



Share repurchase, executive options and wealth changes to stockholders and bondholders[☆]

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ABSTRACT

We test the signaling and wealth transfer hypotheses around the announcement of share repurchases using a recent and larger sample of data than previously examined while employing a methodology designed to enhance the power of our tests. Disentangling the wealth transfer and signaling hypotheses is difficult; they are not mutually exclusive and can have opposite effects for bondholders. Wealth transfers decrease bondholder wealth while positive signals increase it; the combined result obscures tests of each hypothesis. By focusing on sub-samples where signaling is more and less likely to be present we increase our ability to isolate the separate effects. In addition to traditional tests of wealth effects, we feature information inherent in the correlation of wealth changes to equity and debt. Our results are generally consistent with the positive signaling effect of stock repurchases, but also provide some support for wealth transfer. Our work also emphasizes the importance of trying to disentangle the various hypotheses. In the subset of option funding repurchases, where signaling effects are less likely, the positive correlation of wealth changes between stockholders and bondholders is completely eliminated. Bond ratings are much more likely to be upgraded in samples without executive options which is precisely where the signaling effects are expected to be concentrated. Firms with weaker shareholder rights experience greater bondholder wealth losses at the announcement of stock repurchases.

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1. Introduction

For over two decades, researchers have documented positive abnormal returns to shareholders around the announcement of stock repurchases (Dann, 1981; Vermaelen, 1981). Explanations for these abnormal returns include signaling, wealth transfers from bondholders to equity holders, and agency explanations. Empirical evidence is generally supportive of the signaling hypothesis, but limited on wealth transfers.

Two recent articles significantly enhance our understanding of repurchases, providing relatively unexplored insights. Maxwell and Stephens (2003) examine wealth changes to both equity holders and bondholders around share repurchases over the 1980 through 1997 period. An important feature of their work is recognition of information inherent in the co-movement of wealth changes to equity holders and bondholders. If positive signaling occurs then the correlation of equity and bond returns should be positive. The opposite would be true for wealth transfers. Kahle (2002) presents compelling evidence on the importance of the option funding effect in repurchases. Repurchases differ in the probability that they convey a signal. Specifically, a repurchase

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associated with the funding of options is less likely to have a signaling impact.¹ Kahle finds that controlling for stock options surrounding repurchases affects the analysis of equity returns.

To the best of our knowledge, tests of wealth transfer between stockholders and bondholders have not controlled for the option funding effect, in spite of its importance. Disentangling the signaling and wealth transfer hypotheses is difficult; they are not mutually exclusive and can have opposite effects for bondholders. Wealth transfers will decrease bondholder wealth while positive signals will increase it: the combined effects obscure tests of each hypothesis. By focusing on sub-samples where signaling is more and less likely to occur we increase our ability to isolate the separate effects.

Our work provides several contributions to the literature analyzing share repurchases: first, by explicitly controlling for the option funding effect we enhance the power to test the signaling and wealth transfer hypotheses. As with Maxwell and Stephens we examine wealth changes to equity holders and bondholders as well as the co-movement of their wealth changes. Second, we use a recent and larger sample of data than previously examined. Most work on wealth changes to bondholders' ends in 1997 with the demise of the Lehman Brothers Bond Database. Obviously, the business environment has changed dramatically. Recent evidence is needed, particularly given the dramatic increase in the use of option related repurchases reported by Kahle (2002). Skinner (2008) also reports on the increased use of repurchases noting that they are now the dominant form of payout. Finally, we provide the first evidence on the impact of governance factors surrounding repurchases.

We examine stockholder and bondholder wealth changes using a sample of 366 open market stock repurchases from 1991 through 2002. Classifications based on the existence of options (as in Kahle) reveal significant differences in wealth effects to equity holders and bondholders. In general, our results indicate positive wealth changes to equity holders and negative wealth changes to bondholders surrounding repurchase announcements. For bondholders, however, the wealth losses are only significant in the subset of firms associated with options. These are precisely the cases where any off-setting effects of positive signaling are less likely to occur. The impact of positive signaling is also likely to be more important to shareholders of firms with non-investment grade debt. Consistent with this, we find that equity holders of these firms earn significantly larger abnormal returns. The results are more dramatic in the subset of firms without options—precisely the cases where signaling is expected to have the greatest impact. Also, returns to shareholders are insignificantly higher for repurchases by firms with poor governance; bondholders, however, experience greater losses when repurchases are announced by firms with poor governance. Firms with poor governance are more insulated from takeover, reducing the threat of increased debt and bondholder losses. Returning funds to shareholders may be more of a surprise here resulting in greater bond losses.

When we examine the co-movement between equity and debt wealth changes, our results indicate that wealth changes to equity holders are significantly positively related to bondholder wealth changes, which is consistent with the signaling hypothesis. However, in the subset less likely to have signaling effects (i.e., option related repurchases), the effect is completely eliminated. Finally, our results show that bond ratings for firms with options are less likely to be upgraded after stock repurchases. Our results are generally consistent with positive signaling but also provide some support for wealth transfer. In addition, we highlight the enhanced power available through recognition of option related repurchases. Finally, we document a significant relation between the price movement of equity and debt.

The remainder of this paper is organized as follows: Section 2 provides a brief overview of the related literature and hypotheses. Section 3 reveals details on sample selection and research design. Results and conclusions are presented in Sections 4 and 5, respectively.

2. Background and hypotheses

2.1. Wealth effects of share repurchase

The literature documenting positive abnormal returns to equity holders around open market repurchase announcements extends as far back as Dann (1981) and Vermaelen (1981) and continues through Comment and Jarrell (1991), Ikenberry, Lakonishok, and Vermaelen (1995), Stephens and Weisbach (1998) and Henock and White (2007).² The reasons for these abnormal returns, however, are still being debated. Three commonly cited explanations for positive wealth changes to equity are the signaling, wealth transfer, and governance (free cash flow) hypotheses.³

2.2. Signaling

First, it is argued that repurchases occur when managers believe their firm's stock is undervalued, thus signaling positive news about the firm and its future performance (Bhattacharya, 1979; Vermaelen, 1984; Miller and Rock, 1985; Constantinides and Grundy, 1989). Most, but not all, of the empirical evidence supports this view. Several authors report that repurchases are negatively related to prior price declines which may lead management to believe their stock is undervalued (Comment and Jarrell, 1991; Cook et al., 2004; Stephens and Weisbach, 1998). Related to this, D'Mello and Shroff (2000) estimate that 74% of firms announcing fixed-price tender offers are undervalued.

¹ Weisbenner (2000) also explores the link between stock options and repurchases.

² See Peyer and Vermaelen (2005) for an analysis of the announcement returns to privately negotiated repurchases.

³ Eberhart and Siddique (2002) also argue that liquidity effects associated with repurchases are an explanation for the positive abnormal returns to equity holders.

Also supporting the signaling argument, Bartov (1991), Dannet et al. (1991), and Hertzel and Jain (1991) find that stock repurchases convey information about a firm's future earnings and risk changes. Lie and McConnell (1998) find some evidence that earnings improve following both Dutch-auction and fixed-price self tender offers. Dittmar (2000) reports that firms repurchase stock to take advantage of potential undervaluation. Lee et al. (1992) find that insider trading around repurchases is consistent with positive information. Henock and White (2007) use evidence from financial reporting to infer that managers use repurchase tender offers to signal. Lie (forthcoming) documents an improvement in operating performance following repurchases. Maxwell and Stephens (2003) also find support for the signaling hypotheses.

In a survey conducted by Brav et al. (2005), executives support the notion that dividends and repurchases convey information to investors. However, Jagannathan and Stephens (2003) and Grullon and Michaely (2004) find that, inconsistent to the signaling hypothesis, earnings fall after share repurchase. Also, Ben-David et al. (2007) find that executives are overconfident and that this trait is associated with specific actions including stock repurchases. Absent a decrease in collateral that accompanies a repurchase, a positive signal should enhance bondholder wealth. However, the confounding nature of the decrease in assets makes the positive effect more difficult to detect. Only a few researchers have examined bondholder wealth in repurchases issue and (to the best of our knowledge) none using data beyond 1997 or controlling for the loss in collateral.

2.3. Wealth transfer

A second explanation for repurchases is the wealth transfer hypothesis. Compared to signaling, the evidence is relatively scarce. Repurchasing equity reduces a firm's assets which produces a decrease in the value of claims protecting bondholders' interests. Consequently, repurchases can transfer wealth from bondholders to equity holders. Using a sample of repurchases between from the 1980 to 1997 period, Maxwell and Stephens (2003) find support for wealth transfer: losses to bondholders are significantly related to both the size of the repurchase and to the riskiness of the firm's debt.⁴ In addition, bond ratings are twice as likely to be downgraded as upgraded following a repurchase announcement. Again, we are unaware of evidence on this issue covering the post-1997 period.

