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

By

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ABSTRACT

Spin-off announcements affect bondholders in two possible ways. Bondholders may profit from the increase in the total firm value that is caused by a spin-off. On the other hand, they may also suffer from a wealth transfer from bondholders to shareholders, because they lose part of the coinsurance effect that occurs in diversified firms. This problem is studied by analyzing 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 percent for shareholders and 0.11 percent for holders of 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.

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1. Introduction

The last decades have witnessed many diversified firms that went back to basics by focusing on their core business. An important reason for this is that extensive research, starting with Berger and Ofek (1995), has shown that a diversified firms' equity is traded at a discount compared to single business firms. A common way for a firm to pair down the number of its business lines without the need to attract extra capital is to spin off its non-core divisions. A spin-off is defined as a pro-rata distribution of the shares of a firm’s subsidiary to the shareholders of the parent company. No cash transaction takes place, and the former subsidiary becomes an independent company. After the spin-off, the shareholders of the parent company hold shares in both the parent company and the subsidiary. The objective of this paper is to study the consequences of the spin-off announcement for both shareholders and bondholders.

In line with the existence of a diversification discount, the decision to spin off a subsidiary is mostly associated with an expected restructuring of the parent firm and improving the overall operations of both the parent and the subsidiary. The stock market generally receives announcements of such a decision positively. Previous studies from all over the world uniformly document economically and statistically significant positive abnormal returns of up to 5.56 percent during the spin-off announcement window. Among factors found to play a role in the process of value creation resulting from a spin-off are focus increase (i.e., decrease in diversification), reduction of information asymmetry, and improved operational performance.

Although it is clear from the literature that spin-offs benefit shareholders, 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. Mansi and Reeb (2002) show that the risk reduction, which is due to diversification, is one of the sources of the diversification discount. This is caused by the coinsurance arising when the cash flows from the different divisions are not perfectly

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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 Mikkelsen (2003) study a sample of carve-outs. The difference between carve-outs
correlated. Lower asset risk results in a higher value of the corporate debt securities. This coinsurance disappears with a spin-off and hence, the loss of diversification may lead to a value transfer from bondholders to shareholders.

Hite and Owers (1983), and Dittmar (2004) put forward the hypothesis that spin-offs are detrimental to the value of corporate debt. Both studies do not confirm this wealth transfer hypothesis as they find insignificant abnormal bond returns around the date of the spin-off announcement (Hite and Owers, 1983) or during the announcement month (Dittmar, 2004). However, in a case study of the Marriott Corporation Parrino (1997) documents a wealth transfer from the bondholders to the shareholders 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 percent. Using monthly data, Maxwell and Rao (2003) also find a wealth transfer from the bondholders to the stockholders. Their study contradicts the earlier mentioned studies showing no negative impact of divestitures on the value of corporate bonds.

This study attempts to resolve this contradiction in the literature by using daily bond data and by analyzing the factors driving abnormal returns over a short event window. In addition we analyze the returns that accrue to the shareholders. In line with the previously mentioned literature we find an abnormal return for shareholders of 2.02 percent on the announcement date. The three-day event window even shows an abnormal return of 3.07 percent. Both results are significant on the 1-percent level. More surprising is the positive abnormal return of 0.14 percent for the holders of straight bonds on the announcement date. The return during the three-day event-window is 0.11 percent. Both results are also significant on the 1-percent level. These results are contrary to the results of Maxwell and Rao (2003). In order to investigate the different results between the current study and the Maxwell and Rao (2003) paper, we split up our sample in two sub-samples. The first sub-sample covers the period 1995-1997. This period overlaps with the last years of the sample period of Maxwell and Rao (2003). The second sub-sample covers a later period (1998-2002). and spin-offs is that carve-outs attract additional capital. The authors find that performance did not improve beyond the first post-carve-out year.
For the first sub-sample we find negative but not significant bond returns (-0.14 percent) and for the second sub-sample we find significantly positive bond returns (0.14 percent). 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 (2003) 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 percent of their wealth.\textsuperscript{3} It is possible that after the occurrence of this case, bondholders learned how to better protect themselves against this type of expropriation.

Three-stage least squares regression is used to explain stock and bond abnormal returns. We hypothesize that a number of variables affect stock and bond abnormal returns in the same way. The reason for this is that these variables affect the value creation through spin-offs. Shareholders are most likely to benefit from this value creation, but bondholders may also profit from an increase in the overall firm value. In this analysis we find that the pre-spin-off leverage affects stock returns positively. This result is in line with the model of Leland and Toft (1996). This model predicts that while debt and equity values are inversely related to asset volatility in most cases, this relationship reverses for high levels of debt. Therefore a high pre-spin-off level of leverage is associated with positive abnormal stock returns. Another prediction from the same model is 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. This prediction is confirmed for both the stock and bond abnormal returns in our study. A number of previous studies have found that increase in industrial focus affects abnormal stock returns that are associated with spin-offs positively.\textsuperscript{4} This result is not confirmed in our study. The hypothesized relationship between industrial focus and bond returns is less obvious. On one hand, bondholders may profit from the overall increase in firm value due to the increase in industrial focus. On the other hand, the spinning off of an unrelated division will lead to a higher volatility of the firm’s assets. In other words, the bondholders will lose part of their co-insurance. We find no significant

\textsuperscript{3}This is based on Parrino (1997, page 252) who writes: “The dealer bid price data reveal that the prices of all Marriott’s fixed-income securities declined during the three days following the spinoff announcement. The aggregate market-adjusted value of the 13 senior notes and debentures fell 16.51% ($333.3 million)”.

