The Impact of Open Market Share Repurchases On Bondholders and Shareholders

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RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN FINANCE

BEEDIE SCHOOL OF BUSINESS

SIMON FRASER UNIVERSITY

Fall 2012

Approval

Name: **Ziyi Zhu and Fei Rong**

Degree: **Master of Science in Finance**

Title of Project: **The Impact of Open Market Share Repurchases on Bondholders and Shareholders**

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Abstract

Past studies examined the impact of open market repurchase announcements on bond and stock prices and identified its main causes, such as signaling, free cash flow, and wealth redistribution. Building on the work by Maxwell and Stephens (2003), we introduce daily bond return data to analyze abnormal bond and stock returns around share repurchase announcements and examine these hypotheses. We find a strong wealth transfer effect, as well as some evidence of undervaluation signaling. The wealth gain or loss of bondholders is a function of the size of the repurchase program, the leverage ratio, and the book-to-market ratio.

Keywords: Repurchase Announcement; bondholders; Wealth Transfer

I. Introduction

This study examines the impact of announcements of U.S. open market share repurchase programs on bond and stock prices. Although the impact on stock prices has received considerable attention, the impact on bond prices has been overlooked, with the exception of the Maxwell and Stephens (2003) study. The research of bond price response to repurchase announcements is important for several reasons. First of all, the impact of announcements on just one security class, common stock, provides an incomplete picture of how stock repurchases affect the firm. In addition, possible wealth transfers between different security classes, such as bond and stock, can be studied using stock and bond reaction to stock repurchase announcements.

Corporate finance theory has studied agency conflicts between various security classes. Managers' decisions, such as dividend payout and share repurchases, often profit one class and harm another. Stock buy-backs obviously benefit shareholders because they raise the stock price and EPS. Since a portion of firms' free cash flow is used to repurchase stock, the money available to cover interest payments to the bondholders is reduced, which means default risk on bonds increases and can cause bond prices to drop. This suggests that stock repurchases can lead to a wealth transfer from bondholders to shareholders in a firm.

Maxwell and Stephens (2003) is the only research paper that studies the impact of repurchase announcements on bond prices. We use it as our guide with modifications of data sample and variable testing. The contribution of this research paper is our use of daily bond returns instead of monthly bond returns used by Maxwell and Stephens

(2003).[1] We find that the bond market does not react as quickly as the stock market and that the immediate bond price reaction is more complex than the results in Maxwell and Stephens (2003) for monthly bond returns; for example, we find different signs of reactions for one-day and two-day post-announcement bond returns. Besides, we also find a phenomenon of a wealth transfer from shareholders to bondholders when the stock return is negative and the bond return is positive for approximately half of the sample.

We find negative abnormal bond returns on the announcement days of open market share repurchase program. Consistent with prior studies, we find positive abnormal stock returns during the three-day repurchase announcements period. Also, we find a negative correlation between bond and stock value changes on the announcements day which can be explained by the wealth transfer hypothesis. For the two-day period, which includes the announcement day and the day after, abnormal bond return is less negative than one-day abnormal bond return. Since many repurchase programs can be announced after-trading hours, this insignificant abnormal bond return on the first trading day following the announcement is puzzling. In addition, small repurchases have a negative impact on abnormal bond return. The abnormal bond price reaction is negative for firms with high market leverage and positive for small leverage ratio firms. In contrast, abnormal stock return is positive regardless of the repurchase size or leverage ratio. Besides, we find stock returns are greater for large repurchase size as well as large market leverage.

[1] Daily bond price data has become available since 2002, after the publication of Maxwell and Stephens's paper.

The outline of the paper is as following: Section II provides general literature review. In Section III, we describe the data we use and our sample, as well as the methodology we use to test our data. Our empirical results are provided in Section IV. Section V is our conclusion.

II. Literature Review

Besides stock repurchase announcements, numerous corporate events influence bond prices. Dividend announcements, for example, influence bond prices in a contradictory way because of the following two hypotheses. The information content hypothesis predicts a positive bond price reaction to a dividend increase due to signaling, but the wealth redistribution hypothesis implies negative bond price response (Dhillon and Johnson, 1994; Handjinicolaou and Kalay, 1984). Warga and Welch (1993) study the impact of leveraged buyout (LBO) on bond price with data from 1985 to 1989. They find that LBO announcements cause bondholder wealth loss. Elliott, Prevost and Rao (2009) examine the influences of seasoned equity offering (SEO) announcements on bondholders and find positive bond returns. Adams and Mansi (2009) study the impact of CEO turnover announcements on bondholder wealth and find a negative relationship between them.

Share repurchases have become a common way of cash distribution to shareholders for corporations. From 1980 to 2000, share repurchase programs grew at an average rate of 26.1% (Grullon and Michaely, 2002). For example, open market share repurchase programs totaled only $16 billion in 1985; but in 1998, the announcement value was approximately $216 billion (Jagannathan and Stephens, 2003). Compared to

dividend payouts, share repurchases are more flexible in order to respond to investment opportunities (Rasbrant, 2011). Grullon and Ikenberry (2000) believe that stock buy-back program will still be an important form of cash payout. Grullon and Michaely (2002) find "firms have gradually substituted repurchases for dividends."