The wealth redistribution between shareholders and bondholders is observed in other corporate financial policies. Handjinicolaou and Kalay (1984) report that the positive effect of dividend increases (resulting from improved profitability) is captured only by equity holders, while the negative effect of dividend reduction (resulting from profit reduction) is shared by the bondholders and shareholders. For merger announcements, Bagnani et al. (1994) demonstrate a non-monotonic relation between bond return premia and managerial ownership. Specifically, they find evidence consistent with wealth transfers for moderate levels of managerial ownership (where managerial interests would be more aligned with shareholders). Billett et al. (2004), however, find no evidence of wealth transfer in their analysis of equity/debt return correlations surrounding mergers.

The opposite of stock repurchase is, of course, a seasoned equity offering (SEOs). With SEOs the additional equity added to the firm decreases the risk of default suggesting a transfer of wealth from equity to debt. This is precisely what Eberhart and Siddique (2002) report in their analysis of 189 SEOs.⁵

2.4. Governance and free cash flow

A third explanation for the positive abnormal returns to shareholders is the governance (free cash flow hypothesis) which recognizes that share repurchase is an effective means to disgorge free cash flow (Jensen, 1986).⁶ Empirical evidence generally supports the governance hypothesis. Jagannathan et al. (2000), Guay and Harford (2000) and Dittmar and Dittmar (2002) report that managers do indeed use repurchases to disburse temporary cash flows. Nohel and Tarhan (1998) find that, consistent with the free cash flow hypothesis, improvements in operating performance following tender offer repurchases are concentrated in low growth firms. Similarly, Grullon and Michaely (2004) report that firms more likely to over-invest also experience the most positive market reactions to the repurchase announcement. In contrast, Howe et al. (1992) find that announcement returns of tender offer repurchases for low q firms are not larger than those for high q firms. Oded (2008) argues that repurchases provide managers flexibility, announcing the reduction of free cash flow, but providing an option to cancel the actual action. Harford et al. (2008) find that firms with weaker governance structures are more likely to repurchase shares than increase dividends, thus avoiding future commitments. However, they also conclude that the market expects poorly governed firms to "dissipate firm value". To the extent that the returning of cash through repurchase is more of a surprise, we would expect larger abnormal returns to shareholders of poorly governed firms. Finally, Billett and Xue (2007) and John and Knyazeva (2006) find a significant positive relation between share repurchase and the probability of takeover.

Recent literature finds that governance impacts bondholder yields but not necessarily in the same way as governance impacts shareholder wealth. First, acquisitions can help discipline management and increase equity returns, but they can be detrimental to bondholders by adding more debt to the firm. Klock et al. (2005) and Cremers et al. (2006) find that strong anti-takeover provisions lower the cost of debt financing. In addition, Cremers et al. note that as managerial and owner interests converge, the possibility of

⁴ In an analysis of spinoffs, Maxwell and Rao (2003) report that consistent with wealth transfer, the magnitude of wealth losses to bondholders is related to the wealth gains to equityholders.

⁵ Nash et al. (2003) provide an analysis of contractual relationships between bondholders and stockholders and the role of financial flexibility.

⁶ While we do not formally test this hypothesis, we are careful to control for its effects in sensitivity tests of our multivariate analyses. In addition, free cash flow is directly linked to corporate governance, an issue we do examine.

bondholder losses increase due to the risk of asset substitution. However, Bhojraj and Sengupta (2003) argue that improved governance enhances shareholder value through a reduction in agency costs and informational asymmetry.

While these studies examine the impact on debt in general, the further implication of governance for bondholder wealth changes surrounding repurchases is an empirical issue. There are, however, several reasons consistent with the literature above that suggest governance could matter. First, as suggested by John and Knyazeva (2006) governance may impact the probability of repurchase as a way of returning cash to shareholders. Second, firms with greater levels of shareholder rights might be more likely to engage in signaling to reduce informational asymmetries benefiting both shareholders and bondholders. Alternatively, firms with stronger shareholder rights could engage in wealth transfers from bondholders. In addition, entrenched managements are better able to pursue self interests at the expense of either stockholders or bondholders. Stock repurchases by more entrenched management could be more of a positive surprise since management is releasing assets under their control.

2.5. The link between repurchase and stock options

Several authors have discussed the relation between repurchases and stock options. This includes Bartov et al. (1998), Jolls (1998), Jagannathan (2000), Fenn and Liang (2001), and Kahle (2002). Using a sample of open market repurchases between 1991 and 1996 Kahle (2002) examines the probability of repurchase, the amount repurchased, and the stock market reaction to the announcement. An important result documented in her research is the need to control for the existence of stock options in analyzing the wealth impact of repurchases. Specifically, repurchases to fund options should not be expected to have the strong signaling impact of other types of repurchases. Since the true purpose of a repurchase is generally unknown, she uses the existence of options as her test measure. Consistent with signaling, Kahle reports significantly greater abnormal returns to equity holders for firms without options.

Kahle (2002), Skinner (2008), and our own analysis indicate that the level of option related repurchases have increased in recent years. However, the impact that option related repurchases have on bondholder wealth is unknown. Nevertheless, wealth changes to bondholders are small, noisy, and difficult to measure. It is important to isolate factors that have the potential to improve the power of tests focused on bondholder wealth.

2.6. Evidence inherent in stock and bond correlations

An important feature of Kwan (1996), Maxwell and Stephens (2003) and Billett et al. (2004) is recognition of relevant information inherent in equity/debt return correlations. In terms of repurchases, since signaling is likely to be positive, it will affect equity holders and bondholders in a similar fashion, and the correlation of wealth changes should be positive. The opposite is true for the wealth transfer hypothesis where gains to shareholders stem from losses to bondholders.

2.7. Summary and hypotheses

In summary, evidence consistent with positive signaling includes positive wealth changes to equity holders and to bondholders. Evidence consistent with wealth transfer includes positive wealth changes to equity holders and negative wealth changes to bondholders. Correspondingly, positive correlations between bondholder and stockholder wealth are consistent with signaling while negative correlations are consistent with wealth transfer.

However, evidence on the wealth transfer and signaling hypotheses is limited, especially with regard to bondholders and particularly in the post 1997 period. Moreover, evidence on bondholders and on the correlation between changes in bondholder and stockholder wealth has not controlled for the option funding effect. Controlling for repurchases associated with options enhances our ability to test both the signaling and wealth transfer hypotheses. Since the hypotheses are not mutually exclusive, both could prevail, and attempts to disentangle them are difficult. Signaling should be more dominant in cases without options since these firms are doing something other than funding options. Similarly, wealth transfer should be easier to detect in cases with options, since the positive effects of signaling are negated. The specific hypotheses we examine are stated below.

Hypotheses:

H1. Firms without options will provide stronger evidence of positive signaling at the announcement of stock repurchases.

Evidence of positive signaling includes bond upgrades, positive announcement returns and positive correlations of wealth changes to shareholders and bondholders.

H2. Firms with options will provide stronger evidence of wealth transfers at the announcement of stock repurchases.

Evidence of wealth transfers includes fewer bond upgrades (or more downgrades), positive announcement returns to shareholders, negative announcement returns to bondholders and negative correlations of wealth changes to shareholders and bondholders.

H3a. Firms with weaker shareholder rights will experience greater shareholder wealth gains at the announcement of stock repurchases.

H3b. Firms with weaker shareholder rights will experience greater bondholder wealth losses at the announcement of stock repurchases.

Shareholders in firms with weaker shareholder rights benefit more because the return of cash to them through repurchase is more of a surprise and decreases the probability and size of losses associated with managerial empire building. Bondholders in firms with weaker shareholder rights experience greater losses because the repurchase is more of a surprise and because it reduces collateral. In addition, to the extent it suggests an increased probability of takeover it increases bondholder risk. To the best of our knowledge, this is the first analysis of the impact of corporate governance on equity and bond returns around repurchases.

2.8. Control variables

Other variables linked with repurchases in the literature include: free cash flow, whether a firm's debt is investment grade or below, the percentage repurchase authorized, the size of the repurchase, whether the firm pays dividends, the amount of long term debt relative to assets, stock run-up and the total amount of options (exercisable, exercised and existing) relative to total shares outstanding.

The rationale for these variables and their link to the hypotheses surrounding repurchases is as follows: Under the signaling hypothesis, firms with below investment grade debt stand to gain the most from positive signaling; consequently, they will experience greater equity and bond returns around repurchase. Firms already paying dividends are already committed to returning funds to shareholders. Announcing a repurchase could be less of a signal for dividend paying firms than for firms not regularly committed to returning funds. The level of debt affects the magnitude of financial stress surrounding a firm as well as the relative position of equity and debt holders regarding their claim on assets. Several studies indicate an increased propensity to repurchase following stock price declines—consistent with management feeling the stock is undervalued. The strength of a signal should increase with the percentage of shares repurchased. Conversely, the loss to bondholders increases with the percent of shares repurchased since more assets are returned to shareholders and unavailable to debtholders. Finally, the incentive to repurchase stock in order to avoid the dilutive effects of options increases with the proportion of options outstanding.