\textsuperscript{4}This result is not confirmed in our study. The hypothesized relationship between industrial focus and bond returns is less obvious. On one hand, bondholders may profit from the overall increase in firm value due to the increase in industrial focus. On the other hand, the spinning off of an unrelated division will lead to a higher volatility of the firm’s assets. In other words, the bondholders will lose part of their co-insurance. We find no significant
relationship between industrial focus and abnormal bond returns. This probably means that both factors cancel each other out. Finally, other factors, such as information asymmetry, are either not significant, or do not have the hypothesized relationship with abnormal stock and bond returns.

The remainder of 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.

2. Factors that affect change in firm value

We investigate a number of factors that may play a role in the stock and bond market reaction to spin-off announcements. All of them are hypothesized to contribute to the total value created by the spin-offs. In addition, the first variable may also (partly) explain the wealth transfer between bondholders and stockholders. These factors are described below.

2.1. Change in degree of the firm’s diversification.

The effect of the change in the level of firm’s diversification on the value of the corporate securities can be twofold. Extensive research on the diversification discount suggests that the market value of more diversified companies is lower than 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. These factors motivate a hypothesis that a decrease in the level of firm’s diversification would result in the overall increase in firm’s value, and, consequently, the spin-off announcement returns being positively related to the increase in firm’s industrial focus.

On the other hand, 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. When the cash flows from different divisions are not perfectly correlated,

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4 See for example Daley, Mehrotra, and Sivakumar (1997), Desai and Jain (1999), and Krishnaswami and Subramaniam (1999).
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. A decreased asset base also leads to a wealth transfer in the same direction. 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.

Both the firm value increase and the wealth transfer theories suggest that the shareholders’ wealth should increase as a result of a decrease in the firm’s diversification. This leads to our first hypothesis:

**H1: An increase in industrial focus affects abnormal returns positively for shareholders**

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, is expected to be beneficial to bondholders. The second effect, the increase in risk and reduction in collateral, would decrease the wealth of bondholders. Therefore we formulate the competing hypotheses 2a and 2b. Hypothesis 2a will hold if the expected value increase for bondholders due to the elimination of inefficiencies will be larger than the value decrease because of the increase in risk and reduction in 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**

2.2. **Leverage and degree of financial distress.**

For all, and especially financially distressed, companies bankruptcy risk has a significant impact on the bonds’ value. Reducing assets and cash flows by divesting a unit can increase this 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, both equity and debt of financially troubled companies can benefit from the risk increase following a spin-off if it can increase the probability of the firm avoiding bankruptcy. In particular, the model of Leland and Toft (1996) predicts that
while debt and equity values are inversely related to the asset volatility in most cases, this relationship
reverses for the very high levels of leverage (“junk bonds”). As with industrial focus, the firm value increase
hypothesis suggests that stockholders benefit more from a spin-off if the leverage prior to the spin-off is
higher:

\textit{H3: A higher pre-spin-off leverage affects abnormal returns positively for shareholders}

The model of Leland and Toft (1996) also predicts a positive effect for bondholders if the pre-spin-off leverage is high. This is also based on the increase in firm value if a company with high leverage spins off a division:

\textit{H4: A higher pre-spin-off leverage affects abnormal returns positively for bondholders}

2.3. Information asymmetry.

As Krishnaswami and Subramaniam (1999) note, one of the most frequent motivations for the spin-offs, offered by the management of the involved companies, is to reduce information asymmetry between company insiders and the market. It is argued that the investment analysts cannot correctly value firms that operate in different industrial sectors. Therefore the market undervalues such companies. If this is the case, 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. It is hypothesized that both bondholders and shareholders profit from a spin-off by a firm that has a higher level of pre-spin-off information asymmetry. This leads to hypotheses 5 and 6:

\textit{H5: A higher pre-spin-off level of information asymmetry affects abnormal returns positively for shareholders}

\textit{H6: A higher pre-spin-off level of information asymmetry affects abnormal returns positively for bondholders}

2.4. Firm liquidity.
The total cash payouts made by a company to its bond- and shareholders (in the form of interest and dividend payments) affect both its 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, debt of companies with higher payout ratios starts to suffer from the risk increase at lower volatility levels. Therefore, it can be expected that if the pre-spin-off payout in the form of dividends and interest payments relative to the cash flow is high 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 shareholders. This leads to hypotheses 7 and 8.

\[ H7: \text{A higher level of pre-spin-off payout affects abnormal returns negatively for shareholders} \]

\[ H8: \text{A higher level of pre-spin-off payout affects abnormal returns negatively for bondholders} \]

2.5. Efficiency.

Schipper and Smith (1983) suggest that spin-offs benefit shareholders by reducing real diseconomies existing in conglomerate firms. This point of view is also supported by the post-spin-off increase in the cash flow margin on sales, found by Johnson, Klein, and Thibodeaux (1996). Such improvement in efficiency is likely to increase the value of both firm debt and equity to some extent. Furthermore, the companies with less efficient pre-spin-off operations are likely to benefit most from this reorganization:

\[ H9: \text{More efficient pre-spin-off operations affect abnormal returns negatively for shareholders} \]

\[ H10: \text{More efficient pre-spin-off operations affect abnormal returns negatively for bondholders} \]

2.6. Investment expenditures.

While providing a tax shield, the presence of outstanding risky debt can also lead to an underinvestment problem. The model of John (1993) predicts that, due to the possibility to optimally reallocate company debt between the parent and subsidiary, spin-offs might result in improved investment policy and, consequently, higher firm value without foregoing the tax advantages of corporate debt.
Supporting this model, Johnson, Klein, and Thibodeaux (1996) find that after a spin-off the real growth of the total assets of the spin-off parent and subsidiary significantly increase from below industry median to a level close to industry median.

