Bond Market Reaction Surrounding Share Repurchase Announcement

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for the Degree of Master of Science in Finance
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I reexamine the bond market reaction to share repurchase announcement. The wealth transfer hypothesis suggests that shareholders expropriate wealth from debtholders hence the debtholders should react negative to this news. I collect daily yield-to-maturity of corporate bond during 2005-2019 to calculate excess change in bond yield spread and classify bond characteristics into five subsamples which are sensitive to the wealth redistribution effect: payment rank, issuer rating, bond rating, bond maturity, and size of repurchase. However, I do not find evidence supporting wealth redistribution effect in all bond attributes. Moreover, firm ratings of repurchasing firms are less likely to be downgraded no matter three months, six months, nine months, or twelve months after repurchase announcements compared to non-repurchasing firms.

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Phasaporn Kitjakarnkoson : Bond Market Reaction Surrounding Share Repurchase Announcement. Advisor: Assoc. Prof. KANIS SAENGCHOTE, Ph.D.

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Field of Study:	Finance	Student's Signature .....
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Phasaporn Kitjakarnkoson

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INTRODUCTION

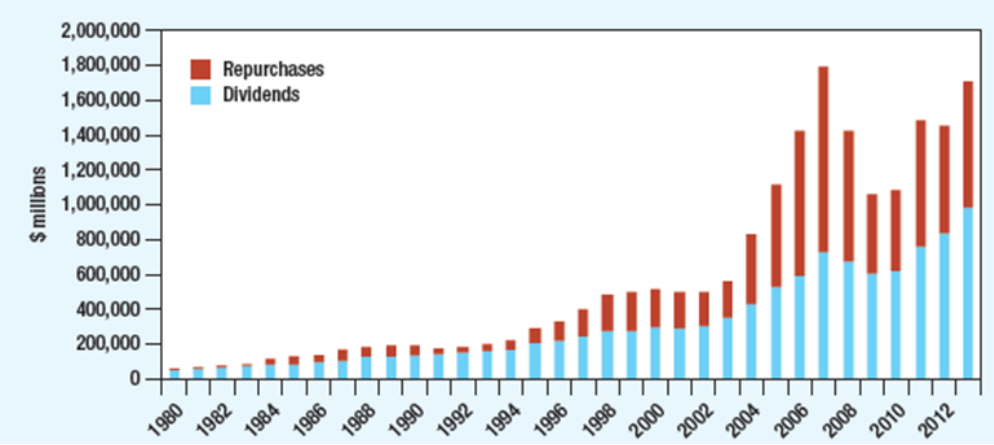
Share repurchase is one of the corporate actions that distribute firm's excess cash to compensate shareholders. It occurs when company buys its own outstanding shares hence the outstanding shares are reduced. The larger size of share repurchases, the more likely that the share price increase. Moreover, firm's earnings per share (EPS) increases as well. However, it is not a legal obligation for firm to distribute excess cash by share buyback method.

There are several similar motivations for share repurchase and dividend payment. First, firms may declare share repurchase when lack of profitable investment opportunities. Second, firms may convey superior inside information by the management that their firm's stock is undervalued thus reflect their expectation about firm's future prospect. (Bhattacharya: 1979, Vermaelen: 1984, Miller and Rock: 1985, Constantinides and Grundy: 1989). Third, share repurchase eventually change in capital structure especially if the repurchase is debt financed which is similar to debt-finance dividend payment. Finally, both share repurchase and dividend might create conflict of interest between shareholders and other claimants (Handjinicolaou and Kalay :1984, Maxwell and Stephens: 2003, Jun, Jung, and Walkling :2009)

However, there are some differences between share buyback and dividend payment. First, cash dividend is taxed as ordinary income while repurchase is treated as capital gain. Second, cash distribution from repurchase is disproportionate. Only shareholders who sell back all shares to firm are involved in cash distribution. Consequently, repurchase may revise the proportions of shareholders' holding and thereby affect the ownership structure of the firm.

Share repurchase transactions have experienced dramatically growth for decades. (Grullon and Michaely: 2002, Chan et al.:2007). There are four main methods of share repurchase; open market repurchases (OMR), fixed price tender offer, Dutch auction, and direct negotiation. Open market repurchase is the most popular method since the firm could have more flexibility in choosing convenient time and price to buy back its own shares. OMRs play more role in corporate distribution to shareholders than dividends (Grullon and Ikenberry 2000; Jagannathan, Stephens, and Weisbach 2000). The historical data of dividend and share repurchase obviously increased during 1980-2013 (figure 1).

