AN EMPIRICAL ANALYSIS OF THE STOCKHOLDER – BONDHOLDER CONFLICT IN CORPORATE SPIN-OFFS

By

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ABSTRACT

We analyze the effect of daily stock and bond abnormal returns around spin-off announcements. Over a three-day event window, we find statistically significant abnormal returns of 3.07% for stocks and 0.11% for straight bonds. Both stock and bond abnormal returns are higher for firms with lower interest and dividend payouts. Stock abnormal returns are also higher for firms with higher pre-spin-off leverage. Overall, we find that the firm value increase compensates for the wealth transfer effect and that bondholders' wealth is not reduced as a result of spin-off.

Over the past 20 years, many diversified firms have gone back to basics by refocusing on their core businesses. An important reason is that extensive research, starting with Berger and Ofek (1995), shows that diversified firms' equity trades at a discount compared to that of single-business firms. A common way for a firm to refocus on its core business lines is to spin off its non-core divisions. In this paper, our objective is to study the consequences of the spin-off announcements for both stock- and bondholders.

The decision to spin off a subsidiary is usually associated with a restructuring of the parent firm and improvement of the overall operations of both the parent and the subsidiary. The stock market generally receives announcements of a spin-off decision positively. Previous studies from all over the world uniformly document economically and statistically significant positive abnormal returns of up to 5.56% during the spin-off announcement window.[1] These findings are in line with the diversification discount literature. Among the factors that play a role in the value creation that results from a spin-off are focus increase, reduction of information asymmetry, and improved operational performance.[2]

[1] See for example, Copeland, Lemgruber, and Mayers (1987), Cusatis, Miles, and Woolridge (1993), Daley, Mehrotra, and Sivakumar (1997), Hite and Owers (1983), Krishnaswami and Subramaniam (1999), Miles and Rosenfeld (1983), Mulherin and Boone (2000), Schipper and Smith (1983), and Slovin, Sushka, and Ferraro (1995) for the United States, Veld and Veld-Merkoulova (2004) for European countries, and Koh, Koh, and Koh (2005) for Singapore.

[2] The expected improvement in the operational performance of the reorganized firms is not clearly confirmed. For example, Boone, Haushalter, and Mikkelson (2003) study a sample of carve-outs. They find that performance did not improve beyond the first post-carve-out year.

Although it is clear from other studies that spin-offs benefit stockholders, the position of bondholders is less evident. One point of view is that bondholders benefit from the value increase of the firm. An alternative point of view is that bondholders suffer from a spin-off since the risk of an undiversified firm is higher. Mansi and Reeb (2002) show that the risk reduction, which is due to diversification, is one of the sources of the diversification discount. This risk reduction is caused by the coinsurance that arises when the cash flows from the different divisions are not perfectly correlated. Lower asset risk results in a higher value of the corporate debt securities. This coinsurance disappears with a spin-off, so the loss of diversification may lead to a value transfer from bondholders to stockholders.

Hite and Owers (1983) and Dittmar (2004) propose that spin-offs are detrimental to the value of corporate debt. Neither study confirms this wealth transfer hypothesis, since Hite and Owers find nonsignificant abnormal bond returns around the date of the spin-off announcement and Dittmar finds the same during the announcement month. However, in a case study of the Marriott Corporation, Parrino (1997) documents a wealth transfer from the bondholders to the stockholders of Marriott. The spin-off announcement, made in October 1992, was associated with a large increase in the stock price. However, directly after the issue, Moody's lowered its rating of Marriott's senior debt, leading to a decline in the prices of some of

Marriott's debt by as much as 30%. Using monthly data, Maxwell and Rao (2003) also find a wealth transfer from the bondholders to the stockholders.

We use daily stock and bond data and analyze the factors that drive abnormal returns over a short event window. We also analyze the returns that accrue to the stock- and bondholders. We find an abnormal return for stockholders of 2.02% on the announcement date. The three-day event window even shows an abnormal return of 3.07%. Both results are significant on the 1% level. More surprising is the positive abnormal return of 0.14% for the holders of straight bonds on the announcement date. The return during the three-day event-window is 0.11%. Both results are also significant on the 1% level. Our results contradict the results of Maxwell and Rao (2003). To investigate the difference in results between our study and the Maxwell and Rao paper, we split up our sample in two subsamples. The first subsample covers the period 1995-1997. This period overlaps with the last years of the sample period of Maxwell and Rao. The second subsample covers 1998-2002. For the first subsample we find negative but not significant bond returns (-0.14%) and for the second subsample we find significantly positive bond returns (0.14%). This result suggests that the difference between the two studies is mostly driven by different sample periods. A related explanation may be that the results of Maxwell and Rao seem to be partly driven by some extreme cases where bondholders suffered large wealth losses. For example, in the Marriott case bondholders lost 16.51% of their wealth (Parrino,

1997). It is possible that after the occurrence of this case, bondholders learned how to better protect themselves against this type of expropriation.

We use three-stage least squares regression to explain stock and bond abnormal returns. We hypothesize that a number of variables affect stock and bond abnormal returns in the same way. We find that the pre-spin-off leverage affects stock returns positively. We use the Leland and Toft (1996) model, which predicts that although debt and equity values are inversely related to asset volatility in most cases, this relation reverses for high levels of debt. Therefore, a high pre-spin-off level of leverage is associated with positive abnormal stock returns.

The Leland and Toft (1996) model also predicts that abnormal returns for both stocks and bonds are negatively affected if the payout in the form of interest and dividend is high before the spin-off. The stock and bond abnormal returns in our study confirm this prediction.

Several previous studies find that an increase in industrial focus has a positive effect on the abnormal stock returns that are associated with spin-offs.[3] Our study does not confirm this finding. The hypothesized relation between industrial focus and bond returns is less obvious. We find no significant relation between industrial focus and abnormal bond returns. This finding probably means that the effects of increase in firm value and in asset volatility cancel each other out. Finally, we find that other

[3] See for example Daley, Mehrotra, and Sivakumar (1997), Desai and Jain (1999), and Krishnaswami and Subramaniam (1999).

factors, such as information asymmetry, are either not significant, or do not have the hypothesized relation to abnormal stock and bond returns.

The paper is organized as follows. Section 2 discusses the factors used to explain abnormal returns. Sections 3 describe the data and the methodology, Section 4 presents the empirical results, and Section 5 concludes.

I. Factors that affect change in firm value

We investigate several factors that play a role in the stock and bond market reactions to spin-off announcements. We hypothesize that all these factors contribute to the total value created by the spin-offs.