The corporate decision to repurchase shares can have several reasons. Ikenberry, Lakonishok and Vermaelen (1995) provide a list of motivations, such as "capital structure adjustment, takeover defense, signaling, excess cash distribution, substitution for cash dividends, and wealth expropriation from bondholders". The one that is widely discussed and most accepted by prior researchers is signal of stock undervaluation. A share repurchase announcement signals a firm's willingness to invest in itself due to the firm's undervaluation (Rasbrant, 2011; Ikenberry, Lakonishok and Vermaelen, 1995; Jagannathan and Stephens, 2003; Netter and Mitchell, 1989). Grullon and Ikenberry (2000) prove that share repurchases rise when stock prices drop. Stephens and Weisbach (1998) support the undervaluation theory with their finding that actual "repurchases in one quarter are negatively related to the performance of the firm's stock in the prior quarter, as well as to the cumulative return on the firm's stock since the announcements of the program" (p. 314). Rasbrant (2011) explains in his study that managers would buy-back shares when they notice the stock price below its "real" value, so a share repurchase announcement is a positive signal to the market. Grullon and Ikenberry (2000) consider managers using "repurchases to 'signal' their optimism about the firm's prospect to the firm" (p. 35). One explanation is that the managers expect the firm's future cash flows will increase. Another thought is that the managers do not agree with the current market price based on the firm's performance. (Grullon and Ikenberry, 2000)

A stock buy-back is not only a substitution of cash dividend, but also more flexible method of cash distribution because it is not a commitment of a future payment. Compared to dividend payout which represents ongoing commitment and used by firms with higher continuous operating cash flow, share repurchases are often used by firms having high temporary non-operating cash flow (Ikenberry, Lakonishok, and Vermaelen, 1995; Jagannathan, Stephens, and Weisbach, 2000).

Since repurchase announcements signal undervaluation of the company, "the stock price rises when this information is revealed" (Stephens and Weisbach, 1998). Rasbrant (2011) find 3% abnormal stock return surrounding the open market share repurchase announcements. Ikenberry, Lakonishok, and Vermaelen (1995) find four-year 12.1% average stock buy-and-hold abnormal return after initial share repurchase announcements.

III. Data

In this section, we discuss the sources of repurchase announcements and bond data, the derivation of the final sample, and the characteristics of our data sample.

A. Data Selection

We utilize a sample of open market share repurchase from July 1, 2002 to December 31, 2008, from the Securities Data Corporation (SDC) database. The SDC database has the most comprehensive source of data on share repurchase programs and announcements that are reported in a number of business media sources. Following Babenko et al (2011), we delete the announcements which are duplicated by the SDC and have little modification for the multiple repurchase announcements by a firm within a

month. Besides, we only keep the firms trading at stock prices no lower than $1 to avoid microstructure effects in returns. The program size is reported as the dollar value of shares in the repurchase divided by the firm's market value at the beginning of the fiscal year, as 98% of announcing firms reported the dollar value of repurchases while less than 80% did not report the percentage of outstanding shares sought.

For the stock abnormal return for the announcing companies, we use the cumulative abnormal return (CAR) as the sum of the differences between the observed stock returns and the returns predicted by the market model for the three trading days [-1,1] centered on the announcement. The parameters of the market model are estimated by the value-weighted CRSP index within the estimation window (-252, -44) relative to the announcements. This method has been widely used in the stock repurchase literature (e.g., Comment and Jarrell (1991), Kahle (2002), and Maxwell and Stephens (2003)). We choose three-day abnormal stock returns rather than one-day or two-day returns because of following reasons. First of all, the stock market reacts very quickly and frequently to news. In addition, since repurchase announcements are not material non-public information, some information leakages happen possibly one day before. As a result, three-day stock returns could show the overall reaction of stock market to the share repurchase announcement.

B. Bond Returns

Our primary source of bond data is Trade Reporting and Compliance Engine (TRACE), which is the FINRA (Financial Industry Regulatory Authority) developed vehicle that reports the over-the-counter secondary market transactions in eligible fixed income securities, with the transaction recorded by all broker/dealers who are FINRA

members mandatorily. Often the accurate bond pricing data are difficult to find; but this bond data could reflect the market value of each bonds. However, the bond market does not trade as frequently as the stock market; thus the reaction should be slower. Therefore, the one-day and two-day bond return should be more accurate than three-day bond return and a three-day window around the announcements is not necessary for bonds. In order to calculate the abnormal return of bonds, we also use the treasury data from TRACE.

From the sample of 4964 open market share repurchase announcements from 2002 to 2012, we find bond data of 438 announcements, which is 9% of the sample) covering 1,002 bonds outstanding. According to Bessembinder et al (2008), there are mainly three ways to construct daily returns from the TRACE data. One is simply utilizing the price of the last trade. Another way is weighting each trade by its size, which is referred as the "trade-weighted price, all trades" approach. The best method to select bond price data is weighing each trade by size and eliminating small trades, which called the "trade-weighted price, trade≥100k" method. However, we do not have the value of bond trades data because the amounts for large trades are not provided in the TRACE database. Since we lack the data for trade size, we use a simple approach using TRACE data, which is constructing the daily bond returns based on the price of the last trade of the day.

