors. However, it can also cause directors to be busy, rendering them ineffective monitors of corporate management (Fich and Shivdasani, 2006). Fich and Shivdasani (2006) present evidence that firms in which a majority of independent directors hold more than three board seats are associated with weaker corporate governance, lower market-to-book ratios, and weaker profitability. Following Fich and Shivdasani (2006), we construct an indicator variable, NOTBUSY, which takes the value 1 if less than 50% of the board's outside directors hold three or more board positions and 0 otherwise. Our results indicate that there is no significant difference in the proportion of firms with busy board between the two groups. We also compare the average number of total directorships held by inside, affiliated, and outside directors across the two samples. However, the results are still insignificant.

Finally, we examine the level of engagement of the board. We find no significant difference in the percentage of directors that attended at least 75% of board and committee meetings. We also examine the number of annual meetings. Currently there is no consensus on whether higher board meeting frequency reflects more effective corporate governance (Lipton and Lorsch, 1992; Jensen, 1993; Vafeas, 1999). Therefore, we make no prediction on the relation between the number of annual meetings and governance quality. The results in Table 4 show that refocusing firms have significantly greater number of annual meetings as compared to non-refocusing counterparts (p -value=0.030 for the mean and 0.029 for the median). Finally, we examine the average age of the board of directors, assuming that older directors have fewer career concerns as compared to younger ones and hence are less likely to act in the best interests

of the shareholders. Our results show no significant difference in the average age of the directors between the two samples.

4.2.2. CEO characteristics

Panel B of Table 4 presents univariate statistics for CEO characteristics. We include CEO age as a proxy for the “horizon problem” that can misalign the interests of the CEOs and the shareholders. As pointed out by Bryan *et al.* (2000), CEOs nearing retirement may be inclined to forgo positive NPV projects, including R&D, since such expenses are likely to reward the successor CEO and to punish the current CEO, if the performance measure for CEO compensation is earnings-based. We also include CEO tenure and a founder indicator variable (FOUNDER), which equals 1 if the CEO is the founder of the firm or is from the founding family and 0 otherwise. These two variables can potentially reflect CEO power and entrenchment (Ahn and Walker, 2006). However, as shown in Table 4, none of the three variables is significantly different between the two groups.

4.2.3. Compensation structure

In Panel C of Table 4, we report summary statistics for the structure of executives and directors’ compensation. Mehran (1995) provide evidence that the form rather than the level of compensation is what motivates managers to increase firm value. Specifically, they find that firm performance is positively associated with the percentage of executive compensation that is equity-based. Following Mehran (1995), we examine three measures of executive compensation structures: the percentage of total compensation in grants of stock options, with the options valued by the Black-Scholes formula, the percentage of total compensation that is equity-based, and the percentage of total compensation in salary plus bonus. Total compensation comprises of

the following: salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted long-term incentive payouts, and all other total. The percentage of total compensation that is option-based is measured as the ratio of the value of stock options granted to total compensation. The percentage of equity-based compensation is the ratio of the sum of the value of restricted stock granted and the value of stock options granted to total compensation. Finally, the cash percentage of total compensation is the ratio of salary plus bonus to total compensation. The results in Table 4 show that CEOs in refocusing firms have significantly higher percentage of total compensation that is option-based as compared to CEOs in control firms (p-value=0.073 for the mean and 0.071 for the median). Moreover, option-based and equity-based compensation accounts for a significantly larger proportion of top three executives' total compensation in refocusing firms than in matching firms (p-value=0.020 for the mean and 0.021 for the median for option-based compensation; p-value=0.070 for the mean and 0.060 for the median for equity-based compensation). However, as pointed out by Jensen and Meckling (1976), when executives already hold a large fraction of their firms' equity, the demand for further equity-based compensation is likely to be reduced, since the interests of executives and shareholders are relatively aligned. Accordingly, we have to take into account the equity ownership by executives, which is examined in the next section. In Table 4, we also compare the level of total compensation for CEOs and top three executives in refocusing and matching firms. The results show no significant difference for these two variables.

Next, we examine the compensation structure for directors. Fich and Shivdasani (2005) find that the presence of an outside director option plan increases firm value. Perry (1999) provides evidence that when independent directors receive equity-based compensation, the likelihood of CEO turnover following poor performance increases. We construct two indicator variables, DIROPT and DIREQU, to measure whether a firm has an annual option-based or

equity-based compensation plan for non-employee directors. DIROPT (DIREQU) takes the value 1 if there is an annual option-based (equity-based) compensation plan for non-employee directors in the firm and takes the value 0 otherwise. Equity-based compensation includes restricted stock grants and stock options. The results in Table 4 show that a significantly higher fraction of refocusing firms have annual option-based compensation plans for non-employee directors as compared to their matched peers ($p\text{-value}=0.015$). However, there is no significant difference in the proportion of firms with equity-based compensation plans between the two groups. Finally, we examine annual director retainer and director meeting fee. However, these two variables are not significant.

4.2.4. Ownership structure

Panel D of Table 4 presents summary statistics of equity ownership structure for refocusing firms and matched control firms. The empirical evidence has been mixed regarding the role of managerial ownership. On the one hand, equity ownership can help align the interests of managers and shareholders and thus enhance firm performance. On the other hand, it can also facilitate managerial entrenchment and adversely affect firm performance. For example, Mehran (1995) find a positive relation between firm performance and the percentage of equity held by managers while Himmelberg *et al.* (1999) document no meaningful correlation between performance and managerial ownership. It has also been suggested that equity ownership by directors, especially outside directors, can create an incentive for them to actively monitor the management. For example, Bhagat *et al.* (1999) find a positive association between firm performance and equity ownership by individual outside directors. They also show that a disciplinary-type CEO turnover in a poorly-performing firm is more likely when individual outside director's equity holdings are large. Finally, institutional investors and blockholders can

also exert pressure to force the management toward value maximization. For example, Cremers and Nair (2005) use the percentage equity ownership by a firm's largest institutional blockholder as one proxy of internal governance and find evidence that external governance mechanisms are effective only when internal control is strong. In Table 4, we examine the fraction of equity held by a firm's CEO, top 3 executives, inside directors, affiliated directors, independent directors, all executives and directors, institutional investors, institutional blockholders, and the largest institutional blockholder. The equity ownership measures include both stocks and options. However, we do not detect any significant difference in these variables between refocusing and control firms.

4.2.5. Financing characteristics

In panel E of Table 4, we investigate financing characteristics. Prior studies have provided evidence that firms may rely on debt and dividend to discipline managers. For example, Litov (2005) shows that firms with weak shareholder rights use more debt finance. John and Knyazeva (2006) show that firms with weak corporate governance on average pay higher dividends. We examine leverage ratio and dividend payout ratio for the two groups of firms. Leverage ratio is defined as long-term debt divided by total assets. Dividend payout ratio is dividend divided by net income. We do not find any significant difference in leverage ratio between the two groups. There is a significant difference in the median dividend payout ratio across the two samples ($p\text{-value}=0.046$). Compared to their matched peers, refocusing firms pay lower dividends relative to their net income.

In general, the results in Table 4 suggest that refocusing firms have characteristics associated with more effective internal control as compared to their matched counterparts. Relative to non-refocusers, refocusers have smaller boards, more independent nominating

committees, greater number of annual meetings, and lower dividend payout ratio. Executives in refocusing firms receive significantly higher percentage of total compensation that is option-based as compared to their counterparts in non-refocusing firms. Finally, a significantly larger fraction of refocusers have annual option-based compensation plans for non-employee directors than non-refocusers.

5. Multivariate analysis

In this section, we use the governance variables described above in probit regressions to explain the incidence of refocusing. Table 5 shows the results of estimation of six probit specifications. The dependent variable in these regressions is an indicator variable set to 1 for refocusing firms and 0 for control firms. Models 1 through 3 use G-INDEX as the proxy of external governance while models 4 through 6 replace G-INDEX with two sub-indices, GOV-10 and GOV-14. Consistent with the agency hypothesis, the coefficients of G-INDEX and GOV-10 are negative and significant at the 0.01 level in all regressions, indicating that the more the ATPs a firm have, and hence the weaker the takeover threat, the less the likelihood that it will refocus. The coefficients on GOV-14 are not statistically significant in any regression, which is consistent with prior findings that only a small subset of ATPs matter for firm valuation.

In all six models, we include the log of board size (LOGBSIZE), the log number of annual meetings (LOGMTGS), a dummy variable indicating whether the firm has an independent nominating committee (NOMIND), the percentage of top 3 executives' total compensation that is option-based (EXEOPTCOMP), a dummy variable indicating whether the firm has an annual option-based compensation plan for non-employee directors (DIROPT), and the dividend payout ratio (DIVPAY) as the proxies for internal governance. The univariate analysis indicates that the values of these variables are significantly different between the

refocusing and control groups at the 0.1 or better level. Consistent with the univariate results, all regressions show that NOMIND is significantly positively associated with the incidence of refocusing at the 0.01 level. The coefficients on the other five internal governance variables have their predicted sign in all regressions, but are not especially significant. The coefficients on LOGMTGS, EXEOPTCOMP, and DIROPT are positive and significant at the 0.1 or better level in all models, indicating that firms that conduct greater number of annual meetings, have annual option-based compensation plans for non-employee directors, and offer greater percentage of option-based compensation to top 3 executives are more likely to refocus. The coefficient on LOGBSIZE is negative but only significant at the 0.1 level in models 1 through 3, suggesting that firms with smaller boards show higher incidence of refocusing. DIVPAY is not significant in any model. Overall, the level of G-INDEX (GOV-10) and whether a firm has an independent nominating committee appear to have the strongest effects on its decision to refocus as the coefficients on these variables are consistently significant at the 0.01 level in all models.

Finally, we turn to a brief discussion of the control variables employed. In models 2 and 4, we add the percentage of equity held by a firm's top 3 executives and non-employee directors as two control variables since the demand for equity-based compensation is likely to be reduced when executives and directors already own a large proportion of the firm's equity (Jensen and Meckling, 1976). These two control variables are insignificant while EXEOPTCOMP and DIROPT maintain significance at the 0.1 or better level. In models 3 and 6, we include a Delaware dummy (DEINC) which is set to 1 for firms incorporated in Delaware and 0 otherwise since Daines (2001) provides evidence that Delaware corporate law enhances firm value. We also add an external event dummy (EXEVENT) which equals 1 for firms that experience disciplinary events such as management turnover, takeover attempts, financial distress, and proxy fight in the year prior to the change in focus and 0 otherwise. Denis *et al.* (1997) and

Berger and Ofek (1999) document a strong relation between corporate control events and the likelihood of refocusing. Following Denis *et al.* (1997), we define management turnover as any change in the individual occupying the position of CEO and financial distress as either a restructuring of debt claims for the purpose of resolving or avoiding default or a Chapter 11 filing. However, the results in Table 5 show that these two control variables are not statistically significant. In untabulated results we also include the other internal governance variables discussed in section 4.2 in the regression models. The univariate analysis shows that the values of these variables are not significantly different across the refocusing and control groups. Consistent with the univariate results, these variables are insignificant in any regression model while our main results are largely unaffected.