A. Change in degree of the firm's diversification

The value of the corporate securities can undergo a twofold effect when there is a change in the degree of a firm's diversification. Extensive research on the diversification discount suggests that the market value of more-diversified companies is lower than is the value of single-segment firms (see, e.g., studies by Berger and Ofek, 1995, or Servaes, 1996). Reasons for this include inefficient internal capital

markets, agency problems, and poor previous merger decisions.[4] These factors underlie our hypothesis that a decrease in the level of firm's diversification could result in the overall increase in firm's value, and consequently, that the spin-off announcement returns would be positively related to the increase in firm's industrial focus.

However, changes in the firm's diversification may also lead to a redistribution of wealth between different classes of securities. Two major reasons for that are higher asset risk and possible reduction in the debt collateral. Galai and Masulis (1976) argue that bondholders, after a spin-off, may find that their position is deteriorated because fewer assets now serve as collateral for the debt. Furthermore, when the cash flows from different divisions are not perfectly correlated, spinning off part of a company leads to a higher volatility of the firm's assets. This increases the value of the common stock at the expense of the bondholders. Mansi and Reeb (2002) show that most of the diversification discount found in previous studies can in fact be explained by this wealth redistribution that results in a higher debt market value for diversified companies.[5]

[4] For example, Doukas and Kan (2004) find that the diversification discount is positively related to the post-acquisition reductions in excess cash flows.

[5] This point of view is consistent with the study by Villalonga (2004) who after controlling for a wide range of firm characteristics finds that diversification by itself does not destroy value.

Both the firm value increase and the wealth transfer theories suggest that the stockholders' wealth should increase as a result of a decrease in the firm's diversification. These theories lead to our first hypothesis:

H1: An increase in industrial focus affects abnormal returns positively for stockholders.

The effect of the focus-increasing spin-offs on the value of debt is not obvious. The outcome will depend on the question which of the two opposite effects will dominate. The first effect, the expected firm value increase due to the elimination of inefficiencies, should be beneficial to bondholders. The second effect, the increase in risk and reduction in collateral, should decrease the wealth of bondholders. Therefore, we formulate the competing hypotheses 2a and 2b. Hypothesis 2a will hold for bondholders if the expected value increase due to the elimination of inefficiencies is larger than is the value decrease due to the increase in risk and the reduction in the asset base:

H2a: An increase in industrial focus affects abnormal returns positively for bondholders.

Hypothesis 2b will hold if the negative effects for the bondholders dominate the positive effects:

H2b: An increase in industrial focus affects abnormal returns negatively for bondholders.

B. Leverage and degree of financial distress

Reducing assets and cash flows by divesting a unit can increase bankruptcy risk and adversely affect the value of the debt. Lower bankruptcy risk for large diversified firms may explain the higher debt valuation found for such firms by Mansi and Reeb (2002). On the other hand, the Leland and Toft (1996) model predicts that although debt and equity values are inversely related to the asset volatility in most cases, this relation reverses for very high levels of leverage ("junk bonds"). The reason is that the higher risk may increase the probability that bankruptcy is avoided. Therefore, both the equity and debt of financially troubled companies can benefit from the risk increase following a spin-off. Our firm-value-increase hypothesis suggests that both stock- and bondholders benefit more from a spin-off if the leverage prior to the spin-off is higher:

H3: A higher pre-spin-off leverage affects abnormal returns positively for stockholders.

H4: A higher pre-spin-off leverage affects abnormal returns positively for bondholders.

C. Information asymmetry

One of the most frequent motivations for the spin-offs cited by the management of the involved companies is the need to reduce information asymmetry between company insiders and the market. The argument here is that the investment analysts cannot correctly value firms that operate in different industrial sectors, so the market undervalues such companies. If this is the case, then a spin-off might result in lower information asymmetry and higher valuation of a firm. Such an increase in valuation does not cause a wealth transfer between bond- and stockholders, and should benefit both groups. We hypothesize that both bond- and stockholders profit from a spin-off by a firm that has a higher level of pre-spin-off information asymmetry:

H5: A higher pre-spin-off level of information asymmetry affects abnormal returns positively for stockholders.

H6: A higher pre-spin-off level of information asymmetry affects abnormal returns positively for bondholders.

D. Firm liquidity

The total cash payouts (i.e., interest and dividend payments) made by a company to its bond- and stockholders affect both the firm's value and its ability to

efficiently restructure. Excessive payouts relative to the operating cash flow decrease the total value of the company assets and increase bankruptcy risk. Leland and Toft's (1996) model suggests that the bondholders suffer substantial wealth losses due to the increase in payout level. In addition, the debt of companies with higher payout ratios starts to suffer from the risk increase at lower volatility levels. Therefore, we expect that if the pre-spin-off payout in the form of dividends and interest payments relative to the cash flow is high, then it will negatively affect abnormal returns. This factor affects the value of the whole company and it will go in the same direction for both bondholders and stockholders:

H7: A higher level of pre-spin-off payout affects abnormal returns negatively for stockholders.

H8: A higher level of pre-spin-off payout affects abnormal returns negatively for bondholders.

E. Efficiency

An improvement in efficiency is likely to increase, at least to some extent, the value of both firm debt and equity. Furthermore, the companies with less efficient pre-spin-off operations are likely to benefit most from this reorganization:

H9: More efficient pre-spin-off operations affect abnormal returns negatively for stockholders.

H10: More efficient pre-spin-off operations affect abnormal returns negatively for bondholders.

F. Investment expenditures

Although it provides a tax shield, the presence of outstanding risky debt can also lead to an underinvestment problem. John's (1993) model predicts that due to the possibility of optimally reallocating company debt between the parent and subsidiary, spin-offs might result in improved investment policy and result in higher firm value without losing the tax advantages of corporate debt. Johnson, Klein, and Thibodeaux (1996) also find that after a spin-off, the real growth of the total assets of both the spin-off parent and the spun-off subsidiary significantly increase from below the industry median to a level close to the industry median.

Our hypothesis, which is based on John's (1993) model, is that firms with low pre-spin-off investment expenditures suffer the most from the underinvestment problem and benefit more from spin-offs than do the companies with higher investment outflows. Therefore, we expect the investment expenditure variable to have a negative coefficient for the abnormal stock returns, because firms with higher

pre-spin-off investment expenditures experience a lower value increase due to the spin-off announcement:

H11: Higher pre-spin-off investment expenditures affect abnormal returns negatively for both stockholders and bondholders.

Since the effect is on the firm value, bondholders may also profit from the lower probability of underinvestment for firms that have low pre-spin-off investment expenditures. For this reason, we also expect a negative coefficient for bondholders:

H12: Higher pre-spin-off investment expenditures affect abnormal returns negatively for bondholders.