In order to calculate abnormal bond and stock returns around the repurchase announcements, we use standard event study methodologies. Following Bessembinder et al (2008) and Maxwell and Stephens (2003), we use the mean adjusted model to calculate the daily abnormal returns. The mean-adjusted model was introduced by Handjinicolaou and Kalay (1984) to account for term structure change. It is the most frequently used

method of calculating abnormal bond return. In the mean-adjusted return model, the abnormal bond return is calculated in two steps: first, we calculate the premium holding period return (PBR) for bond i during period t, that is, using the bond's return (BR) minus the matching Treasury return (TR) [a. Treasury bonds with matching maturity are used for the adjustment. Those treasury bonds with the closest maturity are chosen:

$$\mathrm{PBR_i} = \mathrm{BR_i} - \mathrm{TR_i}$$

The mean expected excess return (EBR) for bond i in the announcement day is equal to the average PBR for bond i for the previous y days:

$$\mathrm{EBR_i} = (\sum_{t=Rr}^{-y} \mathrm{PBR_{i,t}})\frac{1}{y}$$

After calculating the expected return, the abnormal bond returns (ABR) for bond i are calculated as:

$$\mathrm{ABR_i} = \mathrm{PBR_i} - \mathrm{EBR_i}$$

While the majority of firms in the sample have a single bond outstanding, there are still a number of firms that have multiple bonds. According to Bessembinder et al (2008), there are several methods to deal with this issue. First, we could treat each bond as a separate observation (denoted as the all-bond sample). However, this method neglects the impact of the likely high correlation between returns of bonds issued by the same firm; so it would inflate the t-statistics and overweigh firms with multiple issues in the sample.

Earlier researchers also pick representative bond for each firm in the sample (denoted as the Representative Bond Approach), but this approach is unlikely to capture the debt value change of the company due to different attributes in different bonds.

Another approach is to treat each firm as a single observation and calculate the abnormal return of bondholders in a firm as the weighted-average abnormal return to the different bond issues. This method will overestimate the standard error because the bonds in firms are not perfectly correlated but it can generally reflect the debt value change of a firm. However, since we do not have the amounts of bond trades data, we cannot calculate the weighted-average abnormal return for firms. Instead, we use the equally-weighted average return to the different bonds issued by the same firm as the abnormal return of bondholders in a firm.

C. Summary Statistics

Table II presents the summary statistics for the variables used in our study. The mean equally-weighted three-day CAR (cumulative abnormal return) for stock around the announcement date is 0.899%, which is statistically significant at 1% level, supporting the assumption that stock return should have a positive reaction to the open market repurchase announcement. The reason why we use equal-weighting to calculate averages is based on Loughran and Ritter (2000), who argue that weighting firms equally is better to detect abnormal returns than tests that underweighting small cap companies. For all bonds sample, the average one day abnormal return (the return for announcement day) is -7.316% and the average three day (the [-1,1] day cumulative return around the announcement day) abnormal return is 6.575%, both statistically different from zero with 99% and 90% confidence level respectively. This result indicates that the bonds have a large negative immediate reaction to the repurchase announcement. However for the three-day return, the result is a large positive return. Our explanation is that the bond market does not react as quickly and as frequently as the stock market. The bond price run-up (the excess return

during the [-31, -3] days prior to the announcement) has a mean of -2.72%, which is statistically significant and indicates that the whole bond market lacks confidence before the repurchase announcement. For firm data, we get 2.96% and 3.55% for one day return and three-day bond AR averaged by firm, but they are not statistically significant. In addition, we have the mean of market leverage of 25.3%, 0.44% of the book to market ratio, and 0.26 of the daily stock return volatility. Finally, in Table 2 it also shows that the average repurchase is 6.66% of the firm's market value.

D. Predicted Returns with Signaling and Wealth Transfer Effects

Following Maxwell and Stephens (2003), table I shows the outcome of the past studies about the wealth transfer effect and signaling effect of repurchase announcements. On average, stock prices increase around the announcement of a share repurchase program. If there is a signaling effect, bond prices will generally increase; conversely, the wealth transfer hypothesis indicates the wealth transfer from bondholders to stockholders, thus the bond price drops at the same time as the stock price rises. In addition the table in Maxwell and Stephens, we add one more combination of positive bond returns and negative stock returns, which is the outcome of wealth transferring from shareholders to bondholders. It can arise if a repurchase announcement signals a lack of investment opportunities, which leads to a negative stock price reaction. Simultaneously, the announcement signals relatively less investment into new risky projects, which results in positive bond returns.

IV. Empirical Results

A. Full Sample

Table III lists the abnormal bond returns of all bond samples as individual observations and all bond samples averaged by firm for the announcements day, the day before and after as well as two-day and three-day announcements period.

On the announcement days, the mean of abnormal bond return for all bond samples is -7.316%, which is statistically significant with 99% confidence level. It indicates that repurchase announcements has large negative impact on bond abnormal return on announcement days because share buy-backs increase firms' default risk therefore shrink bondholders' wealth. Although the median is 0.227%, since it is not significant, it has no difference from zero.

Conversely, the mean and median of abnormal bond returns for all bond samples averaged by firm on the announcement days is 2.958% and 3.777% respectively. As these two numbers are both not significant, they are no difference from zero. An alternative explanation is that returns are more negative for firms that have many bonds. When we average the sample bond returns by firms, the large negative number for individual bonds becomes much smaller in absolute terms; thus the mean of abnormal bond returns for the bond samples averaged by firm becomes positive, though insignificant. This explanation is consistent with bond returns sorted by leverage ratios in table V, where firms with a higher leverage ratio have more negative returns since these firms tend to have relatively more bonds outstanding.