The hypothesis, which is based on John’s 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 the companies with higher investment outflows. Therefore, the investment expenditure variable is expected 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 shareholders*

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, the same effect is hypothesized for bondholders as for shareholders:

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

### 3. Methodology and data description

#### 3.1. Sample selection

A sample of spin-offs by US firms is used to test the hypotheses described above. The spin-off announcements cover the period from January 1995 to January 2002. They are collected from the SDC database and from the Lexis-Nexis database. The total number of announcements collected from both sources is 612. Excluding double announcements made by the same parent company on the same day reduces this number to 571. A necessary requirement for these firms is that both stock and bond prices are available from either Datastream or Bloomberg database. Of these 571 observations no bond data were available in either Datastream or Bloomberg database for 396 cases. The remaining 175 announcements were further checked in Bloomberg in order to eliminate announcements that involve contaminating information
or were incorrectly classified as spin-offs. This led to the elimination of 84 observations, leaving a sample of 91 spin-offs. The breakdown of the excluded observations by the reason for elimination is presented in Table 1. 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. This generally happens within one day. Therefore, they can be considered a good source for the study of market reaction to spin-off announcements.

3.2. Abnormal stock returns

This paper uses an event study methodology adapted from Mikkelson and Partch (1986) to measure stock market reaction to spin-off announcements. The announcement period is defined 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. The market model is estimated 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 used as a proxy for the stock market returns.

3.3. Abnormal bond returns

The abnormal bond returns over the event period are measured using the methodology of Handjinicolaou and Kalay (1984). This methodology adjusts for infrequent trading. The returns on rating and maturity matched corporate bond indices of Merrill Lynch serve as a 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. This period of 45 trading days that precedes the announcement day is chosen in order to minimize the potential impact of credit-spread changes.

Following this methodology, the premium bond return between two bond trades is defined as the difference between the return on the bond and the corresponding index return over the same time period:
\[ PR_{i,n(i,k)} = R_{i,n(i,k)} - IR_{i,n(i,k)}, \]  

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.

The mean \( m_i \) and standard deviation \( s_i \) of the bond premium returns are estimated as

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

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

where \( K \) is the number of days bond \( i \) was traded in the estimation period.

The abnormal bond return is calculated using the estimated mean premium return:

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

The standardized abnormal return is equal to

\[ SAR_{i,n(i,k)} = \frac{AR_{i,n(i,k)}}{s_i \sqrt{n(i,k) - n(i,k-1)}} \]  

For every event window the portfolio standardized and average abnormal 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 \(+1\) only the bonds traded on days \(-2\) and \(+1\) are included in the sample). The test statistics for these observations is defined as

\[ Z_t = \frac{\sum_{i=1}^{n_t} SAR_{i,t}}{\sqrt{n_t * N}} \]

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 statistics has a unit-normal distribution under the assumption of cross-sectional bond return independence.
In a number of cases, data for more than one bond are available for a sample company. These cases are treated in two different ways. First, a complete sample is compiled 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, the 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").

3.4. Proxies

The variables that are used in this analysis are related to the hypotheses mentioned in Section 2. Unless stated otherwise, all variables are based 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.

*Change in the degree of the firm’s diversification.* In line with previous studies, an industrial focus variable is used as a proxy for the decrease in the diversification level.\(^5\) This variable is measured as a dummy equal to 1 if the parent and subsidiary are in different industries (measured by the two-digit SIC code), and to 0 if the parent and subsidiary to be spun-off are in the same industry.

*Leverage and degree of financial distress.* The debt ratio, measured as the ratio of total debt to invested capital, is used as a 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.

*Information asymmetry.* Krishnaswami and Subramaniam (1999) find that stock return volatility is highly correlated with other measures of information asymmetry based on the accuracy of analysts’ forecasts. For this reason we use the residual volatility of asset returns prior to the spin-off announcement as a proxy for the information asymmetry between managers and outsiders.\(^6\) The asset volatility is measured 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.

\(^5\) See, for example, Krishnaswami and Subramaniam (1999), and Daley, Mehrotra, and Sivakumar (1997).
Firm liquidity. This variable is proxied as the interest and dividend payout. These payouts are measured as the sum of total interest and dividend payments to operating cash flow.

Efficiency. The efficiency of the firm’s operations is measured as the sales to assets ratio, also known as the assets turnover ratio, at the end of the year preceding the spin-off announcement.

Investment expenditures. The investment expenditures are measured by the ratio of cash flows for investment activities to earnings before interest and taxes. This ratio is also measured at the end of the year preceding the spin-off announcement.

Control variables. A number of studies find that the wealth effects are larger when the portion of assets that is divested is larger. Therefore, the relative size of a spin-off is controlled for 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 1 when the abnormal return is negative and 0 when it is positive. The combination of these two variables captures the expected relationship between the relative size and the absolute magnitude of the abnormal returns.

3.5. Sample description

Table 2 presents firm size, leverage and profitability statistics for the companies included in the sample.

[Please insert Table 2 here]

There are 91 firms with straight and/or convertible bond data available in the sample. 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 percent, the mean annualized volatility of stock returns is 33.6 percent, and the mean volatility of (straight) bond returns is 5.4 percent.

6 The residual stock volatility is the volatility from the residuals from the market model estimated in Section 3.2. The residual bond volatility is the volatility of the bond premium returns estimated in Section 3.3.

7 See, for example, Hite and Owers (1983), Miles and Rosenfeld (1983), Krishnaswami and Subramaniam (1999), and Veld and Veld-Merkoulova (2004).
The spin-offs included in the sample are relatively large ones. On average, companies spin off 21.1 percent of their total asset value in a transaction. Most of them (55 percent) are spin-offs of divisions that are operating in a different industry from the parent.