In sum, these findings are consistent with the conjecture that firms with more effective corporate governance are more likely to refocus when diversification is destroying value.

6. Value creation around refocusing

In order to confirm that refocusing does create value, we examine the changes in excess value from the year prior to the refocusing (year -1) to the year following the refocusing (year +1) for both the refocusing and control firms. We are able to obtain Compustat data at both the firm level and the business segment level for 114 refocusing firms and 110 control firms in the year after the refocusing. Panel A of Table 6 shows that both the refocusing and control firms are valued at a substantial discount relative to their single segment peers in year -1. The refocusing firms have a significant increase in the mean and median excess value from year -1 to year +1, although they continue trading at a discount in year +1. The control firms, however, do not significantly change their firm value. The last column of Panel A presents test statistics for comparing the changes in excess value for refocusing and control firms. The results show that

refocusing firms experience significantly greater improvement in firm value from year -1 to year +1 as compared to their matched counterparts. The mean and median changes in firm value of the two groups are significantly different from each other at the 0.05 level and the 0.1 level, respectively.

One argument for the increase in firm value after refocusing is that firms are simply divesting deeply discounted segments. In other words, a reduction in imputed value rather than an increase in market value is largely responsible for the increase in excess value. To address this issue, we compare the changes in market value and imputed value from year -1 to year +1 for the sample of refocusing firms. The results in Panel B and Panel C of Table 6 show that the refocusing firms do significantly increase the median market value but the mean market value and the mean and median imputed values do not significantly change. Therefore, the increase in firm value for the sample of refocusing firms can not be fully explained by the fact that firms are simply divesting highly discounted segments.

We also examine the market reaction to refocusing announcements of the sample firms by computing cumulative abnormal returns (CARs). 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. As noted, several firms shed a division by implementing multiple divestitures. In these cases, we use the first announcement of divestiture as the announcement date. After excluding observations where an exact announcement date is unavailable or where announcements occur concurrently with earnings release, dividend declaration, and other material corporate information, we are left with 106 refocusing announcements. Table 7 summarizes CARs over different time intervals around the announcement date for the sample of refocusing firms. Significant CARs ranging from 4.0%

to 4.5% are found, depending on the event window. All CARs are statistically significant at the 0.01 level.

In sum, we find that firms that choose to refocus have more effective corporate governance structure relative to their matched peers. We also find a significant decrease in the diversification discount as well as a significantly positive announcement return associated with refocusing. Further, firms that do refocus experience significantly greater value enhancements than their matching firms. These findings suggest that agency issues are important in determining whether firms choose to reverse value-reducing diversification policies.

7. Robustness

In Table 8, we report the results of a battery of sensitivity and robustness checks. First, we estimate OLS regressions to examine the effect of different governance variables on the change in firm excess value around refocusing. Models 1 and 2 show the results of the OLS regressions to explain the changes in excess value for a sample of 114 firms that completed refocusing in the period 1993-2005. The results indicate that firms that have higher board meeting frequency and firms that pay top 3 executives higher percentage of option-based compensation experience greater value enhancements after refocusing. None of the other governance variables are significantly related to the change in firm excess value. In addition, we do not find any evidence that the cumulative abnormal returns around refocusing announcements are significantly related to the governance variables.

Second, we examine whether refocusing occurs only in firms with sufficiently strong internal as well as strong external governance. We create an indicator variable **STRONG** to capture strong internal governance and strong external governance. The variable **STRONG** is equal to one if the sum of **LOGBSIZE_D**, **NOMIND**, **EXEOPTCOMP_D**, **DIROPT**,

DIVPAY_D, and G-INDEX_D is above the median of all sample and control firms and is 0 otherwise. LOGBSIZE_D is an indicator variable and is equal to 1 if the board size of the firm is below the median of all sample and control firms and is 0 otherwise. Yermack (1996) presents evidence that smaller boards are more effective monitors than larger boards by documenting an inverse relation between firm value and board size. NOMIND is an indicator variable set to 1 if all nominating committee members are independent directors and 0 otherwise. EXEOPTCOMP_D is a dummy variable set to 1 if the percentage of top 3 executives' total compensation that is option based is above the median of all sample and control firms and is 0 otherwise. Mehran (1995) provides evidence that firm performance is positively associated the percentage of executive compensation that is equity-based. DIROPT takes the value 1 if there is an annual option-based compensation plan for non-employee directors in the firm and takes the value 0 otherwise. DIVPAY_D takes the value 1 if the ratio of dividend to net income is below the median of all sample and control firms and is 0 otherwise. John and Knyazeva (2006) show that firms with weak corporate governance on average pay higher dividends. G-INDEX_D is equal to 1 if G-index is below the median of all sample and control firms and is 0 otherwise. Model 3 in table 8 shows that the indicator variable STRONG is positively and significantly related to the probability of refocus in the univariate regression, suggesting that firms with strong internal and external governance are more likely to refocus. Models 4 and 5 show the results when we add the indicator variable STRONG in regression models 1 and 4 in Table 5 and re-estimate these two regressions. The results indicate that the variable STRONG is positive but insignificant while our main results are unaffected.

8. Conclusion

A large and growing literature documents that good corporate governance enhances firm value. However, much less is known about how governance affects, rather than reflects, value. We contribute to this growing literature by uncovering a direct link between governance and a firm's decision to engage in a value-improving refocusing transaction. We study a sample of multi-segment firms that choose to decrease the level of diversification through divestitures, tax-free spinoffs, or discontinued operations from 1993 to 2005. We find that refocusing firms have more effective governance structure than their non-refocusing counterparts that are matched on a wide variety of characteristics. Specifically, we find that refocusers have significantly lower G-index (or Gov-10) relative to controls, suggesting that refocusers have higher quality of external governance. We also find that refocusers have characteristics associated with more effective internal control. Relative to non-refocusers, refocusers have smaller boards, more independent nominating committees, greater number of annual meetings, and lower dividend payout ratio. Executives in refocusers receive significantly higher percentage of total compensation that is option-based as compared to their counterparts in non-refocusers. And a significantly larger fraction of refocusers have annual option-based compensation plans for non-employee directors than non-refocusers. Using multivariate probit analysis and controlling for various governance factors, we find that the G-index (or Gov-10) and whether a firm has an independent nominating committee appear to have the strongest impacts on its decision to refocus. Finally, we find that refocusing events are associated with a significantly positive announcement return and a significant decrease in the diversification discount. Firms that do refocus experience significantly greater value enhancements than their controls. The results suggest that agency issues have a significant impact on whether firms choose to reverse value-reducing diversification policies.

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Table 1 Description of sample

The sample starts with 510 firm-year observations of multi-segment firms that report a decrease in the number of business segments during the period 1993-2005 and are jointly covered by the Compustat Annual Industrial database, the Compustat Business Segment Information database, and the IRRC Governance database. Firms with dual-class common stock and with segments in the financial services industry (SIC 6000 to 6999) or in the regulated utilities industry (SIC 4900 to 4999) are excluded.

<i>Panel A: Sample selection procedure</i>	
Initial sample	510
Reason for elimination	
Reporting change	185
Exchange offer	1
Taxable spinoff	2
Sploff	1
Equity carve-out	1
Incompleted divestiture	2
Unable to identify the source of change in number of segments	9
Associated with major restructuring	33
No IBES data available	27
No data in the IRRC Directors database, the Compustat Executive compensation database, or the CDA/Spectrum Institutional Holdings database	93
Consolidate divestitures in two consecutive years	8
Final sample	148
<i>Panel B: Classification of reason for decrease in diversification</i>	
Divestiture	119
Tax-free spinoff	16
Discontinued operation	9
Mixture of transactions	4
Final sample	148

Table 2 Propensity score matching

Panel A reports probit estimates from the model of firms' propensity to refocus. The dependent variable takes the value 1 if the observation is a refocusing firm and 0 otherwise. Columns 2 to 4 display the estimated coefficients, t-statistics, and p-values. EV is sales based excess value 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. RVA is relative value added by allocation. RVA is defined as firm-and-industry adjusted investment rate weighted by segment sales and the difference between industry median Tobin's q for the segment and the sales-weighted average q for the firm. MB is the ratio of the market value of assets to the book value of assets, where market value is defined as the book value of debt plus the market value of common equity. CFS is the ratio of cash flow to total sales, where cash flow is defined as net income plus depreciation. ERR is the forecast error in earnings, defined as the absolute difference between actual earnings and the median forecasted earnings deflated by the median forecasted earnings. UENTROPY is the unrelated entropy and is measured as 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 two-digit SIC level and the summation is over n two-digit industry segments where the firm operates. LOGAT is the log of total assets. MSHARE is the ratio of firm sales to two-digit industry sales. ISGROW is industry sales growth rate, where industry is defined at the two-digit SIC level. GDP is real growth rates of GDP and CONTRAC is the number of contractionary months in the year. Panel B reports the means of the independent variables used to estimate the probit model and paired t-statistics and p-values of differences in means between the sample and control firms for each variable.

Panel A: Propensity score estimation

	Coefficient	T statistics	P-value
Constant	-2.040	-6.070	0.000
EV	-0.123	-1.980	0.048
RVA	-3.274	-1.247	0.212
MB	-0.032	-0.597	0.551
CFS	-0.903	-3.365	0.001
ERR	0.010	2.129	0.033
UENTROPY	0.421	3.575	0.000
LOGAT	0.083	2.230	0.026
MSHARE	-1.045	-1.155	0.248
ISGROW	0.215	0.752	0.452
GDP	0.005	0.089	0.929
CONTRAC	-0.014	-0.579	0.562
Pseudor R^2			0.051
N			1584

Panel B: Mean firm characteristics

	Refocusing firms	Control firms	T statistics for tests of differences	P-value
Firm characteristics				
EV	-0.382	-0.400	0.210	0.834
RVA	0.001	0.000	0.320	0.750
MB	1.681	1.682	-0.004	0.997
CFS	0.005	0.052	-1.215	0.226
ERR	2.144	0.287	1.350	0.179
UENTROPY	0.526	0.550	-0.662	0.509
LOGAT	7.724	7.775	-0.328	0.743
MSHARE	0.027	0.032	-0.820	0.414
ISGROW	0.037	0.044	-0.400	0.689
GDP	3.247	3.247		
CONTRAC	0.770	0.797	-0.430	0.668