II. Method and data description

This section discusses the sample selection, the method, and the data that we use.

A. Sample selection

We use a sample of spin-offs by US firms to test our hypotheses. We obtain the spin-off announcements, which cover the period from January 1995 to January 2002, from the SDC and Lexis-Nexis databases. The total number of announcements is 612.

When we exclude double announcements made by the same parent company on the same day, this number reduces to 571. A necessary requirement for these firms

is that both stock and bond prices must be available from either Datastream or Bloomberg database. Of these 571 observations, no bond data are available in either Datastream or Bloomberg database for 396 cases. To eliminate announcements that either involve contaminating information or are incorrectly classified as spin-offs, we also check the remaining 175 announcements in Bloomberg. Doing so eliminates 84 observations, leaving a sample of 91 spin-offs. Table I presents the excluded observations by the reason for elimination.

[Please place Table I here]

The price data are available in either Datastream or Bloomberg for 363 straight bonds and 27 convertible bonds issued by 78 different companies (11 companies announced more than one spin-off). Hotchkiss and Ronen (2002) find that the available information is very quickly incorporated in the prices of the exchange-traded bonds, generally within one day. Therefore, we consider these prices a good source for the study of market reaction to spin-off announcements.

B. Abnormal stock returns

To measure stock market reaction to spin-off announcements we use an event study method adapted from Mikkelson and Partch (1986). We define the announcement period as the period from day –1 to day +1, where day 0 denotes the

announcement day as reported by SDC or the first day the announcement appears in a press release. We estimate the market model for each security using a period of 200 trading days, from day –220 to day –21 before the announcement date. The S&P 500 index returns are our proxy for the stock market returns.

C. Abnormal bond returns

We use the Handjinicolaou and Kalay (1984) method, which adjusts for infrequent trading, to measure the abnormal bond returns over the event period. The returns on rating- and maturity-matched corporate bond indexes of Merrill Lynch are our proxy for a bond market index return. The estimation window for the abnormal bond return calculations is the period from day -65 to day -21. We choose this 45 trading day period in order to minimize the potential impact of credit-spread changes.

Following the Handjinicolaou and Kalay (1984) method, we define the premium bond return between two bond trades as the difference between the return on the bond and the corresponding index return over the same time period:

$$PR_{i,n(i,k)} = R_{i,n(i,k)} - IR_{i,n(i,k)}, \quad (1)$$

where $R_{i,n(i,k)}$ stands for the corporate bond i return from trading date n(i,k-1) to trading date n(i,k), and $IR_{i,n(i,k)}$ is the matching index return over the same time period.

We estimate the mean m_i and standard deviation s_i of the bond premium returns as

$$m_i = \frac{1}{K-1}\sum_{k=2}^{K}\left(\frac{PR_{i,n(i,k)}}{n(i,k)-n(i,k-1)}\right), \tag{2}$$

$$s_i^2 = \frac{1}{K-2}\sum_{k=2}^{K}\left(\frac{PR_{i,n(i,k)}}{\sqrt{n(i,k)-n(i,k-1)}} - m_i\sqrt{n(i,k)-n(i,k-1)}\right)^2, \tag{3}$$

where K is the number of days bond *i* was traded in the estimation period.

We calculate the abnormal bond return by using the estimated mean premium return:

$$AR_{i,n(i,k)} = PR_{i,n(i,k)} - m_i[n(i,k) - n(i,k\text{-}1)] \tag{4}$$

The standardized abnormal return is equal to

$$SAR_{i,n(i,k)} = \frac{AR_{i,n(i,k)}}{s_i\sqrt{n(i,k)-n(i,k-1)}} \tag{5}$$

For every event window, the standardized and average abnormal portfolio returns include only those bonds that are traded on the last day and on the day directly preceding the event period. (E.g., for the event period from day –1 to day +1 we include only the bonds traded on days –2 and +1 in the sample.) We define the test statistics for these observations as

$$Z_t = \frac{\sum_{i=1}^{n_t} SAR_{i,t}}{\sqrt{n_t * N}} \tag{6}$$

where t is event window, n_t is the number of observations included for a given event window, and N is the number of days in the event window. This statistic has a unit-normal distribution under the assumption of cross-sectional bond return independence.

In several cases, data for more than one bond are available for a sample company. We treat these cases in two different ways. First, we compile a complete sample of all the available bonds (from now on called the "All-Bond Sample"). As Maxwell and Stephens (2003) note, this approach overestimates *t*-statistics by treating highly correlated bonds of the same firms as independent observations. Therefore, our second sample includes only the median bond return for each firm that serves as a proxy for the return to the firm bondholders (the "Firm Sample").

D. Proxies

The variables in our analysis are related to our hypotheses. Unless otherwise stated, we base all variables on the companies' annual accounting data reported for the year directly preceding the spin-off announcements. The source for these data is Datastream and annual reports.

1. Change in the degree of the firm's diversification

As in previous studies, we use an industrial focus variable as our proxy for the decrease in the diversification level. We measure this variable as a dummy equal to one if the parent and subsidiary are in different industries (measured by the two-digit SIC code), and as zero if the parent and subsidiary to be spun off are in the same industry.

2. Leverage and degree of financial distress

We use the debt ratio, measured as the ratio of total debt to invested capital, as our proxy for leverage. Both total debt and invested capital are based on book values at the end of the year preceding the spin-off announcement.

3. Information asymmetry

Krishnaswami and Subramaniam (1999) find that stock return volatility is highly correlated with other measures of information asymmetry that are based on the accuracy of analysts' forecasts. Therefore, we use the residual volatility of asset returns prior to the spin-off announcement as our proxy for the information asymmetry between managers and outsiders. We measure the asset volatility as the weighted average of the annualized residual stock and bond volatility. The weights are based on the leverage at the end of the year preceding the spin-off.

4. Firm liquidity

Interest and dividend payout is our proxy for this variable. We measure these payouts as the sum of total interest and dividend payments to operating cash flow.

5. Efficiency

We measure the efficiency of the firm's operations as the sales to assets ratio, also known as the assets turnover ratio, at the end of the year preceding the spin-off announcement.

6. Investment expenditures

We measure the investment expenditures by the ratio of cash flows for investment activities to earnings before interest and taxes. We also measure this ratio at the end of the year preceding the spin-off announcement.