3.6. *The models of abnormal stock and bond returns.*

The factors, described in Section 3.4, are used to explain the abnormal stock and bond returns during the event window. When running a regression analysis, it has to be taken 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, the abnormal returns themselves should be included in the model as (endogenous) explanatory variables. This problem is solved by estimating a system of two simultaneous equations for the stock and bond abnormal returns. The system is estimated 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 the firm returns are calculated as a weighted average of the stock and bond returns with the pre-spin-off values of equity and debt to assets used as weights. This regression estimates how the total value effect of spin-offs can be explained by the separate factors.

4. Empirical results

4.1. *Abnormal returns.*

Table 3 presents the announcement period abnormal returns for the stockholders.

[Please insert Table 3 here]

The mean abnormal return on the announcement date is a positive and highly significant 2.02 percent. On this date more than 71 percent of the sample companies’ abnormal returns are positive. The total three-day abnormal returns are even higher (+3.07 percent). These results are similar to those found in previous studies.
on announcement effects associated with corporate spin-offs.\footnote{9} The abnormal returns in the period of 20 to 2 days before the spin-off announcement are insignificant. This 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 Tables 4 and 5. Table 4 shows mean and median abnormal returns for the whole bond sample.

[Please insert Table 4 here]

The straight bonds sub-sample shows a positive abnormal return of 0.14 percent. This abnormal return is significant at the one-percent level. The abnormal return for the three-day event window is 0.11 percent. This return is also significant at the one-percent level. The positive one- and three-day abnormal returns suggest that wealth transfers from bondholders to shareholders are either non-existent or so small that they are outweighed by the benefits. As with the stock returns, the abnormal returns in the period of 20 to 2 days preceding the announcement date are insignificant. This, again, makes it unlikely that there was any information leakage in this period. The convertible bonds sub-sample does not show significant abnormal returns on either the announcement date or in the three-day announcement period.

Since the observations included in Table 4 are from all the available bonds, some of the announcements are represented by two or more bonds. Possible high correlation between different bonds of the same company violates the independence assumption underlying the statistical tests of significance. As remarked above, the test statistics can be overstated as a result of this. To avoid this problem, the results for the “Firm sample” are presented in Table 5.

[Please insert Table 5 here]

In this sample one observation is the return on firm’s total debt rather than on individual bonds. These returns are approximated by 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 Table 5 largely confirm the all-bond sample results presented in Table 4, but are less significant due to the smaller number of observations. On the announcement date, the abnormal return is 0.06 percent for straight bonds,

\footnote{See footnote 1.}
significant at the one-percent level, and –0.70 percent for convertible bonds, significant at the ten-percent level.

Thus, the immediate bond market reaction to spin-off announcements is positive for straight bonds. There is no evidence that a wealth transfer is expected to take place as a result of a spin-off. A possible explanation for the positive abnormal returns to the bondholders is that the spin-off announcements are seen as a signal that the total firm value is going to increase as a result of spin-off or that it is higher than was previously estimated by the market. The latter factor is frequently quoted as one of the reasons for the positive stock price reaction as well. This information asymmetry hypothesis was put forward by Schipper and Smith (1983) and Krishnaswami and Subramaniam (1999) among others.

An alternative explanation is based on Leland (1994) and Leland and Toft (1996). A spin-off is a corporate transaction dividing 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. While 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, debt of highly leveraged firms should display higher abnormal returns at the spin-off announcements than investment-grade debt.

The following sections investigate these and other hypotheses as an explanation of the observed announcement reaction.

4.2. Value creation and wealth transfer.

Table 6 presents evidence of total value created by spin-off announcements, and the relationship between abnormal stock and bond returns. The bond returns in this table are the returns of both straight and convertible bonds.

[Please insert Table 6 here]

The abnormal returns on the total parent firm, shown in this table, are calculated 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. From this table it appears that corporate spin-offs result in
an increase in total firm value of 2.25 percent over the three-day event window, with more than 70 percent of
the companies experiencing this increase. This evidence is consistent with a number of theories discussed in
Section 2, such as decrease of agency costs of internal capital markets, lower information asymmetry, an
increase in operational efficiency, and a reduction in underinvestment. The relative importance of these
factors is investigated in the following sections.

The last column of Table 6 shows the relationship between abnormal changes in the values of debt
and equity for the two different event windows. It can be seen that on the announcement day these changes
are uncorrelated and over the three-day event window they are correlated negatively (indicating 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 with at
least a day delay to the announcement information. For this reason, the focus in the remainder of the paper is
on the three-day abnormal returns. In the analysis of these returns we also try to explain the negative
correlation coefficient in Table 6. The bond returns in these regressions are the abnormal returns of both the
straight bonds and the convertible bonds.

4.3. Comparison with previous studies.

Our result that bondholders do not suffer from a spin-off announcement is in line with 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 (1983) find that such a decline took place in 2 out of 18 cases. Dittmar (2004) found a
decline in 3 out of 61 cases. However, she also found an improvement in 8 out of the 61 cases that she
analyzed. 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 2 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 an insignificant positive wealth effect for 15 bonds during the event period of day (-1, 0). Dittmar
(2004) studies monthly announcement effects for bondholders. On average she finds insignificantly negative
announcement results. On the other hand, Maxwell and Rao (2003) find a significantly negative abnormal return of -0.878 percent for bondholders. This result contradicts our earlier reported results. A direct comparison between our previously reported results and those of Maxwell and Rao (2003) is difficult for two reasons: (1) they report abnormal returns for the announcement month, while we report abnormal returns for the 3-day announcement period and (2) their results cover the period from 1976 to 1997, whereas our results are for the period from 1995 to 2002. In order to make our results better comparable to theirs, we calculate abnormal returns for the announcement month. In addition we break up our sample in two different sub-periods. These results are included in Table 7. In order to further facilitate the comparison we also present the event study results of Hite and Owers (1983), Dittmar (2004), and Maxwell and Rao (2003).