2.9. A caveat

Two cautions to this and previous analyses of bondholder wealth changes around repurchases concern the impact of covenants and the impact of matrix prices. It is likely that covenants have explanatory power related to not only bondholder wealth changes but the act of repurchase itself. Like previous analyses of repurchases, we do not have access to this data. Similarly, many of the prices obtained through standard sources are likely to contain matrix prices, especially for less traded securities. As [Warga and Welch \(1993\)](#) and [Sarig and Warga \(1989\)](#) note, many of these prices are dated estimates for the bond in question. Both of these effects will bias against our finding of a significant relation between repurchases and wealth losses to bondholders.⁷

3. Research design

3.1. Sample selection

We construct our sample starting with the set of Execucomp firms that have open market repurchases identified by SDC over the 1991–2002 period. To eliminate overlapping events we only include firms that have not repurchased stock in the previous two years. The announcement date, reason for the repurchase, amount authorized for repurchase and CUSIP must be available from SDC. In addition, firms must be on NYSE, AMEX, or NASDAQ and have CRSP data available. These initial screens produce a sample of 7683 firms.

To examine the effects on bond returns we require that the repurchases are from firms with monthly straight bond data available (YTM, ratings, issue date, maturity, price and amount outstanding) around the announcement date in either Lehman Brothers Fixed Income Database (1991–1997) or Moody's Bond Record (1998–2002). We explicitly note the existence and quantity of all employee stock options from each firm's annual report. Finally we exclude firms whose financial data (free cash flow, leverage, and book equity) are unavailable in Compustat.

For the 1998–2002 period we collect bond data by hand using Moody's Bond Record. Standard and Poors (S and P) Bond Guide is also used to collect Bond Ratings. Moody's Bond Record is a monthly publication; for each month the data reported is for the last day of the previous month. For example, the January 2000 book reports data as of the 31st December 1999. Except as noted, we use two Moody's books for each observation, obtaining data from the month end before the repurchase announcement, and the month end after the repurchase announcement.⁸ From each Moody's book we collect the coupon rate, maturity date,

⁷ [Chava et al. \(2004\)](#) analyze the impact of covenants on bond pricing in general. Of the 54 covenants analyzed in their research, two are directly related to repurchases: restrictions on payments and on the sale or transfer of stock. Somewhat surprisingly, only 18% of their samples have covenants related to restricted payments and only 5% have covenants related to the transfer or sale of stock. Discussions with practitioners indicate that the power of these covenants is probably concentrated in the private debt of repurchasing firms and that the amount of repurchase necessary to trigger the covenant varies from firm to firm. Related to this, [Bradley and Roberts \(2004\)](#) report that 81% of private debt issuers have covenants restricting dividends.

⁸ Effects of repurchases announced at the very end or beginning of a month could distort the associated month end price. If an observation occurs within a window of $-2, +2$ days around the month end we skip that month end and move up or back one month as appropriate. For example, if the announcement date is 01/01/2002 we do not use data from the January 2002 book since it represents data as of 12/31/2001, which is too close to the event. In this case we use the December 2001 and February 2002 books. However, if the event date is, for example, 01/15/2002, we use the January 2002 and February 2002 books to collect the data.

exchange of the issuer (NYSE, AMEX, NASDAQ or other), bond price, yield to maturity, amount outstanding, and bond rating. Where firms have several bonds outstanding (most cases) we collect the data for all of them. Bonds with missing maturity, price, yield, or amount outstanding are eliminated. Our sample selection criteria result in a final sample of 366 observations over the 12 year span. The total number of bonds prior to 1998 is 1822 representing 259 different firms, while the total number of bonds during the 1998–2002 period is 297 representing 107 different firms. The average number of bonds is 5.79 per firm for the whole sample.

Bond ratings are collected from Moody's and the S and P Bond Guide. All ratings are converted into numbers in order to calculate an arithmetic average rating across the ratings sources. Most of the sample contains averages from both Moody's and S and P. When the S and P rating is not available, the average is set equal to the Moody's rating. In addition, we check whether the ratings change in a 3-month window after the repurchase announcement.

To test hypotheses concerning governance we use standard variables: the *Gompers, Ishii, and Metrick (GIM) index* (2003), the *Bebchuk, Cohen, and Farrell (BCF) index* (2005), and a dummy variable for the existence of staggered boards. The GIM index is calculated by counting the number of 24 shareholder rights indicators a firm has in place. The BCF index uses six of these indicators. In both cases a high value for a firm is indicative of fewer shareholder rights. We also note whether a firm has both a staggered board and a poison pill. The combination effectively insulates management from the market for corporate control and is an indication of entrenchment.

3.2. Yield controlled spread

We use two measures of wealth changes to bondholders: the yield controlled spread and bondholder returns. First, we estimate abnormal wealth changes to bondholders using the yield controlled spread methodology noted in *Kwan (1996)*. An obvious advantage of Kwan's procedure is control for market forces, specifically, appropriate treasury yields matched on term to maturity. Kwan examines correlations between individual stock returns and yield spread changes of individual bonds issued by the same firm. Yield spread changes are defined as the difference between the yield on a bond of interest and a treasury bond of similar maturity. Changes in yield spreads over time relate to abnormal wealth changes to bondholders. Note that positive yield spread changes indicates wealth losses to bondholders. In examining the correlation between equity returns and yield spread changes around repurchases, we would interpret a negative coefficient as consistent with signaling since both wealth changes move in the same direction. A positive coefficient is consistent with wealth transfers.

Ideally we would like to examine contemporaneously correlations between changes in stockholder and bondholder wealth. Unfortunately, daily returns to bondholders are unavailable. Instead we use the monthly yield spread change as a proxy for the contemporaneous change in bondholder wealth. Admittedly, the necessity to use a one month time period adds considerable noise to the measure of bondholder wealth changes and biases against our finding significant results, particularly with regard to correlations with the three day abnormal stock return.

For each of the bonds in our sample we calculate the yield spread (bond yield–treasury yield) matching bond yields and daily treasury yields by the bond's remaining time to maturity. In particular, we extrapolate a comparable treasury yield using the two treasury yields with maturity closest to the maturity of each bond. The specific algorithm to match a treasury rate for every bond utilizes their time to maturity as follows:

$$\text{if } a < \text{time to maturity}_j \leq b \text{ then} \\ \text{TY}_j = \text{rate}_a + (\text{rate}_b - \text{rate}_a) * (\text{time to maturity}_j - a) / (b - a) \quad (1)$$

where: TY_j is the matching treasury rate for bond j , time to maturity is for bond j , a and b represent the closest time to maturity available for treasury bills with $b > a$, and rate_i is the treasury rate for time i . The particular time period breakpoints (a , b) used in our calculations are 3 months, 6 months, and 1, 3, 5, 7, 10, 20, and 30 years. For times to maturity less than 3 months and greater than 30 years we use the 3 month and 30 year rates, respectively. Since most firms have multiple bond issues, we calculate a weighted average yield spread change using the dollar amounts (i.e. price*amount outstanding) of the bonds outstanding as weights.

Treasury controlled yield spreads are defined as the difference between the raw yields of the straight bonds in our sample and the contemporaneous Treasury Bond yield.

$$\text{YS}_j = \text{BY}_j - \text{TY}_j \quad (2)$$

$$\text{YSC}_j = \text{YS}_{j,t} - \text{YS}_{j,t-1} \quad (3)$$

where YS_j is the yield spread for firm j , BY_j is the bond yield for firm j , TY_j is the matching treasury rate for bond j as defined above and YSC_j is the yield spread change for bond j between time t and $t-1$. Thus, yield spread changes are defined as the difference between yield spreads at the end of the month before the announcement and at the end of the month in which the announcement is made.

3.3. Bondholder returns

The use of yield spread changes as a measure of bondholder wealth change has definite advantages. Nevertheless, it is somewhat awkward to interpret and doesn't directly reveal the percentage change in bondholder wealth. A well known transformation approximates a more traditional measure, bondholder returns. Specifically, bond returns can be approximated by

Table 1

The distribution of share repurchases over time

Panel A: Distribution of the sample over time					
	N of obs.	Repurchase (%)		N of firms with stock options	% of firms with stock options
		Mean	Median		
1991–1993	13	4.24	3.45	10	77%
1994	76	7.27	5.10	60	79%
1995	58	7.97	5.62	43	74%
1996	58	6.90	5.43	47	81%
1997	54	8.52	5.53	33	61%
1998	38	7.42	5.40	37	97%
1999	32	8.76	6.25	29	91%
2000	13	7.67	7.70	11	85%
2001	15	7.49	6.60	15	100%
2002	9	6.77	5.10	9	100%
Total	366	7.55	5.46	294	80%

Panel B: Distribution of firms with and without options			
	Firm has executive options	Firm doesn't have executive options	Total
Firm has non-executive options	224	9	233
Firm doesn't have non-executive options	61	72	133
Total	285	81	366

Panel A provides mean (median) statistics for the sample of 366 firms that announce repurchases from 1993–2002. Repurchase % is the percentage of total shares outstanding authorized for repurchases. The number and percentage of firms that have stock options holdings in the year-end of the repurchase announcement are also shown according to the year of the announcement. Panel B shows the distribution of the firms with and without stock options.

multiplying modified duration by the yield change where modified duration is defined as Macaulay duration/(1+yield). In our analysis, both measures produce similar results.