7. Control variables

Many studies find that the wealth effects are larger when the portion of assets that is divested is larger. Therefore, we control for the relative size of a spin-off by using two variables for spin-off size. The first variable is the pre-spin-off ratio of subsidiary assets to the total assets of the parent company (from now on to be referred to as "relative size"). The second variable is the relative size multiplied by a dummy variable that equals one when the abnormal return is negative and zero when it is positive. The combination of these two variables captures the relation between the relative size and the absolute magnitude of the abnormal returns.

E. Sample description

Table II presents firm size, leverage, and profitability statistics for the companies in our sample.

[Please place Table II here]

There are 91 spin-off announcements in the sample for which there are straight and/or convertible bond data available. The average number of straight bonds per company is 3.99. The mean book value of assets is $21.1 billion, the leverage is 46.8%, the mean annualized volatility of stock returns is 33.6%, and the mean volatility of (straight) bond returns is 5.4%.

The spin-offs in our sample are relatively large ones. On average, companies spin off 21.1% of the book value of their total assets in a transaction. Most of them (55%) are spin-offs of divisions that are operating in a different industry from the parent.

F. The models of abnormal stock and bond returns

We use the factors described in subsection D to explain the abnormal stock and bond returns during the event window. When we run a regression analysis, we must take into account that the spin-offs affect the value of debt and equity in two ways: first, by changing the value of the entire firm, and second, by redistributing the wealth between share- and bondholders. Therefore, we should include the abnormal

returns themselves in the model as (endogenous) explanatory variables. We solve this problem by estimating a system of two simultaneous equations for the stock and bond abnormal returns. We estimate the system by using three-stage least squares. This method takes into account heteroskedasticity and correlation in the errors across the equations, and allows for the correlation of the explanatory variables with the error terms.

We have also estimated an OLS regression for the returns on the entire firm. In this regression, we calculate the firms' returns as a weighted average of the stock and bond returns, using the pre-spin-off values of equity and debt to assets as weights. This regression estimates how the total value effect of spin-offs is explained by the separate factors.

III. Empirical results

We start this section by discussing the results for the abnormal returns, followed by a discussion of the results from the regression analysis.

A. Abnormal returns

Table III presents the announcement-period abnormal returns for the stock- and the bondholders.

[Please place Table III here]

In Table III, Panel A presents the returns for the stockholders. The mean abnormal return on the announcement date is a positive and highly significant 2.02%. On the announcement date, more than 71% of the sample companies' abnormal returns are positive. The total three-day abnormal returns are even higher (3.07%). These results are similar to those found in previous studies on announcement effects associated with corporate spin-offs.

We note that we checked the abnormal returns for the period of 20 to two days before the spin-off announcement. These returns are not significant. This finding makes it unlikely that there was any information leakage in the period preceding the announcement.

The results for the straight and convertible bonds are presented in Panels B and C of Table III. Panel B shows mean and median abnormal returns for the whole bond sample. The straight bonds subsample shows a positive abnormal return of 0.14%. This abnormal return is significant at the 1% level. The abnormal return for the three-day event window is 0.11%. This return is also significant at the 1% level. The positive one- and three-day abnormal returns suggest that wealth transfers from bondholders to stockholders are either nonexistent or so small that they are outweighed by the benefits. As above, we calculated the abnormal returns for the period of 20 to two days preceding the announcement date. Again, these returns are

not significant, making it unlikely that there was any information leakage in this period.

The convertible bonds subsample does not show significant abnormal returns on either the announcement date or in the three-day announcement period.

Since the observations in Panel B of Table III are from all the available bonds, some of the announcements are represented by two or more bonds. A possible high correlation between different bonds of the same company violates the independence assumption underlying the statistical tests of significance. Consequently the test statistics could be overstated. To avoid this problem, in Panel C of Table III we present the results for the "firm sample." In this sample, one observation is the return on firm's total debt rather than on individual bonds. We approximate these returns by using the median abnormal returns on all available bonds for a given company (or the actual bond returns for firms with data on only one available traded bond). The results in Panel C confirm the all-bond sample results presented in Panel B, but are less significant due to the smaller number of observations. On the announcement date, the abnormal return is 0.06% for straight bonds, significant at the 1% level, and –0.7% for convertible bonds, significant at the 10% level. Thus, the immediate bond market reaction to spin-off announcements is positive for straight bonds. There is no evidence that the market expects a wealth transfer to take place as a result of a spin-off.

A possible explanation for the positive abnormal returns to the bondholders is that the market sees spin-off announcements as a signal that either the total firm value is going to increase as a result of spin-off, or that the total firm value is higher than previously estimated by the market. The latter factor is also frequently cited as one of the reasons for the positive stock price reaction.

An alternative explanation comes from Leland (1994) and Leland and Toft (1996). A spin-off is a corporate transaction that divides one company into separate divisions. Unless the cash flows from these divisions are perfectly correlated, such a transaction is bound to increase the firm's volatility. Although higher volatility is a negative factor for investment-grade bonds, it may be beneficial for the low-grade bonds of companies that are close to bankruptcy: in this case, the debt of highly leveraged firms should display higher abnormal returns at the spin-off announcements than would investment-grade debt.

Panel D of Table III presents evidence of the total value created by spin-off announcements, and the relation between abnormal stock and bond returns. The bond returns in this table are the returns of both straight and convertible bonds. We calculate the abnormal returns on the total parent firm that we show in this panel as an average of the stock and bond abnormal returns, weighted by the values of the equity- and debt-to-assets ratios at the end of the fiscal year preceding the spin-off announcement. This panel shows that corporate spin-offs result in an increase in total

firm value of 2.25% over the three-day event window, and that more than 70% of the companies experience this increase. This evidence is consistent with theoretical explanations based on a decrease of agency costs of internal capital markets, lower information asymmetry, an increase in operational efficiency, and a reduction in underinvestment.

The last column of Panel D shows the relation between abnormal changes in the values of debt and equity for the two different event windows. This column shows that on the announcement day these changes are uncorrelated, and that over the three-day event window they are correlated negatively, which could indicate a possible wealth transfer between the bond- and stockholders. The fact that the one-day event window results are qualitatively different from the three-day event window results suggests that the bond prices react to the announcement information with at least a one-day delay. For this reason, the focus in the remainder of the paper is on the three-day abnormal returns.

B. Comparison with previous studies

Our result that bondholders do not suffer from a spin-off announcement supports the findings of previous studies by Hite and Owers (1983), Schipper and Smith (1983), and Dittmar (2004). Schipper and Smith (1983) and Dittmar (2004)

find that only a small number of companies decline in bond ratings after the spin-off. Schipper and Smith find that such a decline took place in two out of 18 cases. Dittmar finds a decline in three out of 61 cases. However, she also finds an improvement in eight out of the 61 cases that she analyzes. Schipper and Smith (1983) look at price changes for 26 bonds around 13 spin-off announcements. They find 13 price increases, 11 price decreases and two cases of no price change.