In Panel A of Table 7 we present event study results for the three-day event window (day -1 to day +1); these are based on Tables 3 and 5. In order 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 percent for the three-day window and 2.44 percent for the two-day window). Our bond returns are insignificantly positive for both the two-day and three-day windows. In order to compare our bond returns to those of Maxwell and Rao (2003) we use their methodology to calculate monthly returns. From Panel A it can be concluded that these monthly bond returns do not substantially differ from our daily returns. The mean bond return is a significantly positive 0.177 percent. However, this significance is driven by only one outlier. Excluding this outlier would make the monthly bond return an insignificant 0.173 percent. The median bond return is 0.018 percent, 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. For this purpose 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) is the part that does not overlap with their study. We find that the abnormal stock returns are slightly
higher in the first years of our sample (3.629 percent versus 2.570 percent). 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-significantly negative bond return of -0.136 percent and for the second part we find a significantly positive abnormal bond return (0.135 percent). The difference between two sub-samples is 0.271 percent. This difference is significantly different from zero at the 5-percent level. Even though the sign for the first part of our sample is the same as that for Maxwell and Rao (2003), it should be noticed that on average they find a larger negative return than we find (-0.878 percent). We believe that this may at least partly be driven by some large negative outliers. For example, in the introduction we mentioned the Marriott spin-off, described by 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), but not in our sample. The bondholder wealth loss in this case was 16.51 percent during the three days following the spin-off announcement. This is likely to have a significant impact on the average bond returns. This, and possibly other cases, may also explain the large difference between the mean abnormal bond returns of Maxwell and Rao (2003) and their median abnormal bond returns (-0.266 percent). It should be noticed that for the remainder our results are similar to those of Maxwell and Rao (2003). For example, in Table 6 we find a negative correlation between abnormal changes in the values of debt and equity during the three-day event window. A similar result is presented by Maxwell and Rao (2003) 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.

4.4. Factors explaining abnormal stock returns.

In Section 2 a number of factors that can serve as an explanation of abnormal stock and bond returns are discussed. The proxies that are used to estimate these variables are discussed in Section 3.4. The regression for stock and bond three-day abnormal returns is jointly estimated by the three-stage least squares method that efficiently uses all information available in the data. The abnormal stock return is added to the bond return regression in order to capture wealth transfer effects not explained by the other factors. In
addition we add dummies for subordinated bonds and for senior bonds. We start by running a separate regression where 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 percent level). Table 8 presents the results for the more comprehensive three-stage least squares regression. The t-statistics are reported in parenthesis below the estimated coefficients. In addition the hypotheses are presented.

Table 8 presents the results for the more comprehensive three-stage least squares regression. The t-statistics are reported in parenthesis below the estimated coefficients. In addition the hypotheses are presented.

The explanatory power of the stock regression, measured by the adjusted R squared, is 0.52 with six explanatory and two control variables included.

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 shareholders (Hypothesis 1). These results are contrary to the previous studies of Daley, Mehrotra, and Sivakumar (1997), Desai and Jain (1999), and Krishnaswami and Subramaniam (1999).

The coefficient for leverage is significantly positive, indicating that shareholders of the more leveraged firms benefit more from the spin-offs. This finding is in line with the hypothesis that a higher pre-spin-off leverage affects abnormal returns positively (Hypothesis 3). This hypothesis is based on the model of Leland and Toft (1996), which predicts that financially troubled companies can benefit from the risk increase following a spin-off in order to avoid bankruptcy.

The coefficient for pre-spin-off asset volatility is not significant. This contradicts the information asymmetry hypothesis of Krishnaswami and Subramaniam (1999) (Hypothesis 5). Abnormal returns of companies with high pre-spin-off level of information asymmetry are the same as for firms with low information asymmetry.

The complete regression results (with t-statistics in brackets) are the following. 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.
Firms paying higher interest and dividends as a ratio of their operating cash flow have lower abnormal stock returns. The possibility for independent growth and attracting new capital is sometimes mentioned as one of the reasons to spin off divisions. This suggests that firms with higher payouts cannot fully profit from the growth opportunities offered by spin-offs. The negative coefficient for interest and dividend payout ratios is also consistent with the model of Leland and Toft (1996) (*Hypothesis 7*).

The coefficient for the asset turnover is significantly positive on the 5 percent 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) that predicts a negative relationship between pre-spin-off operating performance and spin-off gains (*Hypothesis 9*).

There is no relationship found between company investment expenditures (measured as higher 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*).

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.

4.5. Factors explaining abnormal bond returns.

The same factors as for the stock returns are hypothesized to affect bond returns. Column 6 of Table 8 presents the results of estimating the same model as for the common stock returns for the three-day (day –1 to day +1) abnormal bond returns. It can be directly seen that while 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 adjusted R squared equal to 0.52, the bond regression explains 30 percent of the variations in the bond abnormal returns.

Industrial focus is insignificant for stocks and it is also not significant in the bond regression (*Hypotheses 2a and 2b*). This means that the effects of an increase in firm value and the wealth transfer effect probably cancel out each other.
Leverage has a statistically significant coefficient for stock returns. It is not significant in the bond regression. This means that the hypothesis, derived from the model of Leland and Toft (1996), 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 have seen that efficiency, measured as the asset turnover, has a significantly positive coefficient for stock returns. This was surprising, because we hypothesized a negative coefficient. The coefficient is non-significant for bond returns. This means that the hypothesis for bond returns is also not confirmed (Hypothesis 10).