4. Results

4.1. Descriptive characteristics

Our sample selection criteria produce 366 observations. The distribution of observations over the 12 year span of our sample is shown in Panel A of Table 1. There is only one observation in 1991 and four in 1992. To avoid descriptions of a single or a few firms, we combine the 1991–93 observations in the first row.

Consistent with Kahle (2002), and Skinner (2008) we document the increased use of repurchases in the early 1990s. The smaller number of repurchases at the end of the decade is actually an artifact of the availability of bond data. The average number of repurchases announced in SDC remains fairly constant over the latter parts of our sample. Many observations are missing from Moody's either because they have no bonds outstanding or because Moody's does not rate them. In subsequent analyses we are careful to test the sensitivity of our results to the source of bond data. In general, the summary statistics of variables look similar across each sub-period and in comparison to the literature.

The mean and median percentage repurchased is 7.6% and 5.5% respectively. This is similar to the 6.4% mean and 5% median noted in Kahle (2002) and the 7% mean and 5.2% median noted in Maxwell and Stephens (2003).

Information on executive and non-executive stock options is obtained from Execucomp database and 10-K reports. For the sample of firms that undertook open market repurchases, we collect executive option data from the Execucomp database, and the total employee (sum of executive and non-executive) option data from 10-K reports. We calculate the quantity of non-executive stock options by subtracting the number of executive options from that of total options.

To strengthen our ability to detect signaling and wealth transfer effects, we need to separate repurchases associated with option funding from those more likely to have signaling impacts. An obvious approach is the one chosen by Kahle (2002) which uses the existence of options themselves for the categorization. While firms with options may use repurchased shares for either funding options or some other reason, firms without options are certainly not repurchasing shares to use for options. Consequently, we identify subsets of firms with and without options using their annual reports and 10-Ks. Panel B of Table 1 reveals that 285 of our firms report executive options while 81 firms do not. Two hundred and thirty-three firms report non-executive options while 133 firms do not. Note that most firms with executive options also have non-executive options: of the 285 firms with executive options only 61 do not have non-executive options. Similarly, for the 233 firms with non-executive options, 224 also have executive options. About a fifth of the sample (72 firms) does not report either executive or non-executive options. To minimize space, our subsequent discussion focuses on sub-samples with and without options. However, results are similar if we base our classifications on either non-executive options or executive options.

Descriptive statistics on the sample are presented in Panel A of Table 2. In general, our firms appear similar to the repurchase characteristics noted in Kahle (2002). Our firms have a similar mean size averaging 6 billion in comparison to her 6.2 billion (all in 1996 dollars). Free cash flow as a percentage of assets averages 7.5% which is lower than her average of 10.6%. Run-up, calculated as

Table 2
Descriptive statistics

Panel A. Firm characteristics and stock option holdings of repurchasing firms				
	Total	With stock options	Without stock options	<i>p</i> -values of <i>t</i> -tests and K–W tests for differences
<i>Firm characteristics</i>				
Repurchase (%)	7.55 (5.46)	7.18 (5.40)	9.07 (6.26)	0.086 (0.369)
Long term debt to assets (LTDA)	0.23 (0.20)	0.22 (0.19)	0.27 (0.24)	0.039 (0.116)
Market value of equity (MVE) (millions)	6,008 (2697)	6,475 (3064)	4,100 (1460)	0.029 (<0.001)
Market to book (M/B) ratio	1.71 (1.49)	1.75 (1.52)	1.56 (1.37)	0.028 (0.071)
Free Cash Flow (FCF) (%)	7.49 (7.73)	7.76 (7.92)	6.31 (6.49)	0.109 (0.031)
Runup (%)	−2.49 (−0.77)	−2.22 (−0.67)	−3.59 (−0.94)	0.576 (0.987)
<i>Option holdings</i>				
Non-executive options exercisable (%)	1.46 (0.78)	1.82 (1.30)		N/A
Non-executive options exercised (%)	0.48 (0.18)	0.59 (0.33)		N/A
Non-executive options total (%)	2.96 (1.99)	2.97 (1.99)		N/A
Executive option exercisable (%)	0.90 (0.60)	0.90 (0.60)		N/A
Executive option exercised (%)	0.19 (0.05)	0.19 (0.05)		N/A
Total Executive options (%)	1.56 (1.09)	1.56 (1.09)		N/A
Panel B. Comparison of characteristics across the earlier and latter sub-periods of the sample				
	Total	1998–2002 (107)	1991–1997 (259)	<i>p</i> -values of <i>t</i> -tests and K–W tests for differences
<i>Firm characteristics</i>				
Repurchase (%)	7.55 (5.46)	7.81 (6.00)	7.45 (5.25)	0.597 (0.019)
LTDA	0.23 (0.20)	0.25 (0.23)	0.22 (0.19)	0.148 (0.059)
MVE (millions—1996 dollars)	6,008 (2697)	5,965 (2943)	6,025 (2607)	0.948 (0.215)
M/B asset ratio	1.71 (1.49)	1.74 (1.54)	1.70 (1.48)	0.617 (0.302)
FCF (%)	7.49 (7.73)	8.01 (7.90)	7.27 (7.68)	0.280 (0.601)
Runup (%)	−2.49 (−0.77)	−4.67 (−4.00)	−1.59 (−0.02)	0.117 (0.042)
<i>Option holdings</i>				
Non-executive options exercisable (%)	1.46 (0.78)	2.24 (1.61)	1.14 (0.00)	<0.001 (<0.001)
Non-executive options exercised (%)	0.48 (0.18)	0.69 (0.35)	0.39 (0.03)	0.001 (<0.001)
Non-executive options total (%)	2.96 (1.99)	4.41 (3.56)	2.36 (0.56)	<0.001 (<0.001)
Executive option exercisable (%)	0.90 (0.60)	1.28 (0.77)	0.70 (0.52)	0.002 (<0.001)
Executive option exercised (%)	0.19 (0.05)	0.26 (0.08)	0.15 (0.05)	0.205 (0.058)
Executive option total (%)	1.56 (1.09)	2.12 (1.46)	1.27 (0.99)	0.001 (<0.001)

Shown are the mean (median) statistics of the firm characteristics and stock option characteristics for the event firms that announce repurchases. Total sample is divided into two sub-samples according to whether the firm has stock options holdings in the year-end of the repurchase announcement or not. Repurchase % is the percentage of total shares outstanding authorized for repurchases. LTDA, MVE, M/B, and FCF indicate, respectively, long-term debt-to-asset ratio, the market capitalization, market-to-book ratio, and free cash flow to asset of the event firms in the year-end prior to the announcement. Free cash flow to asset is obtained using the definition of [Lehn and Poulsen \(1989\)](#). Runup indicates the abnormal stock price return from day −43 to day −4 relative to the announcement using the market model. Executive (non-executive) options indicate the number of executive (non-executive) options divided by the number of shares outstanding in the year-end of the event. The last column indicates the *p*-values of *t*-test (Kruskal–Wallis test) for difference.

Table 3
Industry distribution of repurchases

Industry name	2-digit SIC	Total		With options	W/out options	Compustat
		N	%	N	N	N
Advertising and business services	73, 87, 89	5	0.4	3	2	1249
Agriculture, forestry and fishing	01–09	2	NA	2	0	0
Chemicals, drugs, personal care products	28	25	4.1	23	2	612
Electronics and communications	36	5	0.8	5	0	607
Finance and insurance	60–67	95	4.3	70	25	2216
Foods and kindred products	20	18	8.5	16	2	211
Leather, stone, clay, glass, concrete	31, 32	4	4.7	4	0	85
Machinery, computer equipment	35	22	4.1	17	5	537
Medical and photo equipment	38	6	1.2	6	0	515
Mental products	33, 34	12	4.7	10	2	253
Mining/construction	10–17	29	5.1	22	7	564
Miscellaneous	99	0	0.0	0	0	56
Miscellaneous manufacturing	39	0	0.0	0	0	105
Motion picture/entertainment services	78, 79	5	2.7	4	1	185
Oil/gas	29	4	7.8	1	3	51
Personal services	70–72, 80–86,88	13	4.4	10	3	296
Printing, publishing, and allied service	27	9	7.8	9	0	115
Repair services	75, 76	2	9.1	1	1	22
Retail trade	52–59	18	3.1	15	3	585
Rubber/plastic products	30	4	4.1	3	1	97
Telecommunication, radio, and TV	48	11	3.2	7	4	341
Textiles and apparel products	22, 23	6	4.3	6	0	139
Tobacco products	21	1	7.7	0	1	13
Transportation and shipping	40–47	11	4.9	10	1	223
Transportation equipment, aerospace	37	14	8.0	13	1	175
Utilities	49	16	5.7	10	6	281
Wholesale trade	50, 51	8	2.1	7	1	386
Wood and paper products	24–26	21	10.9	20	1	192
Total		366	3.6	294	72	10,111

Industries are classified by two-digit SIC codes. *N* is the number of sample firms in a given industry. % is the number of sample firms in the industry, divided by the total number of 'active' firms available on Compustat in that industry. The last column shows the number of firms in each industry that exist on Compustat using 1998 as the base year.

the percentage abnormal return from day -43 to day -4 averages -2.5% in comparison to Kahle's -3.6% . Executive options exercisable and total executive options outstanding are slightly greater than in Kahle. In our sample, total executive options average 1.6% which is slightly greater than her 1.3% . Our executive options exercisable average 0.9% in comparison to her 0.7% . Overall, the samples are quite similar, particularly given the different time periods involved.