Table 3 Governance indices and provisions

Panel A reports summary statistics of the G-Index, Gov-10, and Gov-14 for a sample of 148 firms that refocused during the sample period and a sample of 148 matched control firms that did not refocus. The G-Index comprises 24 antitakeover provisions and is created by adding one point if the firm has a specific provision in place and zero otherwise. The values of the G-Index are between 0 and 24. Gov-10 (Gov-14) is based on the 10 provisions (the 14 provisions) the incidence of which is significantly (not significantly) different between the two samples. The values of Gov-10 (Gov-14) range from 0 to 10 (0 to 14). Panel B reports the percentage of firms with each provision comprising the G-Index. Panel C presents the correlation matrix of the refocusing dummy, the G-Index, Gov-10, and Gov-14. REFOCUS is an indicator variable that is set to 1 for firms that refocused and 0 otherwise. T-statistics for the difference in the mean and Z-statistics from the Wilcoxon signed ranks test for the difference in the median are reported. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Antitakeover Provision Indices

Variables		Refocusing firms	Control firms	T/Z statistics for tests of differences	P-value
G-Index	Mean	9.824	10.703	-2.963	0.004
	Median	10.000	11.000	-2.631	0.009
Gov-10	Mean	3.878	4.764	-4.590	0.000
	Median	4.000	5.000	-4.496	0.000
Gov-14	Mean	5.946	5.939	0.039	0.969
	Median	6.000	6.000	0.197	0.843

Panel B: Antitakeover provisions

Governance Provisions	Refocusing firms	Control firms	T statistics for tests of differences	P-value
Antigreenmail	22.30%	25.68%	-0.686	0.494
Blank Check	90.54%	93.92%	-1.043	0.299
Business Combination	93.24%	94.59%	-0.499	0.619
Bylaws	24.32%	20.95%	0.699	0.486
Charter	4.05%	0.00%	2.492	0.014
Classified Board	64.86%	77.03%	-2.246	0.026
Compensation Plans	76.35%	84.46%	-1.965	0.051
Contracts	14.86%	16.22%	-0.364	0.716
Control-Share Cash-Out	1.35%	4.73%	-1.677	0.096
Cumulative Voting	88.51%	91.89%	-0.962	0.338
Director' Duties	4.05%	12.16%	-2.608	0.010
Fair Price	54.05%	66.22%	-2.178	0.031
Golden Parachute	66.89%	77.03%	-1.907	0.059
Indemnification	28.38%	41.22%	-2.433	0.016
Liability	54.73%	66.89%	-2.401	0.018
Pension Parachutes	5.41%	6.08%	-0.276	0.783
Poison Pill	72.97%	66.22%	1.233	0.220
Secret Ballot	76.35%	83.11%	-1.419	0.158
Severance	8.11%	6.08%	0.653	0.515
Silver Parachutes	2.70%	4.05%	-0.631	0.529
Special Meeting	47.30%	45.27%	0.371	0.711
Supermajority	33.11%	46.62%	-2.467	0.015
Unequal Voting	2.03%	2.03%	0.000	1.000
Written Consent	45.95%	37.84%	1.345	0.181

Panel C: Pearson correlation coefficients of refocusing dummy and antitakeover provision indices

Variable	REFOCUS	G-Index	Gov-10
G-Index	-0.167 (0.004)***		
Gov-10	-0.247 (0.000)***	0.830 (0.000)***	
Gov-14	0.002 (0.969)	0.751 (0.000)***	0.256 (0.000)***

Table 4 Internal governance variables

Panel A reports summary statistics of the board characteristics. MINDBOARD is a dummy variable set to 1 if more than 50% of the board members are independent directors. AUDITIND/COMPIND/NOMIND are indicator variables set to 1 if all audit/compensation/nominating committee members are independent directors and 0 otherwise. NOCEOCHR is a dummy variable which equals 1 if the CEO is not the chairman of the board and 0 otherwise. NOINLOCK is a dummy variable which equals 1 if there are no interlocked directors on the board and 0 otherwise. NOEMPCHR is a dummy variable which equals 1 if the chairman is not an insider. NOTBUSY is an indicator variable which takes the value 1 if less than 50% of the board's outside directors hold three or more board positions and 0 otherwise. ATTENDANCE is an indicator variable set to 1 if all directors on the board attended at least 75% of board and committee meetings in the year and 0 otherwise. Panel B presents summary statistics for CEO characteristics. FOUNDER is an indicator variable which equals 1 if the CEO is the founder of the firm or is from the founding family and 0 otherwise. Panel C reports summary statistics for the structure of executives and directors' compensation. Total compensation comprises of the following: salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted long-term incentive payouts, and all other total. The percentage of total compensation that is option-based is measured as the ratio of the value of stock options granted to total compensation. The percentage of equity-based compensation is the ratio of the sum of the value of restricted stock granted and the value of stock options granted to total compensation. The cash percentage of total compensation is the ratio of salary plus bonus to total compensation. DIROPT (DIREQU) takes the value 1 if there is an annual option-based (equity-based) compensation plan for non-employee directors in the firm and takes the value 0 otherwise. Panel D presents summary statistics of equity ownership structure. The equity ownership measures include both stocks and options. Panel E reports summary statistics for financing variables. Leverage ratio is defined as long-term debt divided by total assets. Dividend payout ratio is dividend divided by net income. Median values are reported in parentheses. T-statistics for the change in mean and Z-statistics from the Wilcoxon signed ranks test for the change in median are presented. Sample sizes vary due to missing data.

	Sample size	Refocusing firms	Control firms	T/Z statistics for tests of differences	P-value
<i>Panel A: Board characteristics</i>					
<i>A.1. Board size</i>					
Number of board members	148	9.770	10.270	-1.687	0.094
	148	(9.000)	(10.000)	(-1.794)	(0.073)
<i>A.2. Board independence</i>					
% Insider directors	148	0.180	0.173	0.607	0.545
	148	(0.148)	(0.125)	(1.059)	(0.290)
% Affiliated directors	148	0.129	0.137	-0.481	0.631
	148	(0.111)	(0.111)	(-0.815)	(0.415)
% Independent directors	148	0.691	0.690	0.040	0.968
	148	(0.727)	(0.714)	(0.185)	(0.853)
MINDBOARD	148	86.49%	83.11%	0.821	0.413
AUDITIND	148	66.22%	66.89%	-0.122	0.903
COMPIND	148	77.03%	72.97%	0.801	0.425
NOMIND	148	54.05%	35.81%	3.214	0.002
NOCEOCHR	148	25.00%	18.24%	1.514	0.132
NOINLOCK	148	89.19%	91.22%	-0.576	0.565
NOEMPCHR	148	12.84%	10.81%	0.556	0.579
<i>A.3. Busy board</i>					
NOTBUSY	148	66.22%	71.62%	-1.033	0.303
Average number of directorships-inside	148	1.854	1.904	-0.452	0.652
	148	(1.667)	(1.775)	(-0.405)	(0.685)
Average number of directorships-affiliated	148	1.786	1.753	0.230	0.819
	148	(1.000)	(1.000)	(0.316)	(0.752)
Average number of directorships-independent	148	2.265	2.249	0.158	0.875
	148	(2.042)	(2.000)	(0.185)	(0.854)
<i>A.4 Board engagement</i>					
ATTENDANCE	148	84.46%	80.41%	0.948	0.345
Number of annual meetings	146	8.095	7.260	2.196	0.030
	146	(7.000)	(7.000)	(2.180)	(0.029)
Average age of directors	148	59.662	59.751	-0.236	0.814
	148	(59.683)	(60.143)	(-0.272)	(0.786)

Table 4 Continued

	Sample size	Refocusing firms	Control firms	T/Z statistics for tests of differences	P-value
<i>Panel B: CEO characteristics</i>					
CEO age	148	55.318	56.081	-0.979	0.329
	148	(55.000)	(56.000)	(-0.775)	(0.438)
CEO tenure	148	6.484	6.638	-0.211	0.833
	148	(4.773)	(4.808)	(-0.161)	(0.872)
FOUNDER	148	6.08%	4.05%	0.831	0.407
<i>Panel C: Compensation structure</i>					
<i>C.1. Executive compensation structure</i>					
% of CEOs' option-based compensation	147	0.391	0.337	1.806	0.073
	147	(0.388)	(0.315)	(1.808)	(0.071)
% of CEOs' equity-based compensation	147	0.451	0.404	1.514	0.132
	147	(0.497)	(0.403)	(1.544)	(0.122)
% of CEOs' cash-based compensation	147	0.455	0.475	-0.675	0.501
	147	(0.398)	(0.465)	(-0.445)	(0.656)
% of top 3 executives' option-based compensation	148	0.405	0.340	2.361	0.020
	148	(0.398)	(0.322)	(2.305)	(0.021)
% of top 3 executives' equity-based compensation	148	0.470	0.418	1.827	0.070
	148	(0.500)	(0.404)	(1.884)	(0.060)
% of top 3 executives' cash-based compensation	148	0.429	0.471	-1.530	0.128
	148	(0.370)	(0.454)	(-1.309)	(0.190)
CEOs' total compensation (\$thous)	147	5,477.099	6,062.375	-0.527	0.599
	147	(2,916.517)	(2,798.167)	(-0.458)	(0.647)
Top 3 executives' total compensation (\$thous)	148	10,795.027	10,506.512	0.174	0.862
	148	(6,154.185)	(6,098.254)	(0.360)	(0.719)
<i>C.2. Director compensation structure</i>					
DIROPT	148	68.92%	55.41%	2.467	0.015
DIREQU	148	87.16%	82.43%	1.221	0.224
Annual director retainer (\$thous)	146	25.260	27.456	-1.295	0.197
	146	(25.000)	(25.000)	(-1.296)	(0.195)
Director meeting fee (\$thous)	146	0.993	1.018	-0.333	0.740
	146	(1.000)	(1.000)	(-0.444)	(0.657)

Table 4 Continued

	Sample size	Refocusing firms	Control firms	T/Z statistics for tests of differences	P-value
<i>Panel D: Ownership structure</i>					
CEO ownership	147	0.019	0.017	0.396	0.693
	147	(0.008)	(0.009)	(-0.567)	(0.571)
Top 3 executives' ownership	145	0.042	0.038	0.690	0.492
	145	(0.024)	(0.025)	(-0.374)	(0.708)
Inside directors' ownership	147	0.010	0.028	0.627	0.532
	147	(0.010)	(0.011)	(-0.238)	(0.812)
Affiliated directors' ownership	147	0.015	0.018	-0.668	0.505
	147	(0.000)	(0.001)	(-1.064)	(0.288)
Independent directors' ownership	147	0.008	0.010	-0.868	0.387
	147	(0.002)	(0.002)	(-0.137)	(0.891)
Executives and directors' ownership	145	0.064	0.065	-0.023	0.982
	145	(0.035)	(0.039)	(-0.119)	(0.905)
Institutional ownership	148	0.667	0.650	0.834	0.405
	148	(0.676)	(0.661)	(1.480)	(0.139)
Institutional blockholder ownership	148	0.171	0.170	0.085	0.932
	148	(0.170)	(0.150)	(0.128)	(0.898)
Largest institutional blockholder ownership	148	0.087	0.093	-1.020	0.309
	148	(0.090)	(0.090)	(-0.803)	(0.422)
<i>Panel E: Financing characteristics</i>					
Leverage	148	0.228	0.212	1.049	0.296
	148	(0.218)	(0.206)	(0.637)	(0.524)
Dividend payout	148	0.136	1.033	-1.146	0.253
	148	(0.000)	(0.216)	(-1.997)	(0.046)