Hite and Owers (1983), Dittmar (2004), and Maxwell and Rao (2003) study bondholder wealth effects. Hite and Owers (1983) find on average a nonsignificant positive wealth effect for 15 bonds during the event period of day (-1, 0). Dittmar studies monthly announcement effects for bondholders. On average she finds nonsignificantly negative announcement results.

Maxwell and Rao (2003) find a significantly negative abnormal return of -0.88% for bondholders. This result contradicts our earlier reported results. However, a direct comparison between our previously reported results and those of Maxwell and Rao (2003) is difficult for two reasons: first, because they report abnormal returns for the announcement month, but we report abnormal returns for the three-day announcement period; and second, because their results cover the period from 1976 to 1997, but our results are for the period from 1995 to 2002. To make our results comparable to theirs, we calculate abnormal returns for the announcement month. We also divide our sample in two different subperiods. Table IV includes these results.

To further facilitate the comparison we also present the event-study results of Hite and Owers (1983), Dittmar (2004), and Maxwell and Rao (2003).

[Please place Table IV here]

In Panel A of Table IV we present event study results for the three-day event window (day -1 to day 1), which we base on Panels A and C of Table III. To compare our results to those of Maxwell and Rao (2003), we also present results for the two-day event window (day 0 to day 1). Our stock returns are similar between the various event windows (3.07% for the three-day window and 2.44% for the two-day window). Our bond returns are not significantly positive for both the two-day and three-day windows.

To compare our bond returns to those of Maxwell and Rao (2003), we use their method to calculate monthly returns. From Panel A we conclude that these monthly bond returns do not substantially differ from our daily returns. The mean bond return is a significantly positive 0.18%. However, this significance is driven by only one outlier. Excluding this outlier would make the monthly bond return a nonsignificant 0.17%. The median bond return is 0.02%, which is not significantly different from zero. Based on these results, we believe that the difference in results between our study and the Maxwell and Rao (2003) paper is not based on the use of daily versus monthly returns.

In Panel B we study whether the difference between our results and those of Maxwell and Rao (2003) may be driven by the different choice of sample periods, so we split our sample period in two parts: the first part (1995-1997) overlaps with the last part of Maxwell and Rao's (2003) sample period; the second part (1998-2002) does not overlap with their study. We find that the abnormal stock returns are slightly higher in the first years of our sample (3.63% versus 2.57%). However, the difference between the returns in both samples is not significant.

A more interesting result is the difference in bond returns. For the first part of our sample we find a non-significant negative bond return of -0.14% and for the second part we find a significant positive abnormal bond return (0.14%). The difference between two subsamples is 0.27%. This difference is significantly different from zero at the 5% level. Even though the sign for the first part of our sample is the same as that for Maxwell and Rao (2003), we note that on average they find a larger negative return than we do (-0.88%). We believe that this difference may at least partly be driven by some large negative outliers. For example, in the introduction we mentioned the Marriott spin-off, described in Parrino (1997). This spin-off took place in 1993, and was announced in 1992, a year that is included in the sample of Maxwell and Rao (2003) sample, but not in ours. The bondholder wealth loss in this case was 16.51% during the three days following the spin-off announcement. This outlier is likely to have a significant impact on the average bond

returns. This case, and possibly others, may also explain the large difference between Maxwell and Rao's mean abnormal bond returns and their median abnormal bond returns (-0.27%).

It should be noticed that for the remainder our results are similar to those of Maxwell and Rao (2003). For example, in Panel D of Table III, we find a negative correlation between abnormal changes in the values of debt and equity during the three-day event window. Maxwell and Rao present a similar result in their regression analysis in Table VI, where they find a negative relationship between the abnormal change in the market value of debt and the abnormal change in the market value of equity.

C. Factors that explain abnormal stock returns

The regressions for stock and bond three-day abnormal returns are jointly estimated by the three-stage least squares method, which efficiently uses all information available in the data. We add the abnormal stock return to the bond return regression to capture wealth transfer effects not explained by the other factors. We also add dummies for subordinated bonds and for senior bonds.

Table V presents the results for the three-stage least squares regression. The *t*-statistics appear in parentheses below the estimated coefficients. We also present the hypotheses.

[Please place Table V here]

When we include six explanatory and two control variables, the explanatory power of the stock regression, measured by the adjusted R squared, is 0.52.

The dummy for increase in industrial focus is positive, but not statistically significant (the *t*-statistic is 1.375). This result does not confirm our hypothesis that an increase in industrial focus affects abnormal returns positively for stockholders (*Hypothesis 1*). The coefficient for leverage is significant and positive, indicating that stockholders of the more leveraged firms benefit more from the spin-offs. This finding supports the hypothesis that a higher pre-spin-off leverage affects abnormal returns positively (*Hypothesis 3*).

The coefficient for pre-spin-off asset volatility is not significant. This contradicts the information asymmetry hypothesis (*Hypothesis 5*). The abnormal returns of companies with high pre-spin-off levels of information asymmetry are the same as for firms with low information asymmetry.

Firms that pay higher interest and dividends as a ratio of their operating cash flow have lower abnormal stock returns. Firms sometimes mention the possibility for independent growth and attracting new capital as a reason to spin off divisions. The

negative coefficient for interest and dividend payout ratios in our regression suggests that firms with higher payouts cannot fully profit from the growth opportunities offered by spin-offs. This negative relation between the payout ratio and the stock returns on the spin-off announcement is also consistent with the Leland and Toft (1996) model (*Hypothesis 7*).

The coefficient for the asset turnover is significantly positive at the 5% level, indicating that the stocks of the more efficiently run companies also profit more from the restructuring efforts. This contradicts the hypothesis based on Schipper and Smith (1983) (*Hypothesis 9*).[6]

We find no relation between company investment expenditures (measured as the ratio of cash outflow for investment activities to earnings before interest and taxes) and the spin-off abnormal returns. Thus, the underinvestment reduction hypothesis based on John (1993) finds no confirmation. (*Hypothesis 11*).[7]

Both coefficients for spin-off size are significant, indicating that relatively large spin-offs are associated with higher absolute abnormal returns, either positive or negative.

D. Factors that explain abnormal bond returns

[6] Cusatis, Miles, and Woolridge (1994) find that several measures of operating performance do improve after a spin-off. However, they do not relate this improvement to the market reaction to a spin-off announcement.