Figure 1: Dividends and Stock Repurchases in the US, 1980–2013 (in $ billions)



Source: Standard & Poor's Compustat.

In addition, share repurchase may result in conflict of interest between shareholders and debtholders as share repurchase reduce firm's cash on hand that available to meet debt obligation therefore the default risk on bond of repurchasing firms increase. There are many questions raised by bondholder's wealth effect from share repurchase. Do bondholders affected by share repurchase announcement? What kinds of firm are likely to experience the wealth transfer effect from bondholders to shareholders? What kinds of bond features that lead to wealth redistribution effect?

LITERATURE REVIEW

There are three main purposes behind share repurchase.

Signaling Hypothesis

The firms buy back their own share because managers believe that the firm's share prices are currently not reflect the true value of the firm as the stock price is too low. Thus, share repurchase may reveal superior inside information by the management and reflect their expectation about firm's future prospect (Bhattacharya: 1979, Vermaelen: 1984, Miller and Rock: 1985, Constantinides and Grundy: 1989). The implication of this hypothesis is that the all types of security holders should positively react to this information. Miller and Rock (1985) suggest that repurchase disclose information about true value of the firm and followed by positive relation between stock and bond return. There are several evidences support signaling hypothesis. Ikenberry et al. (1995) find abnormal returns after share repurchases up to four years. Gong et al. (2008) document that reduction in earnings before firms conduct share repurchase lead to positive abnormal returns afterwards. Peyer and Vermaelen (2009) find strong evidence that market overreact to bad news and too

pessimistic in firm's long-term earnings resulting in long-run excess returns after the disclosure of stock repurchases.

Free Cash Flow Hypothesis

From Jensen (1986), cash distributions may align the interests of the agent with principal, by reducing the scope for wasteful investment in low-yield projects, Due to moral hazard, Easterbrook (1984) suggest that managers have incentive to keep the slack within the firm and make wasteful investment so that they can consume on the job. Cash distribution force manager to go to capital market to raise cash. Therefore, they will be monitored by investment banker or lenders. This, hence, alleviate agency problem. Grullon and Michaely (2004) report investors of the firm that spend a lot of cash in poor prospect investment view share repurchase as good device to mitigate agency conflict. Hence the agency cost reduces and brings about decrease in cost of capital.

Wealth Transfer Hypothesis

Share repurchase may result in conflict of interest between shareholders and other senior claimants for example, debtholders. It is similar to risk shifting in the sense that management expropriate debt holder wealth to shareholder by investing in zero-NPV project without enhancing collateral quality. Share repurchase reduce firm's cash on hand that available to meet debt obligation therefore the default risk of repurchasing firm increases. The implication of this hypothesis is that the stock return and bond return should be negatively correlated. In other word, the return to common stock holder should be positive while the return to debt holder should be negative.

However, the previous study shows the inconclusive evidence. Dann (1981) sample tender offer repurchase firms and find no evidence supporting wealth transfer hypothesis. They find positive wealth change for stockholders. Besides, convertible debt holders and convertible preferred stock holders react positively at a lower degree. However, return in straight debt and straight preferred stock are not significant. Maxwell and Stephens (2003) focus on OMRs method of share repurchase and find positive abnormal returns on stock. They use monthly data of bonds and find negative bond returns and insignificant correlation between stock and bond returns. Bond ratings are more likely to be downgraded than upgraded after repurchase announcement. The larger size of repurchase program, the higher probability to be downgraded. The evidence supports both signaling hypothesis and wealth transfer hypothesis. Eberhart and Siddique (2004) find that bondholders do not gain abnormal returns when firm announce share buyback program. Besides, the abnormal stock returns are not associated with the abnormal bond return. Jun, Jung, and Walkling (2009) document that share repurchase are clearly associated with signaling effect but slightly associated with wealth redistribution effect. They find increase in wealth to equity holders but decrease in wealth to bondholders. Nevertheless, bondholders of firms that distribute executive options experience significantly negative return. The shareholders of firm with non-investment grade debt or poor governance experience positive return while debtholders experience greater losses. Moreover, bond ratings of firms with option are less likely to be upgraded. Nishikawa, Prevost, and Rao (2011) investigate daily corporate bond data and they find that both stockholders and bondholders are favorable in OMR announcements. They did not detect wealth redistribution from bondholder to shareholder since bond yield spread surrounding

repurchase announcement significantly decreased. Bond rating of repurchasing firms are likely to be upgraded than downgraded.