Table 5 Probit regressions on the refocusing decision

The table reports probit estimates from the model of firms' propensity to refocus. The dependent variable takes the value 1 if the observation is a refocusing firm and 0 otherwise. LOGBSIZE is the natural log of the number of directors on the board. LOGMTGS is the log of the number of annual meetings. NOMIND is an indicator variables set to 1 if all nominating committee members are independent directors and 0 otherwise. EXEOPTCOMP is the percentage of top 3 executives' total compensation that is option based. DIROPT takes the value 1 if there is an annual option-based compensation plan for non-employee directors in the firm and takes the value 0 otherwise. DIVPAY is dividend divided by net income. EXEHOLDING and DIRHOLDING are the percentage of equity held by a firm's top 3 executives and non-employee directors, respectively. DEINC is an indicator variable set to 1 if a firm is incorporated in Delaware and 0 otherwise. EXEVENT is an indicator variable that equals 1 for firms that experience disciplinary events such as management turnover, takeover attempts, financial distress, and proxy fight in the year prior to the change in focus and 0 otherwise. Management turnover is defined as any change in the individual occupying the position of CEO. Financial distress is defined as either a restructuring of debt claims for the purpose of resolving or avoiding default or a Chapter 11 filing. T-statistics are reported in parentheses. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively. Sample sizes vary due to missing data.

Model	1	2	3	4	5	6
Constant	0.757 (0.910)	0.901 (1.001)	0.814 (0.893)	0.219 (0.255)	0.459 (0.496)	0.523 (0.561)
G-INDEX	-0.087 (-2.889)***	-0.092 (-2.973)***	-0.089 (-2.830)***			
GOV-10				-0.196 (-4.126)***	-0.211 (-4.261)***	-0.229 (-4.175)***
GOV-14				0.050 (0.924)	0.049 (0.905)	0.065 (1.127)
LOGBSIZE	-0.599 (-1.819)*	-0.617 (-1.842)*	-0.614 (-1.824)*	-0.507 (-1.519)	-0.548 (-1.610)	-0.555 (-1.625)
LOGMTGS	0.431 (1.901)*	0.405 (1.765)*	0.394 (1.714)*	0.428 (1.870)*	0.395 (1.702)*	0.404 (1.735)*
NOMIND	0.561 (3.565)***	0.574 (3.589)***	0.571 (3.562)***	0.570 (3.571)***	0.580 (3.570)***	0.581 (3.561)***
EXEOPTCOMP	0.635 (1.891)*	0.666 (1.961)**	0.639 (1.839)*	0.582 (1.699)*	0.613 (1.765)*	0.609 (1.717)*
DIROPT	0.291 (1.775)*	0.295 (1.780)*	0.295 (1.779)*	0.309 (1.853)*	0.316 (1.881)*	0.321 (1.903)*
DIVPAY	-0.047 (-0.517)	-0.045 (-0.491)	-0.041 (-0.454)	-0.050 (-0.538)	-0.047 (-0.499)	-0.050 (-0.531)
EXEHOLDING		0.911 (0.603)	0.948 (0.623)		0.779 (0.507)	0.697 (0.455)
DIRHOLDING		-1.759 (-1.189)	-1.858 (-1.249)		-2.342 (-1.541)	-2.298 (-1.509)
DEINC			0.121 (0.756)			-0.144 (-0.792)
EXEVENT			0.038 (0.161)			0.049 (0.206)
Pseudor R ²	0.097	0.103	0.105	0.120	0.128	0.130
N	294	291	291	294	291	291

Table 6 Changes in firm excess value

The table shows the changes in excess value from the year prior to the refocusing (year -1) to the year following the refocusing (year +1) for both the refocusing and control firms. Excess value is measured as the log of the ratio of a firm's market value to the sum of the imputed value of its segments as stand-alone firms. Market value is computed as the book value of debt plus the market value of common equity. Imputed value is 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 two-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 two-digit SIC level, the one-digit SIC level is examined. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

		Pre-refocusing	Post-refocusing	Changes	T/Z statistics for tests of difference in changes
		Year -1	Year+1	Post-Pre	
<i>Panel A: Excess value</i>					
Refocusing firms	Mean	-0.382***	-0.290***	0.134**	2.416**
	Median	-0.347***	-0.226***	0.103**	1.701*
	Sample size	148	114	114	
Control firms	Mean	-0.400***	-0.359***	0.022	
	Median	-0.203***	-0.235***	0.022	
	Sample size	148	110	110	
<i>Panel B: Market value</i>					
Refocusing firms	Mean	11,204.840	11,791.585	-369.865	
	Median	3,140.970	3,661.810	125.158**	
	Sample size	148	116	116	
<i>Panel C: Imputed value</i>					
Refocusing firms	Mean	18,119.680	16,846.220	-1,690.281	
	Median	4,836.350	5,137.410	-92.500	
	Sample size	148	114	114	

Table 7 Cumulative abnormal returns around refocusing announcements

The table shows cumulative abnormal returns (CARs) for 106 refocusing announcements for the sample firms. Announcements are collected from news articles in Lexis-Nexis. Announcements occurring concurrently with earnings release, dividend declaration, and other material corporate information are excluded. 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 t test and the Wilcoxon signed ranks test are used to test the significance of the mean and median, respectively. The p-values for tests of significance are reported in parentheses.

Interval	Mean	Median	% positive
CAR (day -1 to day 0)	0.04 (0.00)	0.02 (0.00)	70.75
CAR (day -1 to day +1)	0.05 (0.00)	0.02 (0.00)	70.75
CAR (day -2 to day +2)	0.04 (0.00)	0.02 (0.00)	66.04
CAR (day -5 to day +5)	0.04 (0.00)	0.02 (0.01)	62.26

Table 8 Robustness

Models 1 and 2 are ordinary least squares regressions to explain the changes in firm excess value for a sample of 114 firms that completed refocusing in the period 1993-2005. The dependent variable is the change in excess value from the year prior to the refocusing (year -1) to the year following the refocusing (year +1). Excess value is measured as the log of the ratio of a firm's market value to the sum of the imputed value of its segments as stand-alone firms. LOGBSIZE is the natural log of the number of directors on the board. LOGMTGS is the log of the number of annual meetings. NOMIND is an indicator variable set to 1 if all nominating committee members are independent directors and 0 otherwise. EXEOPTCOMP is the percentage of top 3 executives' total compensation that is option based. DIROPT takes the value 1 if there is an annual option-based compensation plan for non-employee directors in the firm and takes the value 0 otherwise. DIVPAY is dividend divided by net income. EXEHOLDING and DIRHOLDING are the percentage of equity held by a firm's top 3 executives and non-employee directors, respectively. DEINC is an indicator variable set to 1 if a firm is incorporated in Delaware and 0 otherwise. EXEVENT is an indicator variable that equals 1 for firms that experience disciplinary events such as management turnover, takeover attempts, financial distress, and proxy fight in the year prior to the change in focus and 0 otherwise. Management turnover is defined as any change in the individual occupying the position of CEO. Financial distress is defined as either a restructuring of debt claims for the purpose of resolving or avoiding default or a Chapter 11 filing. Models 3 to 5 are probit regressions to estimate firms' propensity to refocus. The dependent variable takes the value 1 if the observation is a refocusing firm and 0 otherwise. The variable STRONG is equal to one if the sum of LOGBSIZE_D, NOMIND, EXEOPTCOMP_D, DIROPT, DIVPAY_D, G-INDEX_D is above the median of all sample and control firms and is 0 otherwise. LOGBSIZE_D is an indicator variable and is equal to 1 if the board size of the firm is below the median of all sample and control firms and is 0 otherwise. NOMIND is an indicator variable set to 1 if all nominating committee members are independent directors and 0 otherwise. EXEOPTCOMP_D is a dummy variable set to 1 if the percentage of top 3 executives' total compensation that is option based is above the median of all sample and control firms and is 0 otherwise. DIVPAY_D takes the value 1 if the ratio of dividend to net income is below the median of all sample and control firms and is 0 otherwise. G-INDEX_D is equal to 1 if G-index is below the median of all sample and control firms and is 0 otherwise. T-statistics are reported in parentheses. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively. Adjusted R² is reported for models 1 and 2 and Pseudor R² is reported for models 3 to 5.

Model	1	2	3	4	5
Constant	-0.733 (-1.17)	-0.471 (-0.73)	-0.243 (-2.66)***	0.337 (0.37)	-0.108 (-0.11)
STRONG			0.709 (4.50)***	0.237 (1.08)	0.191 (0.85)
G-INDEX	0.012 (0.49)			-0.076 (-2.38)**	
GOV-10		0.064 (1.49)			-0.185 (-3.76)***
GOV-14		-0.038 (-0.92)			0.056 (-1.03)
LOGBSIZE	0.120 (0.51)	0.038 (0.16)		-0.449 (-1.26)	-0.389 (-1.08)
LOGMTGS	0.376 (2.47)**	0.360 (2.37)**		0.429 (1.88)*	0.427 (1.86)*
NOMIND	-0.188 (-1.51)	-0.180 (-1.45)		0.513 (3.14)***	0.532 (-3.21)***
EXEOPTCOMP	-0.495 (-1.98)*	-0.459 (-1.84)*		0.500 (1.40)	0.477 (1.31)
DIROPT	-0.108 (-0.83)	-0.146 (-1.11)		0.221 (1.25)	0.251 (-1.40)
DIVPAY	0.186 (1.64)	0.178 (1.58)		-0.029 (-0.53)	-0.031 (-0.35)
EXEHOLDING	0.676 (0.61)	0.585 (0.53)			
DIRHOLDING	-0.611 (-0.44)	-0.259 (-0.18)			
DEINC	-0.072 (-0.59)	0.016 (0.12)			
EXEVENT	0.196 (1.18)	0.185 (1.12)			
R ²	0.062	0.072	0.051	0.100	0.122
N	114	114	296	294	294

CHAPTER 3

INSIDER TRADING AND CORPORATE SPINOFFS

1. Introduction

Numerous studies (e.g. Hite and Owers, 1983; Miles and Rosenfeld, 1983; Schipper and Smith, 1983; Desai and Jain, 1999; Daley *et al.*, 1997) document a significant positive announcement effect for spinoffs as well as the long-run positive abnormal stock market and operating performance in the post-spinoff period. There is also considerable empirical evidence that insiders possess valuable information regarding the future price of their firms' stocks (e.g. Clarke *et al.*, 2001; Lee, 1997). Typically, they sell (or postpone purchases) before significant stock price decreases and buy (or postpone sales) before significant price increases. Given the literature on spinoffs and the literature on insider trading, a natural question to ask is how insiders trade prior to spinoffs and whether insider trading provides insights into the post-spinoff performance of the firms.