[7] Although we find no relationship between the abnormal returns and investment levels *before* a spin-off, Cusatis et al. (1994) find that the level of investment activity rises *after* a spin-off.

We start by running a separate regression in which we regress the abnormal three-day "firm" bond returns on separate dummies for subordinated bonds and senior bonds. This regression gives a significant coefficient for the senior bond dummy (significant on the 5% level). The complete regression results (with *t*-statistics in brackets) are as follows: intercept: -0.051 (-0.572); dummy for subordinated bonds, 0.317 (1.126); dummy for senior bonds, 0.394 (1.939). The adjusted R squared is 0.029.

We hypothesize that the same factors that affect stock returns also affect bond returns. In Table V, Column 7 presents the results when we estimate the same model as for the common stock returns for the three-day (day –1 to day 1) abnormal bond returns. We see that although some of these factors also play a role for the bond market, they explain a much smaller portion of the variance in the abnormal bond returns. Compared to the stock return model, where the adjusted R squared is equal to 0.52, the bond regression explains 30% of the variations in the bond abnormal returns.

Industrial focus is not significant for stocks and it is also not significant in the bond regression (*Hypotheses 2a and 2b*). It means that the effects of an increase in firm value and the wealth transfer probably cancel out each other.

Leverage has a statistically significant coefficient for stock returns. It is not significant in the bond regression. Therefore, the hypothesis derived from the Leland and Toft (1996) model, is not confirmed for abnormal bond returns (*Hypothesis 4*).

The coefficient for information asymmetry, which was not significant for the abnormal stock returns, is also not significant for the abnormal bond returns (*Hypothesis 6*).

The payout ratio (interest and dividend to operating cash flow) has significant coefficients in both the stock and the bond regressions, which means that this hypothesis is also confirmed for bond returns (*Hypothesis 8*).

Earlier, we noted that efficiency, measured as the asset turnover, has a significant, positive coefficient for stock returns. This result is surprising, because we hypothesized a negative coefficient. The coefficient is nonsignificant for bond returns. Therefore, the hypothesis for bond returns is also not confirmed (*Hypothesis 10*).

The coefficient for investment expenditures is nonsignificant for the bond regression. It means that we cannot confirm our hypothesis (*Hypothesis 12*).

The coefficients for spin-off size are significant, indicating that relatively large spin-offs are associated with higher absolute abnormal bond returns, either positive or negative. The coefficient for the abnormal stock returns is significant and negative in the bond regressions, showing that spin-off announcements lead to a transfer of

wealth from bondholders to stockholders. This wealth transfer cannot be explained by the other factors included in the model. It suggests that individual terms and conditions of spin-offs that are not included in the regression model play an important role in the wealth transfer process.

The dummies for subordinated bonds and senior bonds are not significant. The lower significance of the dummy for senior bonds (compared to the OLS regression of bond returns on bond seniority) is probably caused by the relation of the senior bond dummy and other variables. In fact, the p-value for this variable only changes from 0.06 to 0.14.

E. Regressions for the total firm returns

Table VI shows the relation between the total value created by spin-offs and the underlying factors.

[Please place Table VI here]

The negative coefficient for the payout ratio is consistent with the Leland and Toft (1996) model. Companies that are able to retain more of their earnings are less sensitive to the increase of bankruptcy risk, and they also profit more from the growth opportunities offered by spin-offs.

Neither the pre-spin-off level of investment expenditures nor the level of information asymmetry significantly affects the total firm returns. This evidence rejects the underinvestment reduction motive offered for spin-offs by John (1993) and the information asymmetry motive suggested by Krishnaswami and Subramaniam (1999).

The coefficient for efficiency, which we measure as the asset turnover, is significant and positive. This result indicates that companies with a high pre-spin-off efficiency level are the ones that profit the most from such a divestiture. Thus, the data do not confirm the efficiency increase hypotheses. Leverage shows a significant and negative coefficient; we would have expected a positive coefficient.

Size is significant, just as in the regressions for the stock and bond returns. The dummy for senior bonds is nonsignificant, and the dummy for subordinated bonds is significant and negative. Finally, the focus-increasing dummy is not significant.

IV. Conclusions

Earlier studies find mixed evidence on wealth loss for the bondholders when the level of the firm diversification decreases. The negative correlations between the stock and bond returns and the negative bond returns in the announcement month found in some studies suggest that such restructuring leads to a wealth transfer from

bondholders to stockholders. But other research shows that the credit quality and the prices of corporate bonds do not suffer after a spin-off.

In our study we use daily stock and bond data, combined with pre-spin-off firm characteristics, to examine the effects of corporate spin-off announcements on the value of both corporate debt and equity and the factors influencing wealth creation and redistribution in these spin-offs.

We find positive announcement-period abnormal returns for stockholders, and either positive or nonsignificant abnormal returns for bondholders. When we split our sample into two periods, 1995-1997 and 1998-2002, we find nonsignificant negative abnormal returns for the first subsample and significantly positive abnormal returns for the second subsample. This difference suggests that bondholders learn from past experiences and become better at protecting themselves against expropriation by stockholders.

There are several factors associated with the sign and magnitude of announcement returns. Our simultaneous equation estimations show that both stock and bond abnormal returns are higher for firms with lower interest and dividend payouts. Stock abnormal returns are also higher for firms with higher pre-spin-off leverage. After correcting for these factors, we find that higher abnormal stock returns still lead to lower abnormal bond returns. This finding indicates that there is some wealth transfer due to the idiosyncratic conditions of the spin-off transactions.

Our overall conclusion from this study is that spin-offs result in the creation of overall value for both stock- and bondholders.

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Table I. Sample selection.

The announcements of spin-offs by U.S. firms made from January 1995 to January 2002. Our sources for the original announcement information are the SDC database and Lexis-Nexis.

	Number of observations
Number of announcements	612
Excluded:	
Double announcements	41
No bond data available	396
Other type of divestitures wrongly classified as spin-offs	39
Contaminating information	15
Event could not be confirmed	13
Other corporate actions regarding a division	6
Not the first announcement	5
Other reason	6
Total excluded	521
Final number of observations	91

Table II. Statistics.

This table presents statistics for the firms that announce the spin-off of a company division to stockholders. We measure the variables as follows: the leverage as the debt ratio (ratio of total debt to invested capital); the interest and dividend payout as the ratio of the sum of total interest and dividend payments to operating cash flow; the efficiency of firm's operations by the assets turnover ratio at the end of the year preceding the spin-off announcement; the investment expenditures by the ratio of the cash outflows for investment activities to earnings before interest and taxes; relative size as the pre-spin-off ratio of subsidiary assets to the total assets of the parent company; and asset volatility as the weighted average of the annualized stock and bond return volatility prior to the spin-off announcement. The increase in industrial focus is our proxy for the decrease in the diversification level. We measure this variable as a dummy equal to one if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and to zero if the parent and subsidiary to be spun off are in the same industry. We obtain book values from the financial results of the year directly preceding the spin-off announcement. Assets and sales are in millions of U.S. dollars.