From unclear explanation of wealth transfer hypothesis, this paper will further analyze in bond market reaction surrounding share repurchase announcement on several attributes.

Research Question: Do stock repurchase affect bondholders' wealth?

Research Objectives: To examine bond market reaction around the disclosure date of share repurchase.

Contribution:

Referred to previous research, Maxwell and Stephens (2003) find evidence of wealth transfer from bond holder to share holder by employing monthly bond prices which have less power compared to daily data in event study methodology, Brown and Warner (1985). Jun, Jung, and Walkling (2009) find an evidence of wealth redistribution effect in subset of executive option funding repurchase firm. Nishikawa, Prevost, and Rao (2011) employ bond yield spread calculation and make conclusion from one largest trading volume bond per one firm. As we already known, the firm could have many outstanding bonds and each of them have different features, for example, bond rating and maturity. Choosing one bond of the firm might not be good indicators as each bond are not identical in the same criteria as one stock per one firm. I think that the difference bond features may lead to difference in wealth transfer exposure. This paper will further analyze of bond market reactions on several attributes to the wealth redistribution effect.

Hypothesis Development

1.Change in Bond Yield Spread

Hypothesis 1a. Regarding secured bonds, they are pledged by specific asset, for example, property, equipment, and revenue from the project that financed by bond issuances. Secured bonds are perceived as less risky than unsecured bonds. If the issuers are unable to repay their debt, debtholders at least have a claim on those assets. Comparing to unsecured bonds, they are not secured by specific asset, but by borrower's full faith and credit. Unsecured bond holders have lower priority claim on asset after secured bondholders. I expect that unsecured bonds are likely to show greater potential for wealth transfer effect.

Hypothesis 1b. As corporate credit rating represents its ability and willingness of a borrowing firm to meet its financial obligation. The corporate ratings are based on many financial and economic indicators that affect the borrower's creditworthiness, for example, financial strength, future earnings outlook, level of debt, debt-paying history, economic recession and industry-specific issues. The investment-graded firms have good quality characteristic. Therefore, they are more likely that the firms could fully meet their financial obligation and have lower default risk. On the other hand, the non-investment grade firms are considered as higher default risk therefore the bond holder of non-investment grade firms should react negatively to share repurchase announcement. The wealth redistribution effect for non-investment grade firms should be largely affected by share repurchase announcement.

Hypothesis 1c. For bond rating level, bonds that are rated at high and medium credit quality are investment grade while bonds that are rated at low credit quality are known as non-investment grade or junk bonds. As non-investment grade bonds have higher exposure to default risk thus higher potential for wealth redistribution from bondholders to shareholders.

Hypothesis 1d. Considering the length of time remaining before bonds are matured, bond holder with short time to maturity are less risky due to that they do not need to tie up money for long period while bondholders with long time to maturity may lack of the flexibility hence they face the higher default risk when firm spend their cash to compensate cash to shareholder. Therefore, long-term bond should have more potential of wealth transfer from bond holder to shareholder.

Hypothesis 1e. The size of repurchase is also an important to issue. The funds that are used to buy back shares could reduce firm's collateral therefore the larger size of repurchase, the more potential for wealth transfer effect.

2.Change in Firm Rating

Hypothesis 2a. As share repurchase does not only reduce equity portion hence increase firm leverage but also reduce firm's ability to repay principal and interest payment, this could increase default risk of repurchasing firm. Therefore, firm ratings of repurchasing firms are more likely to be downgraded than non-repurchasing firms.

Hypothesis 2b. As non-investment grade bonds have higher exposure to default risk, repurchasing firm that have higher portion of non-investment grade bonds comparing to total outstanding bonds are more likely to be downgraded.

DATA

The information of US share repurchase announcement comes from Securities Data Corporation (SDC) mergers and acquisitions database. The observation period is from 2005 to 2019. This program also provides further information, for example, transaction type, percentage and total shares outstanding, percentage and total shares repurchases and the amount of repurchase transaction in USD. The outstanding bond of repurchased firm including active and matured bonds are provided in Bloomberg. In addition, issued date, maturity date, maturity type, payment rank, issue amount, ISIN/CUSIP, coupon type, coupon frequency, bond currency, dirty price and yield to maturity of corporate bonds are provided as well. I choose only bond that issued in the US nation and have currency in USD. Bond credit rating history can be searched from Moody's. Issuer rating history can be searched from Capital IQ database. For daily yield-to-maturity of Treasury bond that match the corporate bond i's maturity are collected from DataStream. Other financial data are collected from CompStat North America.