On the day after the announcements, the mean of the abnormal bond returns for all bond samples is 2.807% without significance. The positive number implies bond prices increase on the next day, which is consistent with the results from table IV even though the number here is not significant.

The two-day abnormal bond returns are not consistent with one-day returns. However, since their mean and median are not statistically significant, they are no difference than zero.

For the three-day bond returns measure, the average and median of both abnormal bond and stock returns are positive and statistically significant. The likely explanation is that the share repurchase announcements send positive signal not only to shareholders but also to bondholders. Further, the three-day abnormal bond returns is positive while one-day abnormal bond returns is negative because the abnormal bond return on the day before announcement is positive, and available data is more limited for three-day returns than one-day returns.

B. Bond Returns Segmented by Positive or Negative Equity Returns

In table IV, we segment abnormal bond returns by positive and negative changes in equity returns over the three days around the announcements in order to test the wealth transfer hypothesis (whether there is a negative correlation between bond returns and stock returns).

On the announcement days, mean and median of abnormal bond return is -18.762% and -3.875%, respectively, significant at 1% level for the firms with positive changes in equity value. These two numbers reveal that bond prices drop dramatically on the same

day of announcements, which is an intense first reaction after announcements. The negative correlation between bond and stock value changes is consistent with the hypothesis of wealth transfer from bondholders to shareholders because repurchases make the firm less cash flow which can be used to pay back to bondholder. The two-day period, which includes announcement days and the one day after, has statistically significant mean with 95% confidence level. The mean of the two-day abnormal returns is -7.610%, which is less negative than the mean of the one-day abnormal returns. Accordingly, the mean of abnormal bond returns on the day after announcements has to be positive. The bond prices increase while stock prices rise can be caused by the positive signal of firms' future performance from bondholders' perspective after their overnight re-thinking.

For the firms with negative changes in equity value, the situation is opposite. The mean and median of abnormal bond returns on the announcement days is 17.217% and 10.163%. On the first two days, the mean and median is 21.613% and 16.476% respectively. All these numbers are statistically significant with 99% confidence level. The four numbers demonstrate the bond prices rise on both days. On the one hand this result is simply evidence of negative correlation between stock and bond announcements returns. Maxwell and Stephens (2003) consider negative stock returns only as an indication of a negative signal about firm value, and their framework does not accommodate for a combination of positive bond returns and negative stock returns. In order to explain what appears to be a wealth transfer from shareholders to bondholders, we need to consider other motives for stock repurchases that could result in a negative stock reaction. A plausible explanation is that the firm announcing its repurchase plans

signals a lack of investment opportunities, which leads to a negative stock price reaction. At the same time, this implies the firm is planning to make relatively less investment into new risky projects. As a result, this action reduces volatility of the firm's cash flows and overall risk, which positively affect bond prices, revealed in the positive bond announcements returns we find. Effectively, such announcements trigger a wealth transfer from shareholders to bondholders.

We also calculate the differences in mean and median bond returns between firms that experience positive and negative changes in their equity values. The results, which are mean difference -35.979% and median -14.038%, are both statistically significant at 1% level. The large negative numbers imply that the impact of the positive and negative changes in equity value has huge impact on bond returns.

In the remaining three columns of table IV, we do the same tests for bond returns averaged within each firm. While the mean of abnormal bond return for the firms with negative changes in equity value averaged by firm on the announcements day is 7.878%, which is consistent with all bond samples of the firms with negative changes in equity value, the means of abnormal bond returns of the firms with positive changes in equity value are not. For the two-day and three-day period, means are positive but not statistically significant. The same lack of significance is observed for two and three day returns in the other subsample. The differences between subsamples are not statistically significant when returns are averaged by firm.

C. Bond and Stock Returns Segmented by Repurchase Size

In table V, we report the abnormal bond and stock returns when the sample is segmented by repurchase size. In order to find the determinant of the "large" repurchase program, we calculate the median program size in the full sample, which is 5.7%. Any repurchase program that is greater than 5.7% is categorized as a large repurchase, and the rest are small repurchases.

The mean of abnormal bond returns for all bond samples on the announcements day is -12.270% with statistically significant at 1% for the small repurchases. This negative abnormal bond return is a negative wealth effect on bondholders. We calculate the difference between the large and small repurchases by subtracting the mean for small repurchases from large repurchases. The result 12.707%, which is statistically significant at 99% confidence level, indicates that the influence of large and small repurchases has big difference.

The average three-day abnormal stock returns for large repurchases is 1.116% with statistical significance at 1% level, and that for small repurchases is 0.687% with significance at 5% level. From these two numbers, we can conclude that repurchase announcements have positive impact on stock returns. Moreover, same as Maxwell and Stephens (2003) express in their research paper, stock returns are greater for large repurchases.

D. Bond and Stock Returns Segmented by Leverage Ratio

We also report abnormal bond and stock returns segmented by leverage ratio in table V. Firms with the leverage ratio greater than 14.45% are considered as those with

large market leverage, and the remaining firms belong to the small market leverage category.

For all bond samples observed as individuals on the announcement days, the mean for large market leverage is -10.808% with statistical significance at 1% level and for small leverage ratio is 8.415% with significance at 5% level. From bondholders' perspective, the firms are risky because of high leverage ratio, and repurchases leave the firm with even less free cash flow to pay back to bondholders, so the bond price fall more than ten percent. On the other hand, for the firms with low leverage ratio, bondholders feel that share buy-backs have less risk than investment in risky projects, thus the bond prices increase.