	Mean	Standard deviation	Median	Number of observations
Panel A: Characteristics of parent firm before the spin-off				
Total Assets	21064.11	48823.24	5286.10	91
Total Sales	14407.33	30600.34	5292.00	91
Return on Stockholders' Equity	13.38	17.92	13.25	90
Leverage	46.76	53.43	40.20	90
Payout	59.74	167.02	40.47	90
Efficiency	0.8938	0.5593	0.8611	91
Investment expenditures	1.6149	2.9622	0.8937	91
Stock Return Volatility	33.55	17.42	30.61	91
Straight Bond Return Volatility	5.36	4.02	4.50	79
Asset volatility	23.59	14.55	20.18	73
Number of bonds per sample firm:				
Straight bonds	3.99	4.24	2.00	91
Convertible bonds	0.27	0.64	0.00	91
Time to Maturity (Straight Bonds)	10.32	7.17	8.21	79
Panel B: Characteristics of spin-offs				
Fraction of completed spin-offs	84.62%			91
Fraction of spin-offs that increased industrial focus	54.95%			91
Relative size of spin-off	21.08%	14.18%	18.45%	91

Table III. Announcement-period returns

This table presents abnormal returns to the stocks, bonds, and total firm value of the firms that announce the spin-off of a company division to stockholders. Panel A presents abnormal stock returns. We calculate these abnormal returns using the market model estimated over the 200-day period from 220 to 21 days preceding the spin-off announcement date. (In one case, due to the limited availability of data, this period is equal to 117 days.) We use the S&P 500 index as our benchmark. Panel B presents abnormal bond returns. We calculate these abnormal returns using the mean- and market-adjusted model estimated over the 45-day period from 65 to 21 days preceding the spin-off announcement date. We use Merrill Lynch corporate bond indexes as our benchmark. Panel C presents abnormal bond returns for the firm sample. In this panel, each announcement is represented by median abnormal bond returns on all available bonds for a given company. Panel D presents abnormal changes in the total value of the firms that announce the spin-off of a company division to stockholders, and the correlation between abnormal changes in the values of debt and equity. The bonds in Panel D include both straight and convertible bonds. Each announcement is represented by median bond returns. We calculate the firm returns as a weighted average of the stock and bond returns, using the pre-spin-off values of equity and debt to assets as weights. We calculate the abnormal changes in the values of debt and equity using abnormal stock and bond returns and pre-spin-off leverage and asset values. We test the significance of the mean abnormal returns using z-statistics (in parentheses), and the significance of the median abnormal returns using Wilcoxon test (test statistics in parentheses). We test the significance of the percentage of positive abnormal returns using sign test (test statistics in parentheses). *** is significant at the 0.01 level. ** is significant at the 0.05 level. * is significant at the 0.10 level.

Panel A: Announcement-period returns to the stockholders

Announcement window	Number of observations	Mean abnormal stock return	Median abnormal stock return	Percent of positive abnormal returns
Day 0	91	2.017*** (12.308)	1.347*** (3.889)	71.43*** (3.983)
Day –1 to day +1	91	3.070*** (9.440)	2.615*** (4.118)	71.43*** (3.983)

Panel B: Announcement-period returns to bond holders: all-bond sample

Announcement window	Number of observations	Mean abnormal bond return	Median abnormal bond return	Percent of positive abnormal returns
Straight bonds				
Day 0	355	0.136*** (7.915)	0.032*** (2.817)	57.18*** (2.654)
Day –1 to day +1	347	0.110*** (3.504)	0.007 (0.372)	51.59 (0.537)
Convertible bonds				
Day 0	23	-0.551 (-1.042)	0.047 (0.624)	52.17 (0.000)
Day –1 to day +1	24	0.090 (1.172)	0.427 (1.300)	70.83* (1.837)

Panel C: Announcement-period returns to bond holders: firm sample

Announcement window	Number of observations	Mean abnormal bond return	Median abnormal bond return	Percent of positive abnormal returns
Straight bonds				
Day 0	78	0.059***	0.037	56.41
		(3.306)	(1.136)	(1.019)
Day –1 to day +1	77	0.008	-0.020	45.45
		(1.002)	(0.660)	(0.684)
Convertible bonds				
Day 0	18	-0.703*	-0.289	44.44
		(-1.743)	(1.089)	(0.236)
Day –1 to day +1	18	0.032	0.241	66.67
		(0.744)	(0.827)	(1.179)

Panel D: Evidence on value creation and wealth transfer in spin-offs

Announcement window	Number of observations	Changes in total firm value			Correlation between abnormal changes in the values of debt and equity
		Mean abnormal return	Median abnormal return	Percent of positive abnormal returns	
Day 0	87	1.479***	0.846***	67.82***	0.158
		(9.836)	(3.714)	(3.216)	(1.475)
Day –1 to day +1	85	2.251***	1.958***	70.59***	-0.308***
		(6.958)	(4.062)	(3.688)	(-2.949)

Table IV.
Comparison of the results of the current study with results in previous studies.

This table presents a comparison of the results of the current study with results of the studies by Hite and Owers (1983), Dittmar (2004), and Maxwell and Rao (2003). Panel A includes a comparison of the abnormal returns between different event windows. Panel B presents a comparison of abnormal returns between different sample periods. The number of observations appears in parentheses. *** is significant at the 0.01 level. ** is significant at the 0.05 level. * is significant at the 0.10 level. n.s. is not significant.