The study analyzes personal trades made by corporate insiders in their firm's stock prior to the announcement of a spinoff. Since insiders have intimate knowledge of their firm's operations, transactions insiders take on their own behalf should reflect their belief regarding the future prospects of the firm. If the firm is currently undervalued and the spinoff is undertaken to enhance market valuation, then we expect insiders to increase their share purchases or decrease their sales prior to the spinoff announcement. Either action results in a higher net share purchase measure. In addition, we could also expect a strong relation between insider trading prior to the announcement and the improvements in the long-run performance of spinoff firms. If only firms with prior increases in insider net purchases exhibit significant improvements in the long-run performance around spinoffs but the other firms do not, then insiders may intentionally trade on superior information regarding the true value of the firm. Otherwise, prior insider trading patterns may simply reflect a tendency for insiders to mechanically follow price increases or decreases. Finally, if investors regard the prior insider trading activity of the firm as a useful

backdrop for evaluating its spinoff decisions, then the spinoff announcement period excess returns are expected to be significantly higher in firms with prior increases in insider net purchases.

The purpose of this paper is to examine insider trading around corporate spinoffs to test these hypotheses. We begin by examining insiders' personal trading of their stock before the announcement of spinoffs. Insider trading in this study is restricted to top executives' open-market and private transactions. The sample consists of 187 separate spinoff events by 172 parent firms during 1987-2006. The results show a clear and almost monotonic increase (decrease) in the number of insider purchases and net purchases (sales) in the four quarters prior to the announcement. Moreover, relative to the benchmark period, insider selling (net purchasing) is significantly lower (higher) in the three quarters prior to the announcement.

Next, we examine whether insider trading has predictive power for spinoff announcement effects. Here, we stratify the sample based on insider trading activity within a quarter prior to the announcement day. Spinoffs with positive abnormal insider net purchases are classified as "abnormal net purchase sample" while those with zero or negative abnormal insider net purchases are classified as "abnormal net sale sample". Consistent with our hypotheses, we find that the announcement period excess returns for the abnormal net purchase group are significantly higher than those for the abnormal net sale group, suggesting that the market views spinoff decisions by firms with prior abnormal net purchases as more compatible with shareholder interests.

Finally, we investigate the ties between insider trading activity and changes in firm performance around spinoffs. The results show that only the firms in the abnormal net purchase subgroup exhibit significant improvements in long-run stock market performance and operating

performance following spinoffs. These results indicate that managers know when their firms are undervalued and time their own trades accordingly.

The rest of the paper is organized as follows. Section 2 reviews the related research and develops the hypothesis to be tested. Section 3 describes the sample selection procedure. Section 4 presents evidence on insider trading before the spinoff announcement. The results of the stock market performance and the operating performance around spinoffs are reported in section 5 and 6, respectively. Section 7 concludes the paper.

2. Related literature and hypothesis development

Numerous studies, such as Hite and Owers (1983), Miles and Rosenfeld (1983), and Schipper and Smith (1983) among others, document a significant positive stock price reaction to the announcement of spinoffs. There is also considerable empirical evidence that spinoffs, on average, enhance long-run shareholder value (e.g. Burch and Nanda, 2003; Ahn and Denis, 2004). A variety of reasons has 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.

Studies dating back to the late 1960s and early 1970s, such as Lorie and Niederhoffer (1968), Pratt and Devere (1970), Jaffe (1974), and Finnerty (1976), etc., document that insiders earn significant abnormal profits by trading stocks of their own firms. More recently, researchers have examined insider trading around corporate announcements of asset sales (Hirschey and Zaima, 1989), capital expenditures (John and Mishra, 1990), corporate bankruptcy (Seyhun and

Bradley, 1997), dividend (John and Lang, 1991), earnings (Penman, 1982; Elliot *et al.*, 1984), equity issues (Clarke *et al.*, 2001; Kahle, 2000; Lee, 1997), mergers and acquisitions (Akbulut, 2005; Boehmer and Metter, 1997; Seyhun, 1990b; Song, 2005), and stock repurchases (Lee *et al.*, 1992). Most studies document significant changes in insider trading patterns before the public announcement. For example, Lee *et al.* (1992) find evidence of increased buying by insiders prior to fixed price repurchase offers, and of decreased selling prior to fixed price repurchases and repurchases that follow takeover-related events. Kahle (2000) shows that insider sales increase and purchases decrease prior to issues of equity and convertible debt by industrial firms. Clarke *et al.* (2001) provide evidence that insider selling increases prior to both completed and canceled seasoned equity offerings.

In this study, we analyze personal trades made by corporate insiders in their firm's stock prior to the announcement of a spinoff. Since insiders have intimate knowledge of their firm's operations, transactions insiders take on their own behalf should reflect their belief regarding the future prospects of the firm. If the firm is currently undervalued and the spinoff is undertaken to enhance market valuation, then we expect insiders to increase their share purchases or decrease their sales prior to the spinoff announcement. Either action results in an increase in net share purchases.

Hypothesis 1. Insider net share purchases will increase prior to the announcement of a spinoff.

However, as Lee (1997) points out, the abnormal insider trading patterns around corporate announcements could simply reflect a tendency for insiders to sell (buy) to mechanically follow price increases (decreases) rather than a tendency for them to take advantage of specific information unavailable to the public. One way to investigate this issue is to examine the relation between insider trading and the long-term performance of the firm. For

example, Lee (1997) shows that primary issuers significantly underperform their benchmarks in the long run, regardless of the insiders' prior trading pattern. For secondary issuers, only those with insiders selling their shares before issuing significantly underperform their benchmarks in the long run, while the others do not. This indicates that those primary and secondary issuers with insiders selling their shares before issuing seem to be knowingly selling overvalued equity, while those primary issuers with insiders purchasing shares before issuing do not seem to be knowingly selling overvalued equity. In this paper, we examine whether the insider trading pattern before the spinoff announcement is related to improvements in long-run stock market performance and operating performance of the firm around the spinoff. Our assumption is that insiders are aware of the *correct* valuation of the firm at the time of the spinoff decision and not all spinoffs are motivated by undervaluation. Whereas insiders of undervalued firms have incentives to increase their net purchases of the firm's stocks, the motive disappears in the absence of undervaluation. As such, we should be able to separate firms where undervaluation is a motive from other firms by examining insider trading. Significant improvements in long-run stock market performance and operating performance following spinoffs are expected in firms with prior increases in insider net purchases.

Hypothesis 2. Following a spinoff, firms with prior increases in insider net purchases will exhibit significant improvements in long-run stock market performance and operating performance.

These studies also suggest that insiders' personal trading of their stock prior to a corporate announcement is related to the market reaction to the announcement. For example, Hirschey and Zaima (1989) find that the most positive market reactions to corporate sell-off announcements occur in closely held firms displaying insider net-buy activity during the six-month period immediately before the sell-off announcement. John and Lang (1991) present

evidence that the announcement day excess returns are negative and significantly lower for firms with insider selling prior to the dividend initiation announcement than for the remaining firms with no insider trading or just insider buying. In this paper, we examine whether investors similarly regard the recent pattern of insider trading activity of the firm as a useful backdrop for evaluating its spinoff decisions. If the market views spinoff decisions by firms with recent increases in insider net purchases as more compatible with shareholder interests, then we expect that the spinoff announcement period excess returns will be significantly higher in these firms than in others.

Hypothesis 3. The spinoff announcement period excess returns will be significantly higher in firms with recent increases in insider net purchases.

3. Sample and data description

3.1. Spinoff sample

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 announced by firms listed on the NYSE/AMEX/Nasdaq between 1987 and 2006. The sample starts in 1987 because the Thomson Financial Insider Filing Data Files, where we can access insider trading data, begin in 1986 and we require at least one year's insider trading data prior to the announcement date. Spinoffs involving a Real Estate Investment Trust are excluded. This results in an initial sample of 524 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. 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 28 transactions.

- 2) A precise announcement date and ex-dividend date for the spinoff must be available from either Factiva, Lexis-Nexis, or the CRSP database. 58 transactions are lost due to lack of an announcement date or ex-dividend date or both.
- 3) 30 spinoffs that were taxable are eliminated.
- 4) 8 spinoffs involving ADRs and 9 spinoffs involving firms with operations in a regulated industry (SIC 4910-4949) are dropped.
- 5) 28 spinoffs are excluded because the spinoff was undertaken to facilitate the parent's or the subsidiary's merger with some other firm.
- 6) 11 spinoffs are removed because the announcement of spinoff occurred simultaneously to other corporate information disclosures (e.g. the appointment of a new CEO).
- 7) 35 spinoffs are eliminated where the subsidiary was trading prior to the spinoff announcement date and 33 two-step spinoffs are dropped.
- 8) Another 7 spinoffs are dropped because they represent cases in which one firm engaged in multiple spinoffs and the interval between the announcement date of the current spinoff and the ex-dividend date of the previous spinoff was less than 1 year.
- 9) Finally, 35 spinoffs are lost because there is no insider trade in the 5 years before the spinoff announcement date.

The final sample consists of 187 separate spinoff events by 172 parent firms. Fifteen parent firms have two spinoffs separated by multiple years. Panel A of Table 1 summarizes our sampling procedure. Panel B reports the frequency of spinoffs by year of announcement.

3.2. Insider trading data

The insider trading data is from the Thomson Financial Insider Filing Data Files, which are designed to capture all insider activity as reported on SEC forms 3, 4, 5, and 144. These data start in 1986. The SEC defines corporate insiders as a company's officers, directors, and any beneficial owners of 10% or more of any equity class of securities. Previous research, however, indicates that trades by large shareholders who are not officers or directors do not convey much information (Seyhun, 1986). Consequently, this study analyzes only top executives' transactions, where top executives are defined as chairpersons of the board of directors, persons who are both officers and directors, controlling persons, presidents, and vice presidents, as in Lee (1997). We study both open market and private transactions because the Thomson Financial Insider Filing Data Files do not separately report the two types of transactions. Following Seyhun (1986), we exclude all duplicate, amended, and inconsistent transactions, and any transactions involving less than 100 shares.

For this analysis, we focus on measures of abnormal insider trading. Following Clarke *et al.* (2001), we define abnormal insider trading as actual trading minus expected trading. Trading refers to sales, purchases, or net purchases that are measured as sales minus purchases. Expected trading is the mean trading of the firm in the 36-month period beginning 48 months prior to the spinoff announcement and ending 13 months prior to the announcement.¹⁶ Trading can be defined in terms of the number of trades (e.g. Clarke, *et al.*, 2001), the number of shares traded (e.g. Kaestner and Liu, 1996), or the dollar value of trades (e.g. Pettit and Venkatesh, 1995). While we examine all three measures, we only report the measure of abnormal insider trading using the number of trades. Results using other insider trading measures are qualitatively similar.