The coefficient for investment expenditures is insignificant for the bond regression. This means that we don’t find a confirmation for 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 significantly negative in the bond regressions, showing that spin-off announcements lead to a transfer of wealth from bondholders to shareholders. This wealth transfer cannot be explained by the other factors included in the model. This shows that individual terms and conditions of spin-offs, not included in the regression model, play an important role in the wealth transfer process. The dummies for subordinated bonds and senior bonds are both insignificant. The insignificance of the dummy for senior bonds is probably caused by the relationship of the senior bond dummy and other variables. In fact the p-value for this variable only changes from 0.06 to 0.14.

4.6. Regressions for the total firm returns.
Table 9 shows the relationship between the total value created by spin-offs and the underlying factors.

[Please insert Table 9 here]

The negative coefficient for the payout ratio is consistent with the model of Leland and Toft (1996). 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.

Both the pre-spin-off level of investment expenditures and the level of information asymmetry do not significantly affect the total firm returns. This evidence rejects the underinvestment reduction motive offered for spin-offs by John (1993) and the information asymmetry hypothesis of Krishnaswami and Subramaniam (1999).

The coefficient for efficiency, measured as the asset turnover, is significantly positive. This indicates that companies with a high pre-spin-off efficiency level are the ones profiting the most from such a divestiture. Thus, the efficiency increase hypothesis is not confirmed by these data. Leverage shows a significantly negative coefficient, where we would have expected a positive coefficient.

Size is significant, just like in the regressions for the stock and bond returns. The dummy for senior bonds is insignificant, and the dummy for subordinated bonds is significantly negative. Finally, the change in total firm market value of firms that perform a focus-increasing spin-off is insignificant.

5. Conclusions

Earlier studies document some 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 announcement month found in some studies suggest that such restructuring lead to a wealth transfer from bondholders to shareholders. On the other hand, other research shows that the credit quality and the prices of corporate bonds do not suffer after a spin-off. This study uses 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.

In line with some previous studies we find positive announcement period’s abnormal returns for stockholders and either positive or insignificant abnormal returns for bondholders. The latter result is different from the result in a recent paper of Maxwell and Rao (2003); they find significantly negative abnormal returns for bondholders. When we split up our sample into a part that overlaps with their sample (1995-1997) and a part that does not overlap (1998-2002), we find insignificantly negative abnormal returns for the first sub-sample and significantly positive abnormal returns for the second sub-sample. This suggests that bondholders learned from experiences in the past and have become better in protecting themselves against expropriation by shareholders.

There are a number of factors associated with the sign and magnitude of announcement returns. The simultaneous equations estimation shows 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, higher abnormal stock returns still lead to lower abnormal bond returns. This indicates that there is some wealth transfer due to the idiosyncratic conditions of the spin-off transactions. The overall conclusion of this study is that spin-offs are shown to result in an overall value being created for both stock- and bondholders.
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The announcements of spin-offs by US firms made from January 1995 to January 2002. Sources of original announcement information are SDC database and Lexis-Nexis.

| Number of observations | Number of announcements |
|------------------------|-------------------------|
|                        | 612                     |
| Excluded:              |                         |
| Double announcements   | 41                      |
| No bond data available | 396                     |
| Other type of divestiture wrongly classified as spin-off | 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 2.
Descriptive statistics.

This table presents descriptive statistics for the firms announcing spin-off of a company division to shareholders. The debt ratio (ratio of total debt to invested capital) is used as a proxy for the leverage. The interest and dividend payout is measured as ratio of the sum of total interest and dividend payments to operating cash flow. The efficiency of firm’s operations is measured by the assets turnover ratio at the end of the year preceding the spin-off announcement. The investment expenditures are measured by the ratio of the cash outflows for investment activities to earnings before interest and taxes. Asset volatility is measured as weighted average of the annualised stock and bond return volatility prior to the spin-off announcement. Increase in industrial focus is a proxy for the decrease in the diversification level. This variable is measured as a dummy equal to 1 if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and to 0 if the parent and subsidiary to be spun-off are in the same industry. Relative size is measured as the pre-spin-off ratio of subsidiary assets to the total assets of the parent company. The book values used are from the financial results of the year directly preceding the spin-off announcement. Assets and sales are in millions of US dollars.

| Characteristics of parent firm before the spin-off | Mean       | Standard deviation | Median      | Number of observations |
|---------------------------------------------------|------------|--------------------|-------------|------------------------|
| Total Assets                                      | 21064.11   | 48823.24           | 5286.10     | 91                     |
| Total Sales                                       | 14407.33   | 30600.34           | 5292.00     | 91                     |
| Return on Shareholders' 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                     |

| 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                     |

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Table 3.
Announcement period returns to the shareholders.