Since we focus on classifications based on the existence of options, we also attempt to understand how characteristics differ across appropriate sub-samples. *T*-tests for differences between sub-samples of firms with and without options are shown in the last column. Firms with options are larger, have more free cash flow, and less debt than the sample without options. They also repurchase significantly smaller percentages of their stock (7.2% as compared to 9.1%). The median percentage of shares repurchased is similar across the two categories.

Our bond sample is derived from two different sources. Consequently, we check whether our descriptive statistics differ across the 1991–1997 and 1998–2002 sub-period. Panel B of Table 2 presents our results. None of the mean values of firm characteristics are significantly different from each other across the two time periods. The median levels of shares repurchased and long term debt are a bit higher in the latter time period, as well as the mean and median levels of run-up. In addition, the sample from the latter period has significantly more stock options outstanding. We also calculate the percentage of non-executive options exercisable, exercised, and total. The percentage of executive and non-executive options exercisable is statistically higher in the latter part of the sample.

Table 3 reveals the industry distribution of our sample classified by 2-digit Compustat SIC codes. The industry with the largest number of firms represented in our sample is the finance and insurance industry. This result is misleading, however, since the number of Compustat firms in this industry is almost twice the number in any other industry. Expressed as a percentage of firms in their 1998 Compustat industry, we find repurchases common in a variety of industries and being most concentrated in the wood and paper products, repair services, and food industries.

4.2. Wealth changes to equity holders

Fig. 1 and Table 4 shows the stock market reaction around the announcement of share repurchases. We calculate abnormal returns using the standard market model technology. Specifically, we calculate market model parameters using the 95 days from $t-100$ through $t-6$ where t is the date of the repurchase announcement. Consistent with positive signaling, the entire sample of 366 repurchases earns significantly positive abnormal returns averaging 1.6% for the three day announcement window. While both sub-samples earn significantly positive abnormal returns, cumulative abnormal returns are significantly larger to equity holders in the sample without

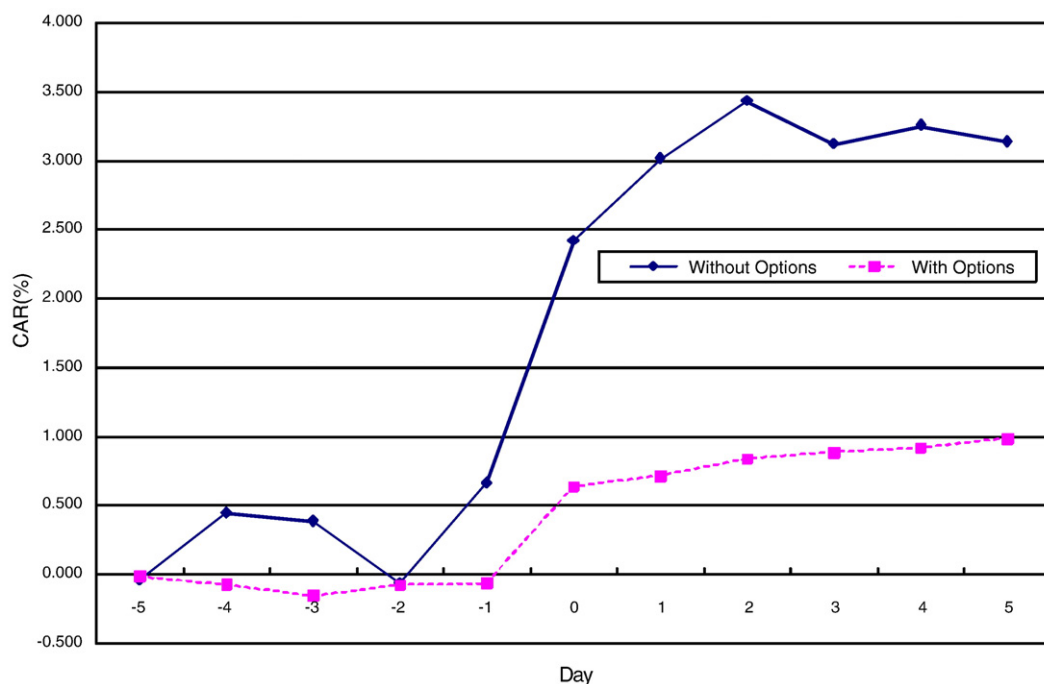


Fig. 1. Cumulative abnormal return to equity for cases with and without options. This figure shows the stock market reaction around the announcement of share repurchases. We calculate abnormal returns using the standard market model technology. The market model parameters are estimated by using the 95 days from $t-100$ through $t-6$ where t is the date of the repurchase announcement.

options. Analysis of Fig. 1 reveals that this effect begins at day $t-1$ and continues through day $t+2$. This result is consistent with Hypothesis 1: stronger signaling effects are found for cases to be unassociated with option funding, those without options.

In panel B we examine abnormal returns to samples classified according to each firm's debt rating. Arguably, positive signals contained in repurchases have greater impact in firms facing financial difficulty. This follows from the fact that the upside potential for these firms is much greater than for firms with financial stability. A small reduction in the probability of financial distress is likely to have a more dramatic impact. The results are consistent with this conjecture: abnormal returns are significantly larger for firms with non-investment grade debt averaging 3.7% for the three day announcement period. Abnormal returns for firms with investment grade debt are significantly positive, but average only 0.9%. Nevertheless, we can envision scenarios where repurchases by firms in financial distress do signal negative information. Specifically, firms with low stock prices may repurchase to move their stocks back into a higher trading range. This does not appear to be an issue with our sample.

Panel C uses a 2 way classification combining bond ratings with the existence of executive options. Several interesting findings emerge. First, for firms with investment grade debt, abnormal returns for firms with options are significantly positive but insignificantly different from the group without options. Analysis of the firms with non-investment grade debt reveals that abnormal returns to equity holders are significantly and dramatically higher in the sub-sample of firms who do not have options. In this sub-sample, abnormal returns for the three day announcement period average 7.7%, the highest of any group; the comparable average for firms with non-investment grade debt and executive options is only 2.0%. This result is consistent with Hypothesis 1: signaling effects are most dramatic for firms without options and with non-investment grade debt.

4.3. Wealth changes to bondholders

The significant relation between wealth changes to equity and option related repurchases leads one to wonder if similar effects are noted for bondholders. Table 5 shows the bondholder reaction to the announcement of share repurchases. In this univariate analysis, we use two measures of wealth change to bondholders: the yield spread change and bondholder returns. For ease of exposition, we do not show the detailed calculations related to yield spread change. To illustrate, however, the average bond in our sample has a raw yield of 8.04% at month end -1 and a slightly greater raw yield of 8.05% at the month end following repurchase (month 0). Over the same period the average treasury yield drops from 6.28% to 6.26%. As a result, the average Treasury-controlled yield spread averages 1.68% at the month end prior to the repurchase announcement and 1.71% in the month end following the announcement. Panel A of Table 5 reveals that the difference of these two numbers is a significantly positive yield spread change of 0.03% indicating abnormal wealth losses to bondholders surrounding the repurchase announcement. The median yield spread change is also significant.