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¹⁶ For spinoffs announced before 1st Jan, 1990, the benchmark period begins on 1st Jan, 1986 and is less than 36 months since the insider trading data from the Thomson Financial Insider Filing Data Files starts in 1986. Our results are robust to excluding these spinoffs.

3.3. Matching firms

To compute long-run abnormal returns, we follow the procedure in Desai and Jain (1999) and select four matching firms for each parent and each subsidiary in our sample. Only CRSP-listed nonspinoff firms are used as a pool of possible matching firms. From this list of possible matches, we select the firms with the same two-digit SIC code as that of the sample firm and are closest to the sample firm in market capitalization in the month of the ex-date. The closest matching firm is designated as the first matching firm; the second closest matching firm is designated as the second matching firm and so on to the fourth matching firm. The stock market return on the sample firm is then compared with the return on the first matching firm. If the first matching firm should disappear for some reason, the return on the second matching firm is used from that point on and then the third and so on until all the four matching firms are exhausted, after that return of CRSP value-weighted index is used.

Following Desai and Jain (1999), we create a pro-forma combined firm following the spinoff by weighting the return of the parent and that of its subsidiary using their market values of equity at the end of the month of ex-date. The matching firm's return is created by weighting the return of the parent's matching firm and the subsidiary's matching firm in the pre-spinoff period as well as the post-spinoff period using the above weights.

To check the sensitivity, we employ two additional benchmarks to compute abnormal returns. For the first benchmark, we use the CRSP value-weighted index return. For the second benchmark, we use the value-weighted industry return, where industry is defined as all non-spinoff firms that have the same 2-digit SIC code as the sample firm. However, these results are not reported here, since they are qualitatively similar to those reported in the paper.

4. Insider trading before spinoff announcement

Table 2 presents the analysis of insider trading in the four quarters prior to the spinoff announcement. The first three columns report the average quarterly number of sales, purchases, and net purchases. Net purchases are measured as purchases minus sales. The last three columns report abnormal sales, purchases, and net purchases, defined as actual sales/purchases/net purchases minus expected sales/purchases/net purchases. Expected sales/purchases/net purchases are the mean sales/purchases/net purchases in the 36-month period beginning 48 months prior to the announcement and ending 13 months prior to the announcement. If undervaluation is an important motive for spinoffs, then insiders have an incentive to increase buying or decrease selling before spinoff announcements. Consequently, we should observe significant abnormal insider net purchasing prior to spinoff announcements.

The first three columns of Table 2 indicate a clear, almost monotonic, increase in purchasing and net purchasing and a steady decrease in selling in the four quarters prior to the announcement. The last three columns show that sales are abnormally low relative to historical levels in the three quarters prior to the announcement. In contrast, there is no evidence of abnormally high purchases. This may be due to the impact of insider trading regulations which deter insiders from increasing purchases when they have favorable private information about the firm. However, insiders do not act illegally if instead of increasing purchases, they simply decrease sales. Finally, significant abnormal net purchases are evident for three quarters before the announcement, primarily due to less insider selling. Overall, these findings are consistent with the conjecture that undervaluation is an important motive for spinoffs.

5. Stock market performance around spinoffs

In this section, we examine spinoff announcement excess returns as well as long-run stock market performance around spinoffs. Here, we stratify the sample based on abnormal insider net purchases a quarter prior to the spinoff announcement day. Spinoffs with positive abnormal insider net purchases are classified as “abnormal net purchase sample” while those with zero or negative abnormal insider net purchases are classified as “abnormal net sale sample”. We then compare announcement period excess returns as well as long-term abnormal returns between the two sub-samples.

5.1. Announcement period abnormal returns

Panel A of Table 3 reports the abnormal returns over different time intervals around the announcement of spinoffs. Abnormal returns are 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. For the entire sample, the average (median) two-day cumulative abnormal return is 3.24% (2.38%) in the window (-1, 0). Both the mean and the median are significant at the 1% level. Significant mean (median) returns of 2.70% (1.89%) and 4.36% (3.94%) are also found on day 0 and in the window (-1, +1), respectively. What is remarkable about these announcement period excess returns is the difference between the abnormal net purchase and abnormal net sale sub-samples. The average two-day cumulative excess return in the abnormal net purchase sample is 4.12%, which is more than two times that of the abnormal net sale sample. A t-test of the difference in the means across the two sub-samples and a Wilcoxon’s signed rank test for the difference in the medians indicate that the announcement period excess returns of the two sub-samples are significantly different from each

other at the 1% level and the 5% level, respectively. These results also persist through the other two time intervals.

Panel B of Table 3 examines the previous results, using univariate and multivariate regression analysis. Models 1 through 3 use cumulative abnormal returns over three different time intervals, day -1 to 0, day 0, and day -1 to 1, respectively, as dependent variables. The independent variable is an indicator variable, ANP, that is set to one for firms in the abnormal net purchase sub-sample and zero otherwise.¹⁷ All three regressions show a significant and positive relationship between ANP and the abnormal returns, suggesting that firms in the abnormal net purchase sub-sample experience significantly higher announcement period abnormal returns. In models 4 to 6, we also include ARPR, FOCUS, and SPINSIZE as three control variables. ARPR is the parent firm's prior annual return minus the industry-and-size matched control firm's prior annual return. FOCUS is a dummy variable that is equal to one if the two-digit SIC code of the subsidiary is different from the two-digit SIC code of the parent and zero otherwise. SPINSIZE is the spun-off firm's market value of equity at the end of the month of ex-date divided by the sum of the parent and the spinoff market value of equity. The results of multivariate regressions are consistent with those of univariate analysis. In all three models, ANP is significantly and positively related to the abnormal returns. Furthermore, the results show that firms with larger SPINSIZE experience higher announcement abnormal returns. Altogether, the results are consistent with our prediction that insider trading activity provides a useful backdrop for the market to evaluate corporate spinoff decisions and spinoff decisions by firms with recent increases in insider net purchases are viewed by the market as more compatible with shareholder interests.

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¹⁷ The main results still hold if ANP is measured as a continuous variable, defined as net purchases minus expected net purchases.

5.2. Performance of the pro-forma combined firms before the spinoff

Table 4 reports the results for the pro-forma combined firms. The results in Panel A show that in the pre-spinoff period of three years (prior to the month of announcement), the firms in the entire sample significantly underperform their benchmarks. The average (median) abnormal return in the first year before the announcement (month -12 to -1) is -15.19% (-8.26%). The average (median) abnormal returns for two years and three years prior to the announcement are -21.51% (-8.97%) and -21.41% (-16.07%), respectively. All the above returns are large in magnitude and are statistically significant at the 1% level. More interestingly, we show below that in the pre-spinoff period, the performance of the abnormal net purchase sub-sample is substantially different from that of the abnormal net sale sub-sample.

Panel B of Table 4 presents the results for the abnormal net purchase sub-sample. The average (median) abnormal returns for one to three years prior to the announcement are -20.72% (-12.31%), -29.28% (-12.11%), -25.98% (-16.36%), respectively. All these returns are statistically significant at the 1% level.

Panel C of Table 4 reports the results for the abnormal net sale sub-sample. In contrast with the results for the abnormal net purchase sub-sample, none of the abnormal returns in the pre-spinoff period is significant. Hence, the significant negative abnormal returns in the full sample are driven solely by the abnormal net purchase sub-sample. A comparison of the performance of the abnormal net purchase sub-sample to that of the abnormal net sale sub-sample indicates that, on average, the abnormal net purchase sub-sample underperforms the abnormal net sale sub-sample by 14.27% (p-value=0.08), 20.12% (p-value=0.08), and 11.85% (p-value=0.34) for holding periods of one, two, and three years prior to the spinoff announcement, respectively.

5.3. *Performance of the pro-forma combined firms after the spinoff*

After the completion of the spinoff (following the month of ex-date), the pro-forma combined firms in the full sample significantly outperform their matching firms for holding period of up to one year. The average (median) abnormal return in the first year following the spinoff (month +1 to +12) is 9.31% (2.72%), which is significant at the 5% (10%) level. For holding periods of two years (month +1 to +24) and three years (month +1 to +36), the average (median) abnormal returns are 7.78% (1.64%) and 12.43% (6.14%), respectively, and are not statistically significant.

For the abnormal net purchase sub-sample, the post-spinoff average (median) abnormal returns are 7.35% (4.18%), 5.95% (1.55%), and 8.43% (3.45%), respectively, for the holding periods of one to three years. For the abnormal net sale sub-sample, the corresponding values are 12.08% (1.92%), 10.56% (2.89%), and 18.58% (10.59%), respectively. However, none of the above returns is statistically significant. Further, a comparison of the performance of the two sub-samples indicates no significant difference between the two sub-samples. Finally, comparing the performance of the pro-former combined firms before and after the spinoff shows that only the abnormal net purchase sub-sample has exhibited significant improvements in stock market performance around the spinoff. In sum, the above results are consistent with our prediction that insider trades reflect superior information on the future prospects of the firm.¹⁸ Next we examine the post-spinoff performance of the parents and the subsidiaries separately to test whether there is any difference between the abnormal net purchase and the abnormal net sale sub-sample.

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¹⁸ We followed the method of Mitchell and Stafford (2000) and double checked our results by estimating the corrected t-statistics which account for cross-correlation of individual buy and hold abnormal returns. Our main results are unaffected.

5.4. *Performance of the parents after the spinoff*

Table 5 reports the results of the parents following the spinoff. Panel A presents the results for all the parents. The results show that the parents earn positive and significant average (median) abnormal returns of 10.57% (3.35%), and 16.36% (8.96%) over holding periods of one and three years, respectively, and insignificant average (median) abnormal returns of 7.70% (−2.18%) over holding period of two years. Panel B and C report the results for the parents in the abnormal net purchase sub-sample and the abnormal net sale sub-sample, respectively. The abnormal net purchase parents earn average (median) abnormal returns of 9.34% (4.54%), 6.25% (−2.18%), and 12.31% (5.19%) for holding periods of one, two, and three years, respectively. The abnormal net sale parents earn abnormal returns of 12.31% (2.54%), 9.90% (−0.89%), and 22.56% (19.04%) over the same holding periods. However, none of the above returns are statistically significant.

5.5. *Performance of the subsidiaries after the spinoff*

Table 6 reports the results for the subsidiaries. Panel A shows that the full sample of subsidiaries exhibit a strong positive performance following the spinoff. The average (median) abnormal returns for the entire sample of subsidiaries for holding periods of one, two, and three years are 22.34% (12.24%), 19.56% (17.63%), and 19.69% (13.64%), respectively. All these returns are significant at least at the 10% level. Panel B shows that the subsidiaries in the abnormal net purchase sub-sample earn significant average (median) abnormal returns of 25.93% (12.21%), 22.88% (27.53%), and 22.50% (16.44%) over holding periods of one, two, and three years, respectively. The corresponding abnormal returns for the subsidiaries in the abnormal net sale sub-sample are 17.26% (12.24%), 14.52% (−0.11%), and 15.39% (6.57%), respectively. However, only the abnormal returns for the one year holding period are significant. Relative to

the parents, the stock market performance of the subsidiaries is much stronger. Overall, the results indicate that the improvements in the stock market performance of the pro-forma combined firms are primarily due to the superior performance of the subsidiaries following the spinoff.