Panel A: Comparison of abnormal returns between different event windows

	Straight bonds	Stocks
Hite and Owers (1983)		
Day -1, 0: 1963-1981		
Mean	0.2 n.s.	3.3***
	(15)	(123)
Median	NA	NA
Dittmar (2004)		
Monthly returns: 1983-1995		
Mean	-0.6 n.s.	NA
	(16)	
Median	-0.2 n.s.	NA
	(16)	
Maxwell and Rao (2003)		
Day 0, +1: 1976-1997		
Mean	NA	3.585***
		(79)
Median	NA	2.568***
		(79)
Monthly returns: 1976-1997		
Mean	-0.878***	2.892***
	(80)	(79)
Median	-0.266***	2.509***
	(80)	(79)
Our study		
Day -1, +1: 1995-2002		
Mean	0.008 n.s.	3.070***
	(77)	(91)
Median	-0.020 n.s.	2.615***
	(77)	(91)
Day 0, +1: 1995-2002		
Mean	0.011 n.s.	2.444***
	(78)	(91)
Median	-0.004 n.s.	1.529***
	(78)	(91)
Monthly returns: 1995-2002		
Mean	0.177***	2.083***
	(78)	(91)
Median	0.018 n.s.	2.502**
	(78)	(91)

Panel B: Comparison of abnormal returns between different sample periods

	Straight bonds	Stocks
Our study		
Day -1, +1: 1995-1997		
Mean	-0.136$^{n.s.}$	3.629***
	(36)	(43)
Median	-0.058*	2.893***
	(36)	(43)
Day -1, +1: 1998-2002		
Mean	0.135**	2.570***
	(41)	(48)
Median	0.041$^{n.s.}$	1.633**
	(41)	(48)
Day -1, +1: difference between 1995-1997 and 1998-2002		
Mean	0.271**	-1.059$^{n.s.}$
Median	0.099*	-1.260$^{n.s.}$

Table V.
Regressions of announcement-period returns: Joint regressions of stock and bond returns.

This table presents the results of the three-stage least squares regressions of the three-day abnormal returns to the common stock and straight and convertible bonds of the firms that announce the spin-off of a company division to stockholders AR(-1,1). We calculate the abnormal stock returns using the market model estimated over the 200-day period from 220 to 21 days preceding the spin-off announcement date. (In one case, due to the limited availability of data, this period is equal to 117 days.) We use the S&P 500 index as our benchmark. We calculate the abnormal bond returns using the mean- and market-adjusted model estimated over the 45-day period from 65 to 21 days preceding the spin-off announcement date. Each announcement is represented by median bond returns. We use Merrill Lynch corporate bond indexes as our benchmark. We use the debt ratio (ratio of total debt to invested capital) as our proxy for the leverage. We measure the interest and dividend payout as the ratio of the sum of total interest and dividend payments to operating cash flow. We measure the efficiency of firm's operations by the assets turnover ratio at the end of the year preceding the spin-off announcement, and the investment expenditures by the ratio of the cash outflows for investment activities to earnings before interest and taxes. Information asymmetry is measured by the asset volatility prior to the spin-off announcement. We measure asset volatility as the weighted average of the annualized stock and bond return volatility. Increase in industrial focus is a dummy equal to one if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and to zero if the parent and spin-off subsidiary are in the same industry. We measure relative size as the pre-spin-off ratio of subsidiary assets to the total assets of the parent company. Leverage, payout, efficiency, investment expenditures and relative size are measured using the financial results of the year directly preceding the spin-off announcement. *t*-statistics appear in parentheses. *** is significant at the 0.01 level. ** is significant at the 0.05 level. * is significant at the 0.10 level.

	Stock AR			Bond AR		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm value change hypothesis	Wealth transfer hypothesis	Estimation results	Firm value change hypothesis	Wealth transfer hypothesis	Estimation results
Intercept			-0.932 (-0.499)			-0.044 (-0.194)
Leverage	+	0	2.566** (2.447)	+	0	0.108 (0.811)
Payout	-	0	-1.072*** (-3.285)	-	0	-0.096* (-1.829)
Efficiency	-	0	2.118** (2.092)	-	0	-0.211 (-1.492)
Investment Expenditures	-	0	0.064 (0.309)	-	0	0.036 (1.306)
Information Asymmetry	+	0	0.015 (0.375)	+	0	0.002 (0.373)
Increase in Industrial Focus	+	+	1.482 (1.375)	+	-	0.114 (0.778)
Abnormal stock return				0	-	-0.038* (-1.769)
Relative size			0.108*** (2.726)			0.023*** (4.577)
Relative size*Dummy for negative abnormal return			-0.322*** (-6.835)			-0.028*** (-5.422)
Subordinated bonds						0.073 (0.315)
Senior bonds						0.290 (1.470)
Adjusted R sq.			0.52			0.30
Number of Obs.			86			83

Table VI.
Regressions of announcement-period total firm returns.

This table presents results of the OLS regressions of the three-day abnormal returns to the total value of the firms that announce the spin-off of a company division to stockholders AR(-1,1). We calculate the abnormal stock returns using the market model estimated over the 200-day period from 220 to 21 days preceding the spin-off announcement date. In one case, due to the limited availability of data, this period is equal to 117 days. We use the S&P 500 index as a benchmark. We calculate the abnormal bond returns using the mean- and market-adjusted model estimated over the 45-day period from 65 to 21 days preceding the spin-off announcement date. Each announcement is represented by median bond returns. We use Merrill Lynch corporate bond indexes as our benchmark. We calculate the firm returns as the weighted average of the stock and bond returns, using the pre-spin-off values of equity and debt to assets as weights. We use the debt ratio (ratio of total debt to invested capital) as our proxy for the leverage. We measure the interest and dividend payout as the ratio of the sum of total interest and dividend payments to operating cash flow. We measure the efficiency of firm's operations by the assets turnover ratio at the end of the year preceding the spin-off announcement, and the investment expenditures by the ratio of the cash outflows for investment activities to earnings before interest and taxes. We measure information asymmetry by the asset volatility prior to the spin-off announcement, and asset volatility as the weighted average of the annualized stock and bond return volatility. We measure the increase in industrial focus as a dummy equal to one if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and as zero if the parent and spin-off subsidiary are in the same industry. We measure relative size as the pre-spin-off ratio of subsidiary assets to the total assets of the parent company. We measure leverage, payout, efficiency, investment expenditures, and relative size using the financial results of the year directly preceding the spin-off announcement. *t*-statistics, based on White (1980) heteroskedasticity-consistent standard errors, appear in parentheses. *** is significant at the 0.01 level. ** is significant at the 0.05 level. * is significant at the 0.10 level.

	Firm value change hypothesis	Estimation results
Intercept		2.493** (2.137)
Leverage	+	-4.314*** (-6.268)
Payout	-	-0.802*** (-3.321)
Efficiency	-	1.348* (1.966)
Investment Expenditures	-	0.285 (1.653)
Information Asymmetry	+	-0.009 (-0.258)
Increase in Industrial Focus	+	0.707 (0.891)
Relative size		0.088** (2.474)
Relative size*Dummy for negative abnormal return		-0.220*** (-5.698)
Subordinated bonds		-1.822* (-1.803)
Senior bonds		-0.761 (-0.565)
Adjusted R sq.		0.57
Number of Obs.		83