Note, however, that the significance of the means and medians is driven by the sub-sample with options. Results are insignificant in the sample without options. Similarly, mean and median bond returns are significantly negative for entire sample and in the set with options but insignificantly different across categories. These results are consistent with Hypothesis 2: firms with

Table 4

Stock market reactions to the announcement of share repurchases

Panel A: Stock options								
Day	Total		With stock options		Without stock options		p-values of t-tests and K-W tests for differences	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AR (%)								
−5	−0.02	0.00	0.00	0.00	−0.09	0.00	0.762	0.846
−4	0.06	0.00	−0.05	0.00*	0.50*	0.05*	0.079	0.058
−3	−0.07	−0.01	−0.08	−0.01	−0.07	−0.12	0.970	0.511
−2	−0.04	−0.01	0.08	0.00	−0.55**	−0.20**	0.005	0.005
−1	0.17*	0.01**	0.02	0.01	0.80**	0.25*	0.046	0.077
0	0.93***	0.03***	0.68***	0.02***	1.95***	0.62***	0.057	0.265
+1	0.19*	0.01*	0.08	0.00	0.66	0.42*	0.185	0.112
+2	0.19**	0.00	0.14*	0.00	0.41*	0.01	0.244	0.562
+3	−0.04	0.00	0.04	0.00	−0.33*	−0.02	0.082	0.167
+4	0.06	0.00	0.04	0.00	0.15	−0.03	0.726	0.492
+5	0.02	0.00	0.07	0.00	−0.14	0.00	0.418	0.454
CAR (%)								
−1, +1	1.57***	1.18***	1.11***	1.15***	3.42***	1.63***	0.024	0.095
−2, +2	1.45***	0.06***	1.00***	0.04***	3.27***	1.41***	0.029	0.083
−3, +3	1.34***	0.06***	0.96***	0.04***	2.87***	1.25***	0.067	0.165
N of Obs.	366	294	72					
Panel B: Bond ratings								
	Investment grade		Non-investment grade		p-values of t-tests and K-W tests for differences			
−1, +1	0.90***		3.73***		0.005			
	(0.97***)		(2.62***)		(0.003)			
N of obs.	280		86					
Panel C: Stock options and bond ratings (two-way analysis)								
	With stock options		Without stock options		t-test and K-W test for difference			
Investment grade								
−1, +1	0.89***		0.97		0.893			
	(1.07***)		(0.50)		(0.857)			
N of obs.	236		44					
Non-investment grade								
−1, +1	2.03**		7.27***		0.027			
	(1.41**)		(3.61***)		(0.035)			
N of obs.	58		28					

The abnormal return (AR) and cumulative abnormal returns (CAR) surrounding the announcement of stock repurchases are computed using the market model of Brown and Warner (1985). Total sample is divided into sub-samples according to whether the firm has stock options holdings in the year-end of the repurchase announcement or not (Panel A), whether the bonds are rated investment grade or non-investment grade (Panel B) and considering both ratings and stock options (Panel C). The last column indicates the p-values of t-test (Kruskal–Wallis test) for difference. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

stock options provide stronger evidence of wealth transfers at the announcement of stock repurchases. Cases with options are those less likely to have positive signaling effects that could offset wealth transfers. This is precisely where we detect significant wealth losses. Mean and median yield spread change is insignificant and substantially smaller for cases without options. Differences in yield spread changes and bond returns are insignificantly different across the categories.

Panel B shows yield spread changes and bond returns across categorizations by investment grade. Firms with investment grade bonds are those less likely to have positive signaling effects that could offset wealth transfers. Thus, if the wealth transfer effect is strong in these firms, bondholders would have significant wealth losses. The median yield spread is significantly different from zero for cases with investment grade debt; mean and median differences across the two categories however, are not significantly different. The mean value of bond returns is significantly negative across both investment and non-investment grade debt but insignificantly different from each other. As before, the negative bond returns and positive yield spread changes are consistent with wealth losses to bondholders which could be transferred to equity. However, panel B shows that bondholder losses seem more substantial in firms with investment grade bonds, though the difference is not statistically significant. Panel C reveals the results of two way categorizations by investment grade and the existence of options. Within each investment grade we do not find a significant difference between yield spread changes of cases with and without options. Thus, the univariate analysis in Table 5 does not allow for a clear interpretation on signaling and wealth transfer effect of share repurchases.

Table 5

Bondholder reaction to the announcement of repurchases

Panel A: Stock options				
	Total	With stock options	Without stock options	<i>p</i> -values of <i>t</i> -tests and K–W tests for differences
Over the period Month 0 minus Month –1	Mean Median	Mean Median	Mean Median	Mean Median
Yield Spread Change (YSC)	0.032* (0.014**)	0.037* (0.015**)	0.010 (0.003)	0.617 (0.441)
Bond returns (Month 0 minus Month –1)	–0.228** (–0.067**)	–0.258** (–0.085***)	–0.107 (–0.017)	0.521 (0.387)
N of obs.	366	294	72	
Panel B: Bond ratings				
	Investment grade	Non-investment grade		<i>p</i> -values of <i>t</i> -tests and K–W tests for differences
YSC	0.01 (0.01**)	0.09 (0.02)		0.258 (0.437)
Bond returns	–0.15* (–0.06**)	–0.49* (–0.13)		0.241 (0.464)
N of obs.	280	86		
Panel C: Stock options and bond ratings (Two-way analysis)				
	With stock options	Without stock options		<i>p</i> -values of <i>t</i> -tests and K–W tests for differences
<i>Investment grade</i>				
YSC	0.02 (0.01**)	0.01 (0.01)		0.651 (0.511)
Bond returns	–0.17* (–0.07**)	–0.01 (–0.04)		0.539 (0.424)
N of obs.	236	44		
<i>Non-investment grade</i>				
YSC	0.11 (0.03*)	0.04 (–0.05)		0.556 (0.397)
Bond returns	–0.60* (–0.14*)	–0.26 (0.26)		0.568 (0.525)
N of obs.	58	28		

This table reveals two measures of the change in bondholder wealth: yield spread changes and bondholder returns. Treasury-controlled yield spreads are the difference between the raw yields of straight bonds and the Treasury yields. The raw yields are the market-value weighted-average of the straight bonds (quoted in LBDD) of the event firm at the repurchase announcement. Yield spread changes (YSC) are defined as the difference between yield spreads one month before and in the month of the announcement (Month + 1 minus Month 0). Bond returns are approximated by multiplying modified duration by the yield change where modified duration is defined as Macaulay duration/(1 + yield). The total sample is divided into sub-samples according to whether the firm has stock options holdings in the year-end of the repurchase announcement or not (Panel A), whether the bonds are rated investment grade or non-investment grade (Panel B) and considering both ratings and stock options (Panel C). The last column indicates the *p*-values of *t*-test (Kruskal–Wallis test) for difference. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

4.4. Corporate governance

Several recent papers mentioned in Section 2 find a link between governance, equity returns and bondholder returns. Consequently, results are analyzed across four governance related measures, the [GIM measure \(2003\)](#), the [Bebchuk, BCF measure \(2005\)](#), the existence or absence of staggered boards and an entrenchment variable. The entrenchment variable takes the value of one if a firm has both staggered boards and poison pills. Bebchuk and others have noted that poison pills can be removed by the board. When it takes three years to remove the board (as in the case of staggered boards) the management is more effectively insulated from corporate control. Panel A of [Table 6](#) reveals the distribution of governance measures for our sample of repurchase offers. The mean and median levels of the GIM measure are 10.9 and 10.0, respectively. The mean and median levels of the BCF index are 2.3 and 2.0, respectively. Approximately two-thirds of our sample has staggered boards. Forty-five percent of our firms have both staggered boards and a poison pill.

Panels B presents the returns to equity holders surrounding repurchase announcements. Results are contrasted between the lowest and highest quartiles of the GIM and BCF measures and for the existence or absence of staggered boards. These univariate results are not strongly supportive of Hypothesis 3a: although mean and median returns to equityholders seem quite a bit higher in the sample with less shareholder rights, differences across the sub sample are insignificant.

However, Panel C reveals significant differences across the categories for the yield spread changes and returns to bondholders. Mean and median wealth losses to bondholders are significantly greater in cases with higher GIM scores and in cases with staggered boards. Median differences in yield spread changes are also significantly different in cases with staggered

Table 6

Governance, equity returns and yield spread changes around repurchase announcements

Panel A: Descriptive statistics for governance measures					
Governance measure	Mean	Median	Q1	Q3	N
GIM	10.9	10.0	8	12	296
BCF	2.3	2.0	1	3	296
Staggered boards	0.665	1.0	0	1	296
Entrenched	0.453	0	0	1	296
Panel B: Equity wealth changes for firms with various governance classifications					
Measure		Lowest quartile of GIM or BCF or does not have staggered boards	Highest quartile of GIM or BCF or does have staggered boards	p-values of <i>t</i> -tests and K–W tests for differences	
GIM		0.730 (0.576) 52	1.438*** (1.192***) 59	0.401 (0.383)	
BCF		0.807* (0.650*) 84	0.704 (1.192*) 57	0.888 (0.938)	
Staggered boards		1.062** (0.956**) 99	1.152*** (1.147***) 197	0.871 (0.897)	
Entrenched		0.947** (1.061**) 162	1.335*** (1.145***) 134	0.450 (0.959)	
Panel C: Returns to debt holders for firms in various governance classifications					
GIM	YSC	−0.002 (0.008)	0.046** (0.023**)	0.103 (0.143)	
	Bond returns	0.103 (−0.043) 52	−0.344*** (−0.097**) 59	0.016 (0.075)	
BCF	YSC	0.007 (0.021)	0.040 (0.027***)	0.476 (0.233)	
	Bond returns	−0.078 (−0.123) 84	−0.347* (−0.193***) 57	0.277 (0.123)	
Staggered boards	YSC	−0.031 (0.005)	0.042* (0.017**)	0.032 (0.073)	
	Bond returns	0.090 (−0.027) 99	−0.288** (−0.095***) 197	0.031 (0.107)	
Entrenched	YSC	0.005 (0.017)	0.033 (0.012*)	0.409 (0.592)	
	Bond returns	−0.087 (−0.089) 162	−0.251* (−0.062*) 134	0.368 (0.577)	