6. Operating performance changes around spinoffs

In this section, we examine the changes in operating performance around spinoffs. Following Daley *et al.* (1997), we use the ratio of operating cash flow (Compustat annual data item #13) to total assets (Compustat data item #6) as the measure of operating performance and label it as deflated operating cash flows (DOC). Table 7 reports changes in DOC from year -1 (the year before the ex-dividend year) to year +1 (the year after the ex-dividend year) for the pro-forma combined firms. Similar to the analysis of the stock market performance, we focus on the matching-firm adjusted DOC. For each parent and each subsidiary in our sample, we select one matching firm with data available on the Compustat annual database. The matching firm selected is the one closest to the sample firm in market capitalization and has the same two-digit SIC as that of the sample firm in the month of the ex-date. The pro-forma combined firm's DOC measure in the post-spinoff period is computed by weighting DOC of the parent and that of its subsidiary using their market values of equity at the end of the month of ex-date. The matching firm's DOC is created by weighting DOC of the parent's matching firm and the subsidiary's matching firm in the pre-spinoff period as well as the post-spinoff period using the above weights. A firm is included in the sample as long as it has at least one year's operating performance data before and after the spinoff.

For the abnormal net purchase sub-sample, the mean (median) change in matching-firm-adjusted DOC is 2.63% (2.20%) around the spinoff year. Both the mean and the median changes

are significant at least at the 5% level. For the abnormal net sale sub-sample, the corresponding changes are -4.31% (-0.95%). Neither the mean nor the median changes are significant at the 10% level. A wilcoxon two-sample median test rejects the equality of median DOC changes across the abnormal net purchase and the abnormal net sale sub-samples at the 10% significance level. Overall, the results in Table 7 suggest that only the abnormal net purchase sub-sample exhibits significant improvements in the operating performance following spinoffs.¹⁹

7. Conclusion

The paper examines insider trading before corporate spinoffs. Our sample consists of 187 separate spinoff events by 172 parent firms during 1987-2006. If the motive for the spinoff is to enhance firm valuation, self-interested managers have an incentive to increase their share purchases or decrease their sales prior to the spinoff announcement. Either action leads to an increase in net share purchases. Consistent with the hypothesis, we find a clear and almost monotonic increase (decrease) in the number of insider purchases and net purchases (sales) in the four quarters prior to the spinoff announcement. In addition, relative to the benchmark period, insider selling (net purchasing) is significantly lower (higher) in the three quarters prior to the announcement. We further stratify the sample based on insider trading activity within a quarter prior to the announcement day. Spinoffs with positive abnormal insider net purchases are classified as “abnormal net purchase sample” while the others are classified as “abnormal net

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¹⁹ We concentrate on the ROA change from year -1 to year +1 since there is a large loss of observations due to missing Compustat data if we examine two or more years around the year of spinoff. For year $t+2$, there are 50 observations in the abnormal net purchase sub-sample and 27 observations in the abnormal net sale sub-sample. For the abnormal net purchase sub-sample, the mean (median) change in matching-firm-adjusted DOC is 2.27% (2.12%) around the spinoff year. Both the mean and the median changes are significant at least at the 10% level. For the abnormal net sale sub-sample, the corresponding changes are -5.14% (-1.72%). Neither the mean nor the median changes are significant at the 10% level. A wilcoxon two-sample median test rejects the equality of median DOC changes across the abnormal net purchase and the abnormal net sale sub-samples at the 10% significance level. For year $t+3$, there are 34 observations in the abnormal net purchase sub-sample and 17 observations in the abnormal net sale sub-sample. There is no significant change in DOC for either of the two sub-samples.

sale sample". We find that the announcement period excess returns for the abnormal net purchase group are significantly higher than those for the abnormal net sale group, suggesting that the market views spinoff decisions by firms with prior abnormal net purchases as more compatible with shareholder interests. Moreover, only the firms in the abnormal net purchase subgroup exhibit significant improvements in long-run stock market performance and operating performance following spinoffs, indicating that managers know when their firms are undervalued and time their own trades accordingly. Overall, the results suggest that improving firm valuation is an important motive behind corporate spinoffs and it is possible to distinguish the quality of a spinoff firm on the basis of the insider trading behavior before the spinoff announcement.

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Table 1 Description of sample

Panel A reports the sample selection procedure. Spinoffs are identified from the SDC Mergers and Acquisitions Database. The initial sample starts with 524 spinoffs announced by non-REIT firms listed on the NYSE/AMEX/Nasdaq between 1987 and 2006. The sample excludes the following cases: 1) the transaction was not a spinoff; 2) a precise announcement date or ex-dividend date for the spinoff was unavailable; 3) the spinoff was taxable; 4) the spinoff involved ADRs or firms with segments operating in the utilities industry (SIC4910-4949); 5) the spinoff was undertaken to facilitate the parent's or the subsidiary's merger with some other firm; 6) the spinoff announcement occurred simultaneously to other corporate information disclosures; 7) the subsidiary was trading prior to the spinoff announcement date; 8) one firm engaged in multiple spinoffs and the interval between the announcement date of the current spinoff and the ex-dividend date of the previous spinoff was less than 1 year; 9) there is no insider trade in the 5 years before the spinoff announcement date. Panel B reports the distribution by year of announcement of the final sample of 187 spinoffs.

Panel A: Sample selection procedure

Initial sample	524
Reason for elimination	
Not a spinoff transaction	28
Unable to identify a precise announcement date or ex-dividend date	58
Taxable spinoff	30
ADRs	8
Utilities	9
Spinoff undertaken to facilitate merger with some other firm	55
Return data unavailable on the CRSP database for the parent on the announcement date	28
Contaminated simultaneous announcements	11
Subsidiary publicly listed before the announcement date	35
Two-step spinoffs	33
Multiple spinoffs by the same parent	7
No reported insider trade in the 5 years before the announcement date	35
Final sample	187

Panel B: Distribution of Spinoffs by year of announcement

Year	Number	Year	Number
1987	5	1997	14
1988	9	1998	11
1989	7	1999	12
1990	9	2000	15
1991	5	2001	6
1992	9	2002	5
1993	10	2003	8
1994	14	2004	6
1995	19	2005	4
1996	18	2006	1
		Total	187

Table 2 Quarterly insider trading before the announcement of spinoffs

The table reports the average number of sales, purchases, and net purchases per firm per quarter in the four quarters before the announcement of spinoffs for a sample of 187 spinoffs. Net purchases are measured as purchases minus sales. Abnormal sales/purchases/net purchases are defined as actual sales/purchases/net purchases minus expected sales/purchases/net purchases in the given quarter. Expected sales/purchases/net purchases are the mean quarterly sales/purchases/net purchases of that firm in the 36-month period beginning 48 months prior to the announcement of spinoffs and ending 13 months prior to the announcement. All variables are winsorized at the 5th and the 95th percentiles. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

	Purchases	Sales	Net Purchases	Abnormal		
				Purchases	Sales	Net Purchases
Q-4	0.08	1.60	-1.51	-0.13***	0.02	-0.08
Q-3	0.26	1.09	-0.83	0.07	-0.34**	0.61***
Q-2	0.17	1.07	-0.95	-0.07**	-0.40***	0.38**
Q-1	0.18	0.76	-0.63	-0.03	-0.61***	0.64***

Table 3 Announcement period abnormal returns

Panel A shows mean and median announcement period abnormal returns for 187 spinoff announcements during the period 1987-2006. Abnormal returns are 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 abnormal net purchase sample comprises firms with positive abnormal net insider purchases in the quarter prior the announcement day. The remaining sample is classified as the abnormal net sale sample. The t test and the Wilcoxon signed ranks test are used to test the significance of the mean and median, respectively. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively. Panel B shows regressions of announcement period abnormal returns on ANP and other control variables. ANP is an indicator variable that is set to one for firms in the abnormal net purchase sub-sample and zero otherwise. ARPR is the parent firm's prior annual return minus the industry-and-size matched control firm's prior annual return. FOCUS is a dummy variable that is equal to one if the two-digit SIC code of the subsidiary is different from the two-digit SIC code of the parent and zero otherwise. SPINSIZE is the spun-off firm's market value of equity at the end of the month of ex-date divided by the sum of the parent and the spinoff market value of equity. Heteroskedasticity-consistent estimates of t-values are reported in parentheses. Sample sizes vary due to missing data. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Announcement period abnormal returns

Variables		All firms (1)	Abnormal Net Purchase (2)	Abnormal Net Sale (3)	T/Z statistics for tests of differences (2)-(3)
CAR (day -1 to day 0)	Mean	3.24%***	4.12%***	2.01%***	2.60***
	Median	2.38%***	2.91%***	1.82%***	2.22**
	No. of obs.	187	109	78	
AR (day 0)	Mean	2.70%***	3.72%***	1.28%***	3.68***
	Median	1.89%***	3.00%***	1.37%***	2.65***
	No. of obs.	187	109	78	
CAR (day -1 to day 1)	Mean	4.36%***	5.28%***	3.07%***	2.15**
	Median	3.94%***	5.12%***	3.18%***	2.37**
	No. of obs.	187	109	78	

Panel B: Regressions of announcement period abnormal returns

Coefficient Estimates	Dependent Variables					
	CAR(-1, 0)	AR(0)	CAR(-1, 1)	CAR(-1, 0)	AR(0)	CAR(-1, 1)
Constant	0.02 (3.30)***	0.01 (2.83)***	0.03 (3.86)***	0.00 (0.44)	0.00 (0.36)	0.01 (0.60)
ANP	0.02 (2.61)***	0.02 (3.66)***	0.02 (2.14)**	0.03 (3.33)***	0.03 (3.60)***	0.03 (2.22)**
ARPR				0.00 (0.58)	0.00 (0.57)	-0.01 (-0.60)
FOCUS				0.00 (0.05)	0.01 (1.10)	0.01 (0.87)
SPINSIZE				0.04 (1.62)	0.04 (2.02)**	0.05 (1.70)*
Adjusted R ²	0.03	0.06	0.02	0.07	0.10	0.04
Sample Size	187	187	187	169	169	169