This table presents abnormal returns to the stock of the firms announcing spin-off of a company division to shareholders. The abnormal returns are calculated 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). The S&P 500 index is used as a benchmark. Significance of the mean abnormal returns is tested using z-statistics (in parentheses). Significance of the median abnormal returns is tested using Wilcoxon test (test statistics in parentheses). Significance of the percentage of positive abnormal returns is tested using sign test (test statistics in parentheses). Asterisks indicate the following significance levels: *** - 1 percent; ** - 5 percent; * - 10 percent.

| Announcement window | Number of observations | Mean abnormal stock return | Median abnormal stock return | Percent of positive abnormal returns |
|---------------------|------------------------|----------------------------|-----------------------------|--------------------------------------|
| Day 0               | 91                     | 2.017***                   | 1.347***                    | 71.43***                             |
|                     |                        | (12.308)                  | (3.889)                     | (3.983)                              |
| Day –1 to day +1    | 91                     | 3.070***                   | 2.615***                    | 71.43***                             |
|                     |                        | (9.440)                   | (4.118)                     | (3.983)                              |
| Day –20 to day –2   | 91                     | 0.365                      | -0.539                      | 45.06                                |
|                     |                        | (0.146)                   | (0.061)                     | (0.839)                              |
This table presents abnormal returns to the bonds of the firms announcing spin-off of a company division to shareholders. The abnormal returns are calculated using the mean- and market-adjusted model estimated over the 45-day period from 65 to 21 days preceding the spin-off announcement date. Merrill Lynch corporate bond indices are used as benchmark. Significance of the mean abnormal returns is tested using z-statistics (in parentheses). Significance of the median abnormal returns is tested using Wilcoxon test (test statistics in parentheses). Significance of the percentage of positive abnormal returns is tested using sign test (test statistics in parentheses). Asterisks indicate the following significance levels: *** - 1 percent; ** - 5 percent; * - 10 percent.

| Announcement window       | Number of observations | Mean abnormal bond return | Median abnormal bond return | Percent of positive abnormal returns |
|---------------------------|------------------------|---------------------------|----------------------------|-------------------------------------|
|                           |                        |                           |                            |                                     |
| A. Straight bonds         |                        |                           |                            |                                     |
| Day 0                     | 355                    | 0.136***                  | 0.032***                   | 57.18***                           |
|                           |                        | (7.915)                   | (2.817)                    | (2.654)                             |
| Day –1 to day +1          | 347                    | 0.110***                  | 0.007                      | 51.59                               |
|                           |                        | (3.504)                   | (0.372)                    | (0.537)                             |
| Day –20 to day –2         | 357                    | -0.016                    | 0.072                      | 52.10                               |
|                           |                        | (-0.525)                  | (0.010)                    | (0.741)                             |
| B. Convertible bonds      |                        |                           |                            |                                     |
| Day 0                     | 23                     | -0.551                    | 0.047                      | 52.17                               |
|                           |                        | (-1.042)                  | (0.624)                    | (0.000)                             |
| Day –1 to day +1          | 24                     | 0.090                     | 0.427                      | 70.83*                              |
|                           |                        | (1.172)                   | (1.300)                    | (1.837)                             |
| Day –20 to day –2         | 23                     | -0.453                    | -1.057*                    | 26.09**                             |
|                           |                        | (-1.356)                  | (1.779)                    | (2.085)                             |
Table 5.
Announcement returns to bondholders: Firm sample.

This table presents abnormal returns to the bonds of the firms announcing spin-off of a company division to shareholders. The abnormal returns are calculated 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 abnormal bond returns on all available bonds for a given company. Merrill Lynch corporate bond indices are used as benchmark. Significance of the mean abnormal returns is tested using z-statistics (in parentheses). Significance of the median abnormal returns is tested using Wilcoxon test (test statistics in parentheses). Significance of the percentage of positive abnormal returns is tested using sign test (test statistics in parentheses). Asterisks indicate the following significance levels: *** - 1 percent; ** - 5 percent; * - 10 percent.

| Announcement window | Number of observations | Mean abnormal bond return | Median abnormal bond return | Percent of positive abnormal returns |
|---------------------|------------------------|--------------------------|----------------------------|-------------------------------------|
| A. 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)                             |
| Day –20 to day –2   | 79                     | -0.033                   | -0.021                     | 48.10                               |
|                     |                        | (-0.457)                 | (0.775)                    | (0.225)                             |
| B. 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)                             |
| Day –20 to day –2   | 18                     | -0.777                   | -0.787                     | 27.78*                              |
|                     |                        | (-1.096)                 | (1.307)                    | (1.650)                             |
Table 6. Evidence on value creation and wealth transfer in spin-offs.

This table presents abnormal changes in the total value of the firms announcing spin-off of a company division to shareholders and the correlation between abnormal changes in the values of debt and equity. The abnormal stock returns are calculated 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). The S&P 500 index is used as a benchmark. The abnormal bond returns are calculated using the mean- and market-adjusted model estimated over the 45-day period from 65 to 21 days preceding the spin-off announcement date. The bonds include both straight bonds and convertible bonds. Each announcement is represented by median bond returns. Merrill Lynch corporate bond indices are used as benchmark. The firm returns are calculated as weighted average of the stock and bond returns with the pre-spin-off values of equity and debt to assets used as weights. The abnormal changes in the values of debt and equity are calculated using abnormal stock and bond returns and pre-spin-off leverage and asset values. Significance of the mean abnormal returns is tested using z-statistics (in parentheses). Significance of the median abnormal returns is tested using Wilcoxon test (test statistics in parentheses). Significance of the percentage of positive abnormal returns is tested using sign test (test statistics in parentheses). Asterisks indicate the following significance levels: *** - 1 percent; ** - 5 percent; * - 10 percent.