Panel A reveals the distribution of governance measures for our sample of repurchase offers. Results are analyzed across three governance related measures, the Compers Ishii and Metrick (GIM) measure, the Bebchuk, Cohen and Farrell (BCF) measure and the existence or absence of staggered boards. Panel B reveals the mean and median (in italics) three-day cumulative abnormal return (CAR) to equityholders surrounding the repurchase announcement. Panels C reveals the mean and median (in italics) yield spread change (YSC) to debtholders for the period beginning at the month end before the repurchase announcement to the month end after the announcement. Results are contrasted between the lowest and highest quartiles of the GIM and BCF measures and for the existence or absence of staggered boards. Entrenched is defined as having both poison pills and a staggered board. The last column indicates the *p*-values of *t*-test (Kruskal–Wallis test) for difference. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

boards. This is consistent with Hypothesis 3b: in firms with fewer shareholder rights, bondholders lose more around repurchases. Klock et al. (2005) find that the bond market views anti-takeover provisions positively. To the extent these firms were protected from takeover, the decision to repurchase may be more of a negative surprise to bondholders. Our results are consistent with the notion that the reduction in collateral, for firms whose assets were more protected, is more detrimental to bondholders.

4.5. Multivariate analysis

Table 7 presents multivariate evidence relating to our hypotheses. The variables are grouped into three sections: the top rows contain the basic model while the intermediate section specifies interaction terms to identify differential effects in the set of firms with options. Alternate specifications are in the bottom rows. Results in column 1 are obtained by regressing the three day abnormal announcement return to shareholders on a dummy variable for the existence of options, the control

Table 7

Cross-sectional relationship between stock market reactions and bond returns

	1	2	3	4	5	6
<i>Basic model</i>						
Intercept	-0.09 (-0.04)	0.41 (0.17)	-0.11 (-0.04)	0.14 (0.06)	-0.11 (-0.05)	-1.07 (-0.45)
Bond returns		0.79 (2.61)***	0.73 (2.43)**	0.78 (2.57)***	0.74 (2.46)**	1.19 (2.94)***
Non-Investment grade debt? (1 = yes)	4.29 (3.06)***	4.49 (2.99)***	4.55 (3.04)***	4.60 (3.07)***	4.54 (3.05)***	1.25 (0.60)
% Shares	0.26 (4.25)***	0.26 (4.14)***	0.26 (4.24)***	0.26 (4.08)***	0.26 (4.24)***	0.28 (4.05)***
L.T. debt-to-asset ratio	-0.05 (-0.02)	0.45 (0.19)	0.56 (0.23)	0.15 (0.06)	0.29 (0.12)	-1.84 (-0.80)
Size (log mkt. capitalization)	0.04 (0.15)	-0.02 (-0.08)	0.05 (0.18)	0.02 (0.09)	0.07 (0.27)	-0.07 (-0.31)
Stock options? (1 = yes)	1.10 (1.12)	0.81 (0.80)	1.37 (1.31)	1.07 (1.06)	1.51 (1.46)	1.45 (1.40)
Dividend paying? (1 = yes)	-1.78 (-2.00)**	-1.45 (-1.63)	-1.53 (-1.72)*	-1.53 (-1.71)*	-1.71 (-1.92)*	-0.21 (-0.23)
Runup (-43 to -4)	-2.11 (-1.10)	-1.78 (-0.94)	-1.57 (-0.83)	-2.16 (-1.13)	-1.70 (-0.89)	-2.23 (-1.14)
Market to book	0.19 (0.60)	0.21 (0.70)	0.22 (0.71)	0.18 (0.59)	0.17 (0.56)	0.19 (0.71)
<i>Interaction terms to specify differential effects in the set of firms with managerial options</i>						
Stock options?* Bond returns		-0.76 (-2.16)**	-0.69 (-1.96)**	-0.74 (-2.12)**	-0.70 (-2.00)**	-1.28 (-2.90)***
Stock options?*Non-inv. Grade debt	-4.53 (-3.09)***	-4.30 (-2.85)***	-4.23 (-2.81)***	-4.30 (-2.85)***	-4.16 (-2.77)***	-0.13 (-0.06)
Stock options?* %Shares	-0.08 (-1.03)	0.08 (-1.12)	-0.09 (-1.20)	-0.08 (-1.04)	-0.09 (-1.18)	-0.12 (-1.61)
<i>Alternate specifications</i>						
% Options exercisable			-0.30 (-1.99)**			
% Options exercised				-0.57 (-1.58)		
% Total options					-0.19 (-2.63)***	
Entrenched						0.38 (0.74)
N	366	366	366	366	366	296
Adj R2	0.15	0.16	0.20	0.16	0.17	0.14
F-test	6.4	6.7	6.5	6.4	6.4	4.2

The dependent variable is the cumulative abnormal return (CAR) for equity around the announcement of stock repurchases. Independent variables are: bond returns over the month surrounding the repurchase announcement, a dummy variable representing 1 if the bonds are rated non-investment grade, the percentage of shares authorized for repurchases, the long-term debt-to-asset ratio, the log of market capitalization, the market to book ratio, the abnormal stock price return from day -43 to day -4 relative to the announcement, a dummy variable representing 1 if the firm pays a dividend prior to the repurchase announcement, a dummy variable representing 1 if the firm has executive stock options holdings in the year-end of the repurchase announcement. Also used as independent variables are: an interaction variable between executive option holdings and YSC, an interaction variable between executive option holdings and non-investment grade debt, an interaction variable between executive option holdings and the percentage of shares authorized for repurchases, and the ratio of non-executive stock options to total shares outstanding (exercisable, exercised and total). The entrenched dummy that is defined as having both poison pills and a staggered board. *t*-statistics of the coefficients are shown in parentheses. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

variables previously mentioned and appropriate interaction terms to separately examine samples with and without options. The signaling hypothesis predicts significant positive coefficients for the existence of non-investment grade debt and for the percentage of shares repurchased. The coefficient on the option dummy and the interaction of this dummy with the investment grade debt and percentage repurchased variables indicate any differential effect on cases more likely to be associated with option funding.

Results on this initial specification are consistent with the signaling hypothesis and with Hypothesis 1. Abnormal returns are significantly higher for non-investment grade debt and increase significantly with the percentage of shares repurchased. However, these results are reversed in cases less likely to have signaling impact (i.e., cases associated with options). In particular, the coefficient on the investment grade debt (4.29) is nearly eliminated in the cases with options. The combined coefficient (4.29–4.53) indicates an insignificant -0.24 slope coefficient in cases associated with options. Similarly, the significant slope coefficient of 0.26 for the percentage repurchased drops to 0.18 (=0.26–0.08) in the cases with options which is insignificant at 10% level. All results

are robust to inclusion of controls for firm size, long term debt, the existence of dividends and run-up. We also include the firm's adjusted market to book ratio defined as the firm's level minus the industry average.⁹

Regression 2 adds bondholder returns to test whether bondholder and shareholder wealth changes are correlated. In results not shown, identical conclusions are obtained using yield spread changes. A positive coefficient on bondholder returns is consistent with positive signaling to both bondholders and equity holders. A negative coefficient on bondholder returns is consistent with wealth transfers indicating wealth changes moving in the opposite direction. Note that bondholder returns are measured over the month surrounding the repurchase announcement. Even with extensive hand collection of data, this is the only relevant measure available of bondholder wealth changes. The coarseness of this one month time period will bias against finding a significant correlation with the three day abnormal return to equity holders.

In spite of this, the evidence presented in regression two is striking. Abnormal returns to equity are significantly related to bondholder returns but the effect is completely reversed in cases associated with stock options. The results are consistent with signaling in cases not associated with options. The results are consistent with Hypothesis 1: firms without options provide stronger evidence of signaling. There is no evidence of wealth transfers. As before, results hold for the inclusion of controls for size, debt, market to book, a dummy for the existence of dividends, and run-up.

In regressions 3 through 5 we add the number of options as a variable. Regression 3 uses exercisable options, regression 4 uses options actually exercised in previous year and regression 5 uses total options. Related to the work of Kahle (2002), an increase in options increases the likelihood that the repurchase is option related and decreases the probability of the announcement signaling other information. Consistent with the signaling argument, shareholder returns decline significantly with the magnitude of options exercisable and exercised as well as with the percentage of total options. In unreported tests, similar results are obtained using either the number of non-executive or executive options.