METHODOLOGY

1.Excess Change in Bond Yield Spread

Since bond trading activity is not as liquid as stock market, to solve this problem, I employ methodology discussed in Maquieira, Megginson, and Nail (1998) and, Nishikawa, Prevost, and Rao (2011). I observe bond market reaction surrounding share buyback announcement by calculating abnormal change in yield spread.

$$Yield\ Spread_{i,j,t} = YTM_{i,j,t} - YTM_{Gov,t}$$

Table 1: Variables and Definition

Variables	Definition
$\boldsymbol{Yield\ Spread_{i,j,t}}$	yield spread of corporate bond i firm j at time t
$\boldsymbol{YTM_{i,j,t}}$	yield-to-maturity of corporate bond i firm j at time t
$\boldsymbol{YTM_{Gov,t}}$	yield-to-maturity of government bond that matched corporate bond i firm j's maturity at time t

This method assume that pre-announcement yield spread are equal to post-announcement yield spread. If wealth transfer hypothesis holds, after share repurchase information are released, I expect the change in yield spread after announcement are wider than yield spread before announcement. I compared the change in yield spread during the event window (-30,-1) and (0, +30) days where day 0 is the announcement date.

As Nishikawa, Prevost, and Rao (2011) claim that the bond with largest trading activity contain more information, they include one bond per firm that have largest trading activity during the (-30, +30) time frame. This sample selection

method may be not representing the whole characteristics of bonds. My research will choose every outstanding bonds of repurchasing firm on announcement date as they better represent more attributes to wealth redistribution effect. Then classify them into following characteristics: payment rank(secured bond and unsecured bond) , firm rating (investment grade firm, non-investment grade firm, and unrated firm), bond rating (investment grade bond, non-investment grade bond, and unrated bond), bond maturity (short-term bond and long-term bond), size of share repurchase (large and small). To examine statistical significance of excess change in abnormal bond yield spread among sub-sample, I employ both Wilcoxon nonparametric test statistic and parametric student t-statistic.

Multivariate Analysis

$$\Delta YS_{i,j,t} = \beta_0 + \beta_1 D_{i,j,t}^{Unsec} + \beta_2 D_{j,t}^{NIGFirm} + \beta_3 D_{j,t}^{UnratedFirm} + \beta_4 D_{i,j,t}^{NIGBond} + \beta_5 D_{i,j,t}^{UnratedBond} + \beta_6 D_{i,j,t}^{LT} + \beta_7 D_{j,t}^{Large} + \beta_8 BTMg_{j,t} + \beta_9 FCFTA_{j,t} + \beta_{10} LNTA_{j,t} + \delta_t + \varepsilon_{i,j,t} \quad \textbf{(1)}$$

Table 2: Variables and Definition

Dependent Variable	**Definition**
$\Delta YS_{i,j,t}$	Change in yield spread
Independent Variables	**Definition**
$D_{i,j,t}^{Unsec}$	Payment Rank (dummy variable, equal to one if unsecured bond)
$D_{j,t}^{NIGFirm}$	Firm Rating (dummy variable, equal to one if non-investment grade firm)
$D_{j,t}^{UnratedFirm}$	Firm Rating (dummy variable, equal to one if unrated firm)

$D_{i,j,t}^{NIGBond}$	Bond Rating (dummy variable, equal to one if non-investment grade bond)
$D_{i,j,t}^{UnratedBond}$	Bond Rating (dummy variable, equal to one if unrated bond)
$D_{i,j,t}^{LT}$	Time remaining from announcement date until bond maturity (dummy variable, equal to one if long-term bond)
$D_{j,t}^{Large}$	Value of repurchase divided by amount of debt outstanding (dummy variable, equal to one if large size of repurchases)
Control Variables	**Definition**
$BTMg_{j,t}$	$BTMg_{t+1}/\ BTMg_{t-1}\ - 1$ (signaling hypothesis)
$FCFTA_{j,t}$	free cash flow divided by total asset (free cash flow hypothesis)
$\mathrm{L}NTA_{j,t}$	natural log of total asset
δ_t	year fixed effect

Note: i index bond, j index firm , t index time

My wealth transfer proxies include payment rank ($D_{i,j,t}^{Unsec}$), firm rating ($D_{j,t}^{NIGFirm}$,$D_{j,t}^{UnratedFirm}$), bond rating ($D_{i,j,t}^{NIGBond}$, $D_{j,t}^{UnratedFirm}$), maturity ($D_{i,j,t}^{LT}$), and repurchase size ($D_{j,t}^{Large}$). The dependent variable is change in yield spread ($\Delta YS_{i,j,t}$). If the wealth transfer hypothesis holds, the coefficient these variables should be positive.