The three-day abnormal stock returns during the announcements period are statistically significant for both samples. For larger market leverage ratio the mean is 1.046% and for small market leverage the average is 0.589%. As a result, market leverage ratio impacts on stock returns positively with the trend of the larger the ratio, the higher the stock return.

E. Cross-sectional Regression Analysis of Bond Return

In order to examine relationship between abnormal bond and stock returns and some independent variables that may affect abnormal returns, we run cross-sectional regression with and without clustering by announcement year and provide our results in table VI. Our dependent variables are one-day, two-day, and three-day abnormal bond returns in Panels A, B, and C. Panel D regresses one and three-day abnormal returns averaged by firm. Our independent variables include firm size, which is the log of firm's

market value, three-day announcement stock returns, repurchase size, indicator variable for a large repurchase, market leverage, volatility of stock return, and book-to-market value.

In panel A and B, almost all of the values of the independent variable, book-to-market value, are statistically significant for one-day and two-day abnormal bond returns. But models do not explain variance in returns since the adjusted R^2 values are small. With clustering by announcements year, the cross-sectional regressions between two-day abnormal bond returns and some independent variables demonstrate in model eight of Panel B. Both stock returns and book-to-market ratios are statistically significant at 10% level. Consistent with prior results, stock returns negatively correlated with abnormal bond return, which is also consistent with wealth transfer hypothesis. The positive correlation between the book-to-market ratio and the abnormal bond returns can be explained by signal of firm undervaluation and positive signal of future performance.

V. Conclusion

There are two main theories of the impact on stock repurchase announcements: the wealth transfer effect and signaling effect. The wealth transfer theory suggests that share repurchases distribute cash to shareholders; thus reducing the cash flow available to cover the interest and principle payment for bondholders, which may lead to a higher probability of default on the bonds and a wealth transfer from bondholders to shareholders. Therefore, stock repurchases may have negative impact on bond prices. However, the signaling theory suggests that the manager of the firms repurchase shares to signal current stock prices or firm values are undervalued by the market. In this case, both

stockholders and bondholders will benefit from repurchase announcements and thus both stock and bond prices should have positive reaction on share repurchases. However, under these two theories, there is also an assumption that the firm will really buy-back the shares. If the firm is assumed to do repurchase action in the future, the wealth transfer effect should be stronger. This is because if the firm is not expected to do real repurchase action in the future, there will be no real wealth redistribution effect and the announcement means that the firm is only informing the public that the stock price is undervalued.

We examine a large sample of repurchase announcements made by firms with publicly traded bonds for which bond price information is available in the TRACE Database. During the announcement period, we find abnormal positive stock returns and negative bond returns (on the announcement day). The negative effect on the announcement day is very intense, but it tends to temper on the next day, which may be due to 33% fewer observations of the two-day return data samples. The sign of the two-day return is relatively weak. Overall, the wealth transfer effect is obvious in our sample.

To further understand the relation between the signaling and wealth transfer hypotheses, we segment the samples into positive and negative stock return firms. For the positive stock return firms, we find statistically significant negative bond returns on the announcing day and the day after. This result is consistent with wealth transfer theory. However, when it turns to negative stock return firm, we also find statistically significant positive bond returns on the announcing day and the day after. A plausible explanation is that these firms are relatively less risky but lack of investment opportunity so they choose repurchase, which is a relatively secured way for investment, thus resulting a reduced

volatility for firm's cash flow. Such risk reduction is known to positively effect on bond price. As a result, such announcement triggers a wealth transfer from shareholders to bondholders.

In explaining the returns, the bond returns are negative for smaller repurchase programs, which is different from the result of Maxwell and Stephens (2003). The explanation is that smaller repurchase are often continuous over years therefore more likely to be completed. Besides, the bond returns are negative for firms with high market leverage and positive for firms with low leverage rate, which can account for the theory that the riskier the firm, the larger the negative impact on bond prices.

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Tables

Table I Predicted Returns for Repurchases with Both Signaling and Wealth Transfer Effects

This table shows the possible outcomes for repurchases with both signaling and wealth transfer effects by using positive and negative signs. Since signaling and wealth transfer effects together may lead to different outcome, we represent the ambiguity of the outcome with "uncertain".

	Abnormal Bond Return	Abnormal Stock Return	Abnormal Firm Return	Correlation between Changes in Stock and bond Values
Pure wealth transfer to shareholder	-	+	0	-
Pure wealth transfer to bondholder	+	-	0	-
Positive signal and no wealth transfer to shareholder	+	+	+	+
Negative signal and no wealth transfer to shareholder	-	-	-	+
Positive signal and wealth transfer to shareholder	uncertain	+	+	uncertain
Negative signal and wealth transfer to shareholder	-	uncertain	-	uncertain

Table II Summary Statistics

Announcement day is assumed to be day 0. Three-day stock CAR is the cumulative abnormal stock return of [-1, 1] trading day around the announcement day, calculated by using the market model with the value-weighted CRSP index, where the parameters of the market model are estimated over a period of [-252,-44] day of the trading day. The bond AR is the abnormal bond return calculated using a mean-adjusted return model accounting for changes in the term structure which is introduced in the empirical method part. Three-day bond CAR is the cumulative abnormal bond return for [-1, 1] day around the announcement. One day bond AR average by firm and three-day AR average by firm is the average return of the one day and three-day bond abnormal returns for bonds in the same firm. Bond price run-up is the average return in the [-31, -3] day. The repurchase size is calculated by the dollar value of the repurchase divided by the market value of firm equity at the beginning of the fiscal year. The book-to-market ratio is the ratio of book value to market value of a firm's equity. Volatility is the standard deviation of daily stock returns measured over one year prior to the announcement. Market leverage is the ratio of total debt value to the market value of equity. The last column reports t-test statistics of a two-sided test for zero mean. The 99 percent, 95 percent, and 90 percent confidence levels are denoted by ***, ** and * respectively.