| 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 7.
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 previous studies of Hite and Owers (1983), Dittmar (2004), and Maxwell and Rao (2003). Panel A includes a comparison of the abnormal returns between different event windows and Panel B presents a comparison of abnormal returns between different sample periods. The number of observations is put in parentheses. Asterisks indicate the following significance levels: *** - 1 percent; ** - 5 percent; * - 10 percent; n.s. - 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\text{n.s.} | 3.3**    |
|                      | (15)           | (123)    |
| Median               | NA             | NA       |
| **Dittmar (2004)**   |                |          |
| Monthly returns: 1983-1995 |            |          |
| Mean                 | -0.6\text{n.s.} | NA       |
|                      | (16)           |          |
| Median               | -0.2\text{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)     |
| **Current study**    |                |          |
| Day -1, +1: 1995-2002 |                |          |
| Mean                 | 0.008\text{n.s.} | 3.070*** |
|                      | (77)           | (91)     |
| Median               | -0.020\text{n.s.} | 2.615*** |
|                      | (77)           | (91)     |
| Day 0, +1: 1995-2002 |                |          |
| Mean                 | 0.011\text{n.s.} | 2.444*** |
|                      | (78)           | (91)     |
| Median               | -0.004\text{n.s.} | 1.529*** |
|                      | (78)           | (91)     |
| Monthly returns: 1995-2002 |            |          |
| Mean                 | 0.177***     | 2.083*** |
|                      | (78)           | (91)     |
| Median               | 0.018\text{n.s.} | 2.502**  |
|                      | (78)           | (91)     |
Table 7: continued

Panel B: Comparison of abnormal returns between different sample periods.

|                                | Straight bonds | Stocks |
|--------------------------------|----------------|--------|
| **Current study**              |                |        |
| Day -1, +1: 1995-1997          |                |        |
| Mean                           | -0.136\text{^n.s.} | 3.629\text{^***} |
|                                | (36)           | (43)   |
| Median                         | -0.058\text{*}  | 2.893\text{^***} |
|                                | (36)           | (43)   |
| Day -1, +1: 1998-2002          |                |        |
| Mean                           | 0.135\text{^**} | 2.570\text{^***} |
|                                | (41)           | (48)   |
| Median                         | 0.041\text{^n.s.} | 1.633\text{^**} |
|                                | (41)           | (48)   |
| Day -1, +1: difference between 1995-1997 and 1998-2002 |    |        |
| Mean                           | 0.271\text{^**} | -1.059\text{^n.s.} |
| Median                         | 0.099\text{*}  | -1.260\text{^n.s.} |
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 announcing spin-off of a company division to shareholders AR(-1,+1). The abnormal stock returns are calculated 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). The S&P 500 index is used as a benchmark. The abnormal bond returns are calculated 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. Merrill Lynch corporate bond indices are used as benchmark. The debt ratio (ratio of total debt to invested capital) is used as a proxy for the leverage. The interest and dividend payout is measured as ratio of the sum of total interest and dividend payments to operating cash flow. The efficiency of firm’s operations is measured by the assets turnover ratio at the end of the year preceding the spin-off announcement. The investment expenditures are measured 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. Asset volatility is measured as the weighted average of the annualized stock and bond return volatility. Increase in industrial focus is measured as a dummy equal to 1 if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and to 0 if the parent and subsidiary to be spun-off are in the same industry. Relative size is measured 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 are in parentheses. Asterisks indicate the following significance levels for the t-statistics: \( *** - 1 \) percent; \( ** - 5 \) percent; \( * - 10 \) percent.

|                          | (1)      | (2)      | (3)      | (4)      | (5)      | (6)      |
|--------------------------|----------|----------|----------|----------|----------|----------|
|                          | Stock AR | Bond AR  |          |          |          |          |
|                          |          |          | Estimation |          |          |          |
|                          |          |          | results   |          |          |          |
|                          |          |          | Wealth    |          |          |          |
|                          |          |          | transfer  |          |          |          |
|                          |          |          | hypothesis|          |          |          |
| Intercept                | -0.932   | -0.044   | (-0.499)  | (-0.194) |          |          |
| Leverage                 | +        | 2.566**  | 0.108     |          |          |          |
|                          | -        | -1.072***| 0.106     |          |          |          |
| Payout                   | -        | -0.118   | -0.211    |          |          |          |
| Efficiency               | -        | 2.118**  | 0.036     |          |          |          |
| Investment Expenditures  | -        | 0.064    | 0.036     |          |          |          |
| Information Asymmetry    | +        | 0.015    | 0.002     |          |          |          |
| Increase in Industrial   | +        | 1.482    | 0.114     |          |          |          |
| Focus                    |          | (1.375)  | (0.778)   |          |          |          |
| Abnormal stock return    |          | -0.038*  | (-1.769)  |          |          |          |
| Relative size            | 0.108*** | 0.023*** | (2.726)   | (4.577)  |          |          |
| Relative size*Dummy for  | -0.322***| -0.028***| (-6.835)  | (-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 9.
Regressions of announcement period returns: Regression of total firm returns.

This table presents results of the OLS regressions of the three-day abnormal returns to the total value of the firms announcing spin-off of a company division to shareholders AR(-1,+1). The abnormal stock returns are calculated 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). The S&P 500 index is used as a benchmark. The abnormal bond returns are calculated 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. Merrill Lynch corporate bond indices are used as benchmark. The firm returns are calculated as weighted average of the stock and bond returns with the pre-spin-off values of equity and debt to assets used as weights. The debt ratio (ratio of total debt to invested capital) is used as a proxy for the leverage. The interest and dividend payout is measured as ratio of the sum of total interest and dividend payments to operating cash flow. The efficiency of firm’s operations is measured by the assets turnover ratio at the end of the year preceding the spin-off announcement. The investment expenditures are measured 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. Asset volatility is measured as the weighted average of the annualized stock and bond return volatility. Increase in industrial focus is measured as a dummy equal to 1 if the parent and subsidiary are in the different industries (measured by the two-digit SIC code), and to 0 if the parent and subsidiary to be spun-off are in the same industry. Relative size is measured 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, based on White heteroskedasticity-consistent standard errors, are in parentheses. Asterisks indicate the following significance levels for the t-statistics: *** - 1 percent; ** - 5 percent; * - 10 percent.

| 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                 |