Regression 6 adds our measure of entrenchment, a dummy variable equal to one for firms with both staggered boards and poison pills. This reduces our sample size to 296 repurchases. Our univariate tests indicated slightly higher but insignificantly different wealth gains to shareholders of firms with entrenched management but significantly greater wealth losses for the bondholders of these firms. Our multivariate tests reveal that the level of equity returns is not significantly greater for repurchases by entrenched firms. In this specification, with the reduced sample size, the dummy variables for non-investment grade debt and dividend paying stocks are insignificant. In sensitivity tests not shown, we note similar results for alternate measures of entrenchment: firms in the highest quartile of either the GIM index or the BCF index.

The magnitude of any wealth transfers between debt and equity would be related to the relative amounts of each used in the capital structure. Hence, we control for the level of debt in our regressions. In sensitivity tests not shown, we repeat the regressions of Table 7 regressing the dollar wealth change to equity on the same independent variables but also calculating the wealth change to debt in dollars. Our results are very similar. The economic interpretation of our 'dollar-specified' regressions suggests that shareholders of a firm without options gain roughly seventy cents for every one dollar change in bondholder wealth. Frankly, we would have expected a stronger impact to signaling for more junior securities. In this case, that means we would have expected the associated wealth change to equity (for a \$1 change in debt value) to be greater than \$1. The level of the coefficient is sensitive to the sample size, however. In the last specification (model six) the sample size drops from 359 to 291 due to the addition of a governance variable. Here the coefficient indicates a wealth change to equity of \$1.74 for every \$1.00 change in debtholder value. Our main conclusion is unaltered, however. In all cases, the evidence of signaling is completely reversed in the firms with options.

In additional sensitivity tests not shown we further analyze the impact of the percentage of shares repurchased. Consistent with the multivariate analysis, the abnormal returns to equity increase with the percentage of shares repurchased. This is also consistent with the expectation that greater repurchases send a stronger positive signal. This positive signal should also benefit bondholders. However, increased repurchases also reduce the collateral securing bondholder positions and should reduce bondholder wealth. The net effect is an empirical issue. Once again, we disentangle the two effects by noting that signaling effects are less likely for repurchases with options. Consequently, we create a two by two table examining the wealth changes to equity and debt across two categories: the existence of options (yes or no) and the level of repurchases (above and below the sample median). In results not shown we find that equity returns are significantly positive in all but one of the four categories. They are insignificantly positive for the set of firms with options and low levels of repurchases. This is precisely where signaling effects should be the lowest. Conversely, wealth changes to bondholders are significantly negative in only one category, the case where options exist and the level of repurchases is above the median. This is precisely the category where wealth transfers are more likely and where the offsetting effects of positive signaling should be absent.

The free cash flow hypothesis is well established in the literature and is not formally tested here. Also, data on free cash flow is only available for a sub-sample of firms which reduces the sample size dramatically. In unreported tests we add a measure of free cash flow to our regressions. Although the sample size is reduced by over a third, all conclusions remain unaltered.

⁹ This variable could be a crude measure of undervaluation. We would expect more undervalued firms to earn higher announcement returns since they would receive a greater benefit from signaling. In our tests, the variable is insignificant. However, the measure is crude because while undervalued firms are likely to have adjusted market to book values below that of their industry, not all firms with low levels are undervalued. Indeed, there are also many valid reasons why this variable would be low. The literature has used the market to book ratio as a proxy for many things including growth options and managerial talent.

Table 8

Rating changes after the announcement of share repurchases

Panel A: Stock options				
Rating change	Total	With stock options	Without stock options	Estimates of logistic regression
Upgraded	30 (8.2%)	19 (6.5%)	11 (15.3%)	–1.003 0.014
No change	314 (85.8%)	259 (88.1%)	55 (76.4%)	
Downgraded	22 (6.0%)	16 (5.4%)	6 (8.3%)	–0.569 0.257
N of obs.	366	294	72	
Panel B: Bond ratings				
Rating change	Total	Investment grade	Non-investment grade	Estimates of logistic regression
Upgraded	30 (8.2%)	21 (7.5%)	9 (10.5%)	0.329 0.433
No change	314 (85.8%)	240 (85.7%)	74 (86.0%)	
Downgraded	22 (6.0%)	19 (6.8%)	3 (3.5%)	0.999 0.176
N of obs.	366	280	86	

Shown are bond rating changes of the firms after the announcement of share repurchases. We use the average bond ratings of Standard and Poor, and Moody's. A rating change is defined as a change in the rating of the straight bond from the month of the announcement to three months after the announcement. Total sample is divided into sub-samples according to whether the firm has stock options holdings in the year-end of the repurchase announcement or not (Panel A) and whether the bonds are rated investment grade or non-investment grade (Panel B). The last column indicates the estimates and their *p*-values of multinomial logistic regression for difference where the highest numbered category (No change) as the comparison group.

4.6. Repurchases and ratings changes

As an additional test of the signaling and wealth transfer hypotheses, we examine changes in bond ratings. If repurchases affect bondholder wealth sufficiently, they could impact bond ratings; if wealth transfers are more observable in samples less affected by signaling (i.e. associated with option funding), the effect should be more pronounced in that sample.

Panel A of Table 8 reveals the number of ratings changes in the sample as well as in sub-samples classified by the existence of options. For the entire sample, we find that 30 firms (8.2% of the sample) experience ratings increases following repurchases; slightly less (22 firms or 6.0%) experience downgrades. Compared to Maxwell and Stephens (2003), our dataset show a much more symmetrical distribution of bond upgrades and downgrades after repurchases. Maxwell and Stephens find that more than twice as many firms (6.8%) experience bond rating downgrades as upgrades (3.0%) in the three months after repurchases. This could be a function of the different time periods examined.

However, we do find dramatic differences across sub-samples classified by the existence of options. First, cases associated with options are much less likely to experience upgrades than cases without options. Firms with options are upgraded 6.5% of the time while those without options are upgraded 15.3%. A simple logistic regression with a dependent variable set equal to one for upgrades and using a dummy variable equal to one for the existence of options indicates that the dummy is significant at close to the 1% level. These results are consistent with the first hypothesis: stronger evidence of signaling in firms without options. Nevertheless, the percentage difference in downgrades is insignificantly different across the sub-samples. If wealth transfers were dominant in the executive option cases, we would have expected a larger percentage of downgrades.

Panel B reveals results classified according to the initial bond rating for the firm. When initial bond ratings are considered, the distribution in ratings changes for non-investment grade debt is comparable to that of Maxwell and Stephens (2003). Substantially more firms experience upgrades (10.5%) in comparison to downgrades (3.5%). Differences across the investment grade categories, however, are insignificant.

5. Conclusions

The signaling and wealth transfer hypotheses are commonly cited to explain the positive abnormal returns to equity holders surrounding stock repurchases. Previous empirical evidence is generally consistent with the signaling hypothesis, but is mixed for wealth transfer. Limited evidence exists on bondholder wealth changes in the post 1997 period. However, the signaling and wealth transfer hypotheses are not mutually exclusive; positive signaling will increase bondholder wealth, whereas wealth transfers would reduce it. Combinations of these two hypotheses in one sample reduce the power to detect either. Recently, the literature has examined the information inherent in the co-movement of bondholder and equity wealth changes (Maxwell and Stephens (2003)) and also recognized that repurchases associated with options have less of a signaling impact (Kahle (2002)). Our work combines these innovations in an attempt to produce more powerful tests of the signaling and wealth transfer hypotheses.

By explicitly controlling for the existence (absence) of options, we isolate samples where signaling is less (more) likely to occur and increase our ability to detect signaling and wealth transfer. We also feature a more recent and larger sample of data, extending the analyses of wealth transfer beyond the 1997 period. Our results are generally consistent with the positive signaling effect of

stock repurchases, but also provide some support for the wealth transfer effect. Specifically, there is evidence that bondholders have significant losses around repurchases but their losses are mitigated by positive signaling effects.

Stockholders of firms with non-investment grade debt and without options earn significantly larger abnormal returns at the announcement of repurchases, consistent with signaling hypothesis. Furthermore, the wealth losses of bondholders are only significant in the subset of firms associated with stock options, where the positive signaling effect of stock repurchase is less likely to obscure these results. Our multivariate analysis shows that wealth changes to stockholders are significantly positively related to bondholder wealth changes. However, in the subset of option funding repurchases, where signaling effects are less likely, the positive correlation of wealth changes between stockholders and bondholders is completely eliminated. Returns to equity are insignificantly higher for repurchases by firms with poor shareholder rights, but bondholder returns are significantly lower in these firms. To the extent these firms were protected from takeover, the decision to repurchase may be more of a surprise. The reduction in assets through repurchase is consistent with an unexpected increase in risk to bondholders. Finally, bond ratings are much more likely to be upgraded in samples without options which is precisely where the signaling effects are expected to be concentrated. Overall, our results provide more focused tests of the signaling and wealth transfer hypotheses and yield additional evidence of the wealth transfer and signaling hypotheses and the need to control for options in tests of repurchases.

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