Variable	Number of Observations	Mean	Median	Standard Deviation	p-value of t-test
One-day Bond AR(%)	1458	-7.316	0.227	77.830	0.000***
Three-day Bond CAR(%)	680	6.575	10.018	89.990	0.057*
Bond price run-up (EBR)	1458	-2.724	-2.191	20.640	0.000***
One-day Bond AR(%) Average by Firm	438	2.958	3.778	59.700	0.300
Three-day Bond CAR(%) Average by Firm	268	3.545	1.358	96.914	0.550
Three-day Stock CAR(%)	438	0.899	0.748	4.168	0.000***
Repurchase Size(%)	438	6.658	5.691	4.804	
Market Value(log)	440	9.458	9.516	1.433	
Market Leverage(%)	439	25.298	20.848	17.055	
Book-to-market Equity Ratio	440	0.437	0.410	0.249	
Stock Return Volatility	438	0.257	0.233	0.117	

Table III Abnormal Bond Returns

This table uses the full sample of bond returns and presents the comparison of bond abnormal returns for the day before announcement (day -1), the day of announcement (day 0), the day after announcement (day 1), two-day return (day [0,1]), and three-day return (day [-1,1). Also, this table presents the comparison of bond abnormal returns average by firms for the day before announcement, the day of announcement, the day after announcement, and two-day return (day [0,1]) and three-day return (day [-1,1]). All returns are expressed in percent and the *p*-values are in parentheses. The 99 percent, 95 percent, and 90 percent confidence levels are denoted by ***, ** and * respectively. (n = number of observations)

Description	Abnormal Bond Return -- All-Bond Sample					Abnormal Bond Return -- Average by Firm				
	day [-1]	day [0]	day [1]	day [0, 1]	day [-1, 1]	day [-1]	day [0]	day [1]	day [0, 1]	day [-1, 1]
Number of Firms	n = 898	n = 1458	n = 954	n = 898	n = 680	n = 326	n = 438	n = 338	n = 326	n = 268
Mean	7.455***	-7.316***	2.807	2.059	6.575*	1.484	2.958	-1.024	5.192	3.545
p-value	(0.000)	(0.000)	(0.132)	(0.509)	(0.057)	(0.640)	(0.300)	(0.732)	(0.267)	(0.550)
Median	7.148***	0.227	-1.681	6.080	10.018**	-0.638	3.777	-1.392	0.099	1.358
p-value	(0.000)	(0.105)	(0.382)	(0.355)	(0.012)	(0.971)	(0.277)	(0.982)	(0.495)	(0.509)

Table IV Difference in Abnormal Bond Returns Segmented by Positive or Negative Equity Returns

This table documents abnormal bond returns (one day return, two-day return and three-day return) segmented by the change in equity value during the three days around the repurchase announcement. All returns are expressed in percent and the *p*-values are in parentheses. We report the mean and the median returns. The 99 percent, 95 percent, and 90 percent confidence levels are denoted by ***, ** and * respectively. (n = number of observations)

Description	Abnormal Bond Return -- All-Bond Sample			Abnormal Bond Return -- Average by Firm		
	day [0]	day [0, 1]	day [-1, 1]	day [0]	day [0, 1]	day [-1, 1]
Firms with positive changes in equity value	n = 984	n = 584	n = 437	n = 263	n = 199	n = 161
Mean	-18.762***	-7.610**	2.063	-0.029	1.885	3.612
p-value	(0.000)	(0.026)	(0.580)	(0.994)	(0.743)	(0.599)
Median	-3.875***	3.711	4.300	3.831	-1.532	-1.613
p-value	(0.000)	(0.218)	(0.344)	(0.681)	(0.910)	(0.678)
Firms with negative changes in equity value	n = 467	n = 308	n = 237	n = 173	n = 125	n = 105
Mean	17.217***	21.613***	17.315**	7.878*	11.275	4.817
p-value	(0.000)	(0.001)	(0.014)	(0.076)	(0.163)	(0.658)
Median	10.163***	16.476***	18.724***	4.943	4.775	10.397
p-value	(0.000)	(0.001)	(0.002)	(0.160)	(0.178)	(0.472)
Firms with positive - Firms with negative changes in equity value						
Mean	-35.979***	-29.223***	-15.252*	-7.907	-9.390	-1.205
p-value	(0.000)	(0.000)	(0.056)	(0.177)	(0.331)	(0.925)
Median	-14.038***	-12.765*	-14.424***	-1.112	-6.307	-12.010
p-value	(0.000)	(0.091)	(0.003)	(0.922)	(0.569)	(0.531)

Table V Abnormal Bond and Stock Returns segmented by repurchase size and leverage