I control for non-wealth redistribution hypothesis: signaling hypothesis and free cash flow hypothesis. First, signaling hypothesis implies that firm's share prices are currently undervalued. I control for percentage change in book-to-market ratio ($BTMg_{j,t}$). Increase in book-to-market ratio means that the stock price decreases after share buyback therefore it is bad news for investors. Bondholder should react negatively to this information (positive change in yield spread). On the other hand, decrease in book-to-market ratio means that the stock price increases after share

buyback therefore it is good news for investors. Bondholder should react positively to this information (negative change in yield spread). If signaling hypothesis holds, the coefficient should be positive.

Second, free cash flow hypothesis, cash distributions may alleviate the conflict of interest between principal and agent. I assign free cash flow to total asset to be proxy of free cash flow effect ($FCFTA_{j,t}$, sum of earnings before extraordinary items, depreciation, and amortization minus capital expenditure divided by total asset) If free cash flow hypothesis holds, the coefficient should be negative. The regression model also includes the natural log of total asset (*LN(TA))* and *year* dummies as additional control variables.

In regression process, I use firm clustered standard error in regression. Since one issuer could have several bonds on announcement date, each bond can be correlated within firm level. Therefore, clustering can explain the effect of correlation on standard errors. Without using clustered standard error will mislead the result.

2.Change in Issuer Rating

Share repurchases not only reduce firm's cash on hand that available to meet debt obligation but also deplete the value of bondholders' claim. According to wealth transfer hypothesis, the default risk of repurchasing firm increases as shareholders expropriate wealth from bondholders. Therefore, the ratings of repurchasing firms are more likely to be downgraded than upgraded.

Lie (2002) find the greater portion of debt ratings downgraded after defensive self-tender offers. Maxwell and Stephens (2003) find such wealth redistribution

evidence that bond rating downgrades are two times more than upgrades in the three months after share buyback. On the contrary, Vermaelen (1981) does not observe the evidence that bonds are more likely to be downgraded following share buybacks. Jun, Jung, and Walkling (2009) find that non-investment grade bonds experience insignificant more rating upgrades than downgrades. Nishikawa, Prevost, and Rao (2011) who segment bonds by bond rating and repurchase size find greater portion of bond rating upgrades than downgrades for every bond subsamples.

A change in issuer rating is defined as the difference in rating level between the end (three months, six months, nine months, and twelve months after repurchase announcement) and the beginning (one month before repurchase announcement). To measure change in issuer rating, I convert a firm's credit rating that obtained from S&P Capital IQ to numerical scale. The lowest level of firm rating, D, is equal to 1 and the pattern continue until the highest level of firm rating, AAA, is equal to 22 (appendix 1). If the post-announcement rating is less than pre-announcement rating, it means that the firm is downgraded, and vice versa.

From hypothesis 2a, I predict that firm ratings of repurchasing firms are more likely to be downgraded than non-repurchasing firms. The non-repurchasing firms must meet the following two criteria: firms' size (total asset) and two-digit Standard Industrial Classification (SIC) that match with the target firms.

For issuer downgrades analysis, I use logistic regression to see the probability of repurchasing firm downgrades. I control several factors that could affect firm's rating: leverage ratio, revenue growth, coverage ratio, year fixed effect, and industry fixed effect. For industry fixed effect, I convert the 4-digits SIC code to Fama French

12 industries (appendix2). Due to variety of industries from SIC code, there are some industries that perfectly predict change in firm rating. In other word, those group of industries are not necessary hence the industries were dropped in regression results. Therefore, I scope down those industries that classified by SIC code to Fama French 12 industries. This will shed light more on specific industry fixed effect in the regression results. I also used cluster standard error in regression process.