Table 4 Stock market performance of the pro-forma combined firm

The table shows raw buy-and-hold returns of the sample firms (RAWS), raw buy-and-hold returns of the matching firms (RAWM), and abnormal returns (AR) over several periods for the full sample of pro-forma combined firms as well as for the abnormal net purchase and the abnormal net sale sub-samples. The abnormal net purchase sample comprises firms with positive abnormal net insider purchases in the quarter prior to the announcement day. The remaining sample is classified as the abnormal net sale sample. A pro-forma combined firm following the spinoff is created by weighting the return of the parent and that of its subsidiary using their market values of equity at the end of the month of ex-date. The matching firm's return is created by weighting the return of the parent's matching firm and the subsidiary's matching firm in the pre-spinoff period as well as the post-spinoff period using the above weights. For each parent and each subsidiary in our sample, we select four matching firms. The matching firms selected are the ones with the same two-digit SIC code as that of the sample firm and are closest to the sample firm in market capitalization in the month of the ex-date. The closest matching firm is designated as the first matching firm; the second closest matching firm is designated as the second matching firm and so on to the fourth matching firm. The stock market return on the sample firm is then compared with the return on the first matching firm. If the first matching firm should disappear for some reason, the return on the second matching firm is used from that point on and then the third and so on until all the four matching firms are exhausted, after that return of CRSP value-weighted index is used. AM is the month of the announcement date. EX is the month of the ex-dividend date. Sample sizes vary due to missing return data. Median values are shown in brackets. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Time period	No. of obs.	RAWS	RAWM	AR
<i>Panel A: All firms</i>				
AM -36 to AM -1	158	45.43% [43.47%]	66.84% [55.51%]	-21.41%*** [-16.07%***]
AM -24 to AM -1	163	24.75% [24.62%]	46.26% [40.46%]	-21.51%*** [-8.97%***]
AM -12 to AM -1	165	8.05% [9.01%]	23.24% [16.12%]	-15.19%*** [-8.26%***]
AM	169	5.67% [4.81%]	1.23% 0.49%	4.43%*** [3.54%***]
EX	169	1.94% [0.44%]	1.43% 0.93%	0.51% [0.81%]
EX +1 to EX +12	157	18.60% [16.77%]	9.29% [11.29%]	9.31%** [2.72%*]
EX +1 to EX +24	131	29.68% [24.40%]	21.90% [27.06%]	7.78% [1.64%]
EX +1 to EX +36	109	51.61% [43.55%]	39.18% [40.25%]	12.43% [6.14%]

Table 4 Continued

Time period	No. of obs.	RAWS	RAWM	AR
<i>Panel B: Abnormal Net Purchase Sample</i>				
AM -36 to AM -1	97	41.61% [38.96%]	67.59% [57.47%]	-25.98%*** [-16.36%***]
AM -24 to AM -1	100	20.22% [23.75%]	49.51% [41.17%]	-29.28%*** [-12.11%***]
AM -12 to AM -1	101	3.34% [5.71%]	24.06% [13.94%]	-20.72%*** [-12.31%***]
AM	104	7.12% [6.25%]	1.78% 0.27%	5.34%*** [4.48%***]
EX	104	1.95% [0.75%]	2.19% 0.93%	-0.24% [0.82%]
EX +1 to EX +12	92	13.69% [11.67%]	6.34% [8.96%]	7.35% [4.18%]
EX +1 to EX +24	79	24.78% [21.49%]	18.83% [24.07%]	5.95% [1.55%]
EX +1 to EX +36	66	42.48% [41.00%]	34.06% [38.51%]	8.43% [3.45%]
<i>Panel C: Abnormal Net Sale Sample</i>				
AM -36 to AM -1	61	51.50% [46.16%]	65.64% [50.00%]	-14.13% [-15.78%]
AM -24 to AM -1	63	31.95% [27.88%]	41.11% [40.32%]	-9.17% [-2.01%]
AM -12 to AM -1	64	15.49% [17.01%]	21.95% [17.70%]	-6.46% [0.15%]
AM	65	3.33% [1.58%]	0.36% [0.66%]	2.97%** [1.79%*]
EX	65	1.91% [-0.41%]	0.21% [0.54%]	1.71% [0.57%]
EX +1 to EX +12	65	25.54% [21.67%]	13.45% [15.41%]	12.08% [1.92%]
EX +1 to EX +24	52	37.13% [36.41%]	26.56% [30.77%]	10.56% [2.89%]
EX +1 to EX +36	43	65.61% [48.58%]	47.04% [42.27%]	18.58% [10.59%]

Table 5 Stock market performance of the parents following spinoffs

The table shows raw buy-and-hold returns of the sample firms (RAWS), raw buy-and-hold returns of the matching firms (RAWM), and abnormal returns (AR) over several periods for the full sample of parent firms as well as for the abnormal net purchase and the abnormal net sale sub-samples. The abnormal net purchase sample comprises parent firms with positive abnormal net insider purchases in the quarter prior to the announcement day. The remaining sample is classified as the abnormal net sale sample. For each parent in our sample, we select four matching firms. The matching firms selected are the ones with the same two-digit SIC code as that of the sample firm and are closest to the sample firm in market capitalization in the month of the ex-date. The closest matching firm is designated as the first matching firm; the second closest matching firm is designated as the second matching firm and so on to the fourth matching firm. The stock market return on the sample firm is then compared with the return on the first matching firm. If the first matching firm should disappear for some reason, the return on the second matching firm is used from that point on and then the third and so on until all the four matching firms are exhausted, after that return of CRSP value-weighted index is used. AM is the month of the announcement date. EX is the month of the ex-dividend date. Sample sizes vary due to missing return data. Median values are shown in brackets. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Time period	No. of obs.	RAWS	RAWM	AR
<i>Panel A: All parents</i>				
EX +1 to EX +12	157	18.38% [17.21%]	7.81% [11.59%]	10.57%** [3.35%*]
EX +1 to EX +24	131	26.90% [22.65%]	19.20% [22.71%]	7.70% [-2.18%]
EX +1 to EX +36	109	51.42% [42.30%]	35.06% [41.33%]	16.36%* [8.96%*]
<i>Panel B: Abnormal Net Purchase Sample</i>				
EX +1 to EX +12	92	11.51% [14.24%]	2.17% [9.06%]	9.34% [4.54%]
EX +1 to EX +24	79	21.48% [19.42%]	15.23% [22.08%]	6.25% [-2.18%]
EX +1 to EX +36	66	41.79% [41.17%]	29.48% [41.16%]	12.31% [5.19%]
<i>Panel C: Abnormal Net Sale Sample</i>				
EX +1 to EX +12	65	28.11% [23.23%]	15.79% [20.91%]	12.31% [2.54%]
EX +1 to EX +24	52	35.13% [37.03%]	25.23% [31.44%]	9.90% [-0.89%]
EX +1 to EX +36	43	66.20% [48.97%]	43.64% [41.33%]	22.56% [19.04%]

Table 6 Stock market performance of the subsidiaries following spinoffs

The table shows raw buy-and-hold returns of the sample firms (RAWS), raw buy-and-hold returns of the matching firms (RAWM), and abnormal returns (AR) over several periods for the full sample of subsidiaries as well as for the abnormal net purchase and the abnormal net sale sub-samples. The abnormal net purchase sample comprises firms with positive abnormal net insider purchases in the quarter prior to the announcement day. The remaining sample is classified as the abnormal net sale sample. For each subsidiary in our sample, we select four matching firms. The matching firms selected are the ones with the same two-digit SIC code as that of the sample firm and are closest to the sample firm in market capitalization in the month of the ex-date. The closest matching firm is designated as the first matching firm; the second closest matching firm is designated as the second matching firm and so on to the fourth matching firm. The stock market return on the sample firm is then compared with the return on the first matching firm. If the first matching firm should disappear for some reason, the return on the second matching firm is used from that point on and then the third and so on until all the four matching firms are exhausted, after that return of CRSP value-weighted index is used. AM is the month of the announcement date. EX is the month of the ex-dividend date. Sample sizes vary due to missing return data. Median values are shown in brackets. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Time period	No. of obs.	RAWS	RAWM	AR
<i>Panel A: All subsidiaries</i>				
EX +1 to EX +12	157	26.88% [21.82%]	4.55% [7.58%]	22.34%*** [12.24%***]
EX +1 to EX +24	131	46.81% [44.36%]	27.24% [22.58%]	19.56%** [17.63%***]
EX +1 to EX +36	109	69.75% [70.71%]	50.06% [49.43%]	19.69%* [13.64%***]
<i>Panel B: Abnormal Net Purchase Sample</i>				
EX +1 to EX +12	92	30.07% [23.09%]	4.14% [4.65%]	25.93%*** [12.21%***]
EX +1 to EX +24	79	46.92% [47.02%]	24.04% [21.68%]	22.88%** [27.53%***]
EX +1 to EX +36	66	65.05% [68.34%]	42.55% [46.40%]	22.50%* [16.44%***]
<i>Panel C: Abnormal Net Sale Sample</i>				
EX +1 to EX +12	65	22.37% [20.18%]	5.11% [9.17%]	17.26%** [12.24%*]
EX +1 to EX +24	52	46.62% [41.56%]	32.11% [25.54%]	14.52% [-0.11%]
EX +1 to EX +36	43	76.98% [70.71%]	61.58% [53.52%]	15.39% [6.57%]

Table 7 Change in operating performance around spinoffs for the pro-forma combined firms

The table reports mean and median changes in operating performance for the pro-forma combined firms from year -1 (the year before the ex-dividend year) to year +1 (the year after the ex-dividend year). The abnormal net purchase sample comprises firms with positive abnormal net insider purchases in the quarter prior the announcement day. The remaining sample is classified as the abnormal net sale sample. Operating performance is measured as the ratio of operating cash flow (Compustat annual data item #13) to total assets (Compustat data item #6). For each parent and each subsidiary in our sample, we select one matching firm with data available on the Compustat annual database. The matching firm selected is the one closest to the sample firm in market capitalization and has the same two-digit SIC as that of the sample firm in the month of the ex-date. The pro-forma combined firm's DOC measure in the post-spinoff period is computed by weighting DOC of the parent and that of its subsidiary using their market values of equity at the end of the month of ex-date. The matching firm's DOC is created by weighting DOC of the parent's matching firm and the subsidiary's matching firm in the pre-spinoff period as well as the post-spinoff period using the above weights. A firm is included in the sample as long as it has at least one year's operating performance data before and after the spinoff. Median values are shown in brackets. *, **, and *** indicate significance of the test statistics at the 0.1, 0.05, and 0.01 levels, respectively.

Year relative to spinoff	No. of obs.	Unadjusted	Match-firm-adjusted
<i>Panel A: Abnormal Net Purchase Sample</i>			
-1	73	13.10% [12.90%]	-1.66% [-0.42%]
1	73	13.36% [15.03%]	0.97% [1.20%]
ΔDOC	73	0.26% [0.50%]	2.63%** [2.20%***]
<i>Panel B: Abnormal Net Sale Sample</i>			
-1	41	14.88% [14.48%]	7.57% [0.58%]
1	41	12.88% [10.97%]	3.26% [1.66%]
ΔDOC	41	-2.00% [0.80%]	-4.31% [-0.95%]