This table documents the abnormal bond (one day and three-day) and stock return segmented by the size of the repurchase and the level of firm's leverage ratio. The differences in segment returns are then tested. The sample is segmented into firms at or below the median of repurchase program size of 5.7 percent and those above the median repurchase of 5.7 percent. Also, the sample is segmented into firms with large and small leverage relative to the median market leverage ratio of 14.45 percent. All returns are expressed in percentages and p-values are in parentheses. The 99 percent, 95 percent, and 90 percent confidence levels are denoted by ***, ** and * respectively. (n = number of observations)

Description	Bond Return -- All-Bond Sample			Bond Return -- Average by Firm			Stock Return
	day [0]	day [0, 1]	day [-1, 1]	day [0]	day [0, 1]	day [-1, 1]	day [-1, 1]
Large repurchases	n = 584	n = 391	n = 280	n = 218	n = 173	n = 129	n = 218
Mean	0.437	4.206	0.582	2.222	3.130	-1.924	1.116***
p-value	(0.869)	(0.301)	(0.917)	(0.596)	(0.626)	(0.820)	(0.000)
Small repurchases	n = 871	n = 561	n = 400	n = 218	n = 163	n = 139	n = 218
Mean	-12.270***	-3.583	10.770**	4.369	1.071	8.621	0.687**
p-value	(0.000)	(0.236)	(0.014)	(0.262)	(0.865)	(0.301)	(0.021)
Large repurchases - Small repurchases							
Mean	12.707***	7.789	-10.188	-2.147	2.059	-10.545	0.429
p-value	(0.001)	(0.124)	(0.146)	(0.707)	(0.819)	(0.375)	(0.283)
Large market leverage	n = 1192	n = 787	n = 553	n = 300	n = 244	n = 189	n = 300
Mean	-10.808***	-1.288	7.309	-0.886	1.340	4.817	1.046***
p-value	(0.000)	(0.622)	(0.035)	(0.800)	(0.802)	(0.475)	(0.000)
Small market leverage	n = 265	n = 167	n = 127	n = 137	n = 94	n = 79	n = 137
Mean	8.415**	3.879	3.380	11.500**	4.135	0.503	0.589**
p-value	(0.020)	(0.552)	(0.753)	(0.019)	(0.611)	(0.967)	(0.050)
Large market leverage - Small market leverage							
Mean	-19.223***	-5.167	3.929	-12.386**	2.796	4.314	0.457
p-value	(0.000)	(0.462)	(0.728)	(0.044)	(0.780)	(0.740)	(0.245)

Table VI Cross-sectional Regression Analysis of Bond Returns

Abnormal bond returns around the dates of announced repurchase programs made from 2002 to 2008 are the dependent variables. Bond returns are one day, two-day, three-day bond abnormal return for individual bonds in Panels A-C, and one day and three-day abnormal bond return averaged by firm in Panel D, respectively. The stock return is the three-day stock CAR defined in Table II. The size of the repurchase program is measured in two ways: (1) as the dollar value of the repurchase program divided by the market value of firm equity at the beginning of the fiscal year, and (2) as an indicator variable categorizing the repurchase as large (greater than 5.7 percent of the market value of equity). Other variables are defined in Table II. The models with clustering by announcement year report unadjusted R^2. Heteroscedasticity-consistent t-statistics are in parentheses. The 99 percent, 95 percent, and 90 percent confidence levels are denoted by ***, ** and * respectively. (n = number of observations)

Panel A: Abnormal Bond Returns on Day [0]

Independent Variables	Dependent variable: Abnormal Bond Returns on Day [0]							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	74.042***	74.042	59.010***	59.010	143.845***	143.845	73.945***	73.945
	(4.27)	(0.93)	(3.52)	(0.77)	(6.64)	(1.19)	(4.24)	(0.94)
Log of Market Value	-7.210***	-7.210	-6.184***	-6.184	-13.153***	-13.153	-7.170***	-7.170
	(-4.96)	(-0.83)	(-4.21)	(-0.74)	(-8.52)	(-1.09)	(-4.92)	(-0.82)
Stock returns							-0.966	-0.966
							(-1.62)	(-0.88)
Book-to-market value	47.000***	47.000*	48.067***	48.067**	32.834***	32.834*	47.922***	47.922*
	(5.06)	(2.23)	(5.21)	(2.47)	(3.64)	(2.40)	(5.12)	(2.17)
Size of repurchase program								
Repurchase size	-0.579	-0.579			-1.143**	-1.143	-0.558	-0.558
	(-1.16)	(-0.61)			(-2.30)	(-1.30)	(-1.11)	(-0.57)
Indicator variable for a large repurchase program (> 5.7%)			3.509	3.509				
			(0.81)	(0.32)				
Measures of risk to bondholders								
Market leverage	-0.625***	-0.625	-0.663***	-0.663			-0.612***	-0.612
	(-5.52)	(-1.24)	(-5.86)	(-1.35)			(-5.34)	(-1.26)
Volatility of stock return					-81.623***	-81.623		
					(-3.43)	(-1.03)		
Clustering by announcement year		yes		yes		yes		yes
Number of observations	1454	1454	1454	1454	1448	1448	1447	1447
Adj. R-squared	0.077	0.076	0.077	0.075	0.066	0.063	0.079	0.078

Panel B: Abnormal Bond Returns on Day [0, 1]

Independent Variables	Dependent variable: Abnormal Bond Returns on Day [0, 1]							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	38.817	38.817	39.632	39.632	72.759**	72.759	37.133	37.133
	(1.39)	(0.53)	(1.49)	(0.55)	(2.16)	(0.71)	(1.33)	(0.56)
Log of Market Value	-2.759	-2.759	-3.057	-3.057	-6.405**	-6.405	-2.613	-2.613
	(-1.17)	(-0.36)	(-1.31)	(-0.40)	(-2.58)	(-0.62)	(-1.11)	(-0.35)
Stock returns							-2.582***	-2.582*
							(-2.77)	(-2.04)
Book-to-market value	40.654***	40.654*	42.190***	42.190*	26.348**	26.348	43.031***	43.031*
	(2.96)	(2.19)	(3.11)	(2.36)	(1.97)	(1.61)	(3.12)	(2.10)
Size of repurchase program								
Repurchase size	-0.944	-0.944			-1.686**	-1.686	-0.87	-0.872
	(-1.25)	(-1.39)			(-2.27)	(-2.72)	(-1.15)	(-1.29)
Indicator variable for a large repurchase program (> 5.7%)			-11.370*	-11.370*				
			(-1.67)	(-2.03)				
Measures of risk to bondholders								
Market leverage	-0.568***	-0.568	-0.553***	-0.553			-0.519***	-0.519
	(-3.36)	(-1.29)	(-3.28)	(-1.24)			(-3.04)	(-1.36)
Volatility of stock return					-12.547	-12.547		
					(-0.38)	(-0.20)		
Clustering by announcement year		yes		yes		yes		yes
Number of observations	896	896	896	896	891	891	890	890
Adj. R-squared	0.026	0.022	0.027	0.023	0.014	0.010	0.034	0.032

Panel C: Abnormal Bond Returns on Day [-1, 1]

Independent Variables	Dependent variable: Abnormal Bond Returns On Day [-1, 1]							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	58.370*	58.370	63.531**	63.531	40.246	40.246	63.209**	63.209
	(1.85)	(1.04)	(2.11)	(1.17)	(1.03)	(0.50)	(2.00)	(1.32)
Log of Market Value	-4.930*	-4.930	-5.643**	-5.643	-3.618	-3.618	-5.129*	-5.129
	(-1.86)	(-0.98)	(-2.14)	(-1.12)	(-1.27)	(-0.56)	(-1.94)	(-1.12)
Stock returns							-2.362**	-2.362
							(-2.21)	(-1.53)
Book-to-market value	13.778	13.777	15.320	15.320	11.092	11.092	13.620	13.620
	(0.91)	(0.83)	(1.03)	(1.07)	(0.76)	(0.59)	(0.90)	(0.93)
Size of repurchase program								
Repurchase size	-1.205	-1.205			-1.304	-1.304	-1.233	-1.233
	(-1.42)	(-0.90)			(-1.58)	(-0.99)	(-1.45)	(-1.07)
Indicator variable for a large repurchase program (> 5.7%)			-16.572**	-16.572				
			(-2.17)	(-1.58)				
Measures of risk to bondholders								
Market leverage	0.080	0.080	0.118	0.118			0.102	0.102
	(0.44)	(0.30)	(0.64)	(0.48)			(0.55)	(0.47)
Volatility of stock return					43.759	43.759		
					1.07	0.56		
Clustering by announcement year		yes		yes		yes		yes
Number of observations	680	680	680	680	674	674	674	674
Adj. R-squared	0.003	-0.001	0.007	0.003	0.006	0.002	0.010	0.007

Panel D: Abnormal Bond Returns Averaged by Firm on Day [0] and [-1, 1]

Independent Variables	Dependent Variables							
	Abnormal Bond Returns – Average by Firm on Day [0]				Abnormal Bond Returns – Average by Firm on Day [-1, 1]			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	43.123	35.546	33.355	43.949	61.238	55.849	51.487	69.641
	(1.15)	(0.95)	(0.92)	(1.15)	(1.23)	(1.16)	(0.96)	(1.37)
Log of Market Value	-3.048	-2.707	-2.467	-3.091	-5.537	-5.260	-4.767	-6.310
	(0.90)	(-0.78)	(-0.74)	(-0.88)	(-1.18)	(-1.12)	(-0.99)	(-1.27)
Stock returns				-0.217				-1.676
				(-0.31)				(-1.43)
Book-to-market value	-2.332	-1.150	-6.752	-2.362	3.010	3.467	3.537	3.607
	(-0.17)	(-0.08)	(-0.55)	(-0.18)	(0.14)	(0.17)	(0.15)	(0.17)
Size of repurchase program								
Repurchase size	-0.806**		0.911**	-0.808**	-1.234		-1.157	-1.138
	(-2.49)		(-2.84)	(-2.46)	(-0.93)		(-0.82)	(-0.87)
Indicator variable for large repurchase program (> 5.7%)		-1.572				-13.620		
		(-0.05)				(-1.76)		
Measures of risk to bondholders								
Market leverage	-0.181	-0.210		-0.182	0.148	0.180		0.164
	(-0.92)	(-1.07)		(-0.90)	(0.96)	(1.27)		(0.91)
Volatility of stock return			9.574				23.431	
			(0.90)				(0.86)	
Clustering by announcement year	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	435	435	434	433	268	268	266	266
Adj. R-squared	-0.005	-0.009	-0.007	-0.005	-0.018	-0.017	-0.017	-0.013