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 \mathrm{Rep}_{j,t} + \beta_2 \mathrm{Lev}_{j,t} + \beta_3 \mathrm{RevG}_{j,t} + \beta_4 \mathrm{Cov}_{j,t} + \delta_l + \delta_t + \varepsilon_t \quad \textbf{(2)}$$

Table 3: Variables and Definition

Dependent Variable	**Definition**
$\log\left(\frac{p}{1-p}\right)$	Dummy variable ($Y_{j,t}$, equal to one if firm ratings are downgraded) p represents the probability that $Y_{j,t}$=1
Independent Variable	**Definition**
$\mathbf{Rep}_{j,t}$	Dummy variable (equal to one if repurchasing firm)
Control Variables	**Definition**
$\mathbf{Lev}_{j,t}$	Leverage Ratio (total asset / total equity)
$\mathbf{RevG}_{j,t}$	One year revenue growth
$\mathbf{Cov}_{j,t}$	Coverage ratio (earning befor interest and taxes / interest expense)
$\boldsymbol{\delta_l}$	Industry fixed effect (convert 4-digit SIC to Fama French 12 industries)
$\boldsymbol{\delta_t}$	Year fixed effect

Note: j index firm, t index time

For hypothesis 2b, I predict that repurchasing firms that have higher portion of non-investment grade bonds compared to total outstanding bond are more likely to be downgraded. Percentage of non-investment grade bonds are calculated by dividing issued amount of total outstanding bond from issued amount of non-investment grade bonds.

For issuer downgrades analysis, I use logistic regression to see the probability of repurchasing firm downgrades and use the same control variables as equation (2). I also used cluster standard error in regression process.

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 \mathrm{NIG}_{j,t} + \beta_2 \mathrm{Lev}_{j,t} + \beta_3 \mathrm{RevG}_{j,t} + \beta_4 \mathrm{Cov}_{j,t} + \delta_l + \delta_t + \varepsilon_t \quad \textbf{(3)}$$

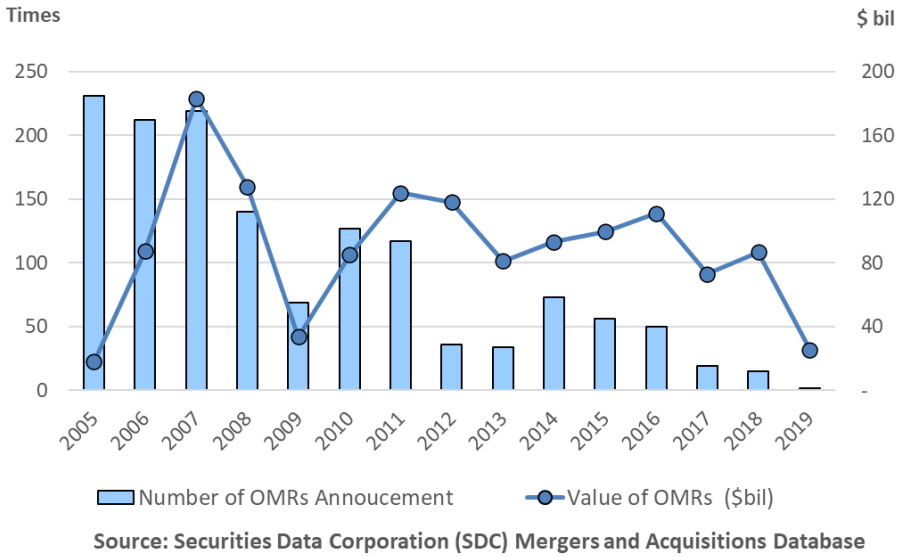
Table 4: Variables and Definition

Dependent Variable	**Definition**
$\log\left(\frac{p}{1-p}\right)$	Dummy variable ($Y_{j,t}$, equal to one if firm ratings are downgraded) p represents the probability that $Y_{j,t}$=1
Independent Variable	**Definition**
$NIG_{j,t}$	Issued amount of non-investment grade bonds relative to total issued amount of outstanding bonds
Control Variables	**Definition**
$\mathrm{Lev}_{j,t}$	Leverage Ratio (total asset / total equity)
$\mathrm{RevG}_{j,t}$	One year revenue growth
$\mathrm{Cov}_{j,t}$	Coverage ratio (earning befor interest and taxes / interest expense)
δ_l	Industry fixed effect (convert 4-digit SIC to Fama French 12 industries)
δ_t	Year fixed effect

Note: j index firm, t index time

Descriptive Statistics

Table 5: Number and Value of OMR Announcements



Source: Securities Data Corporation (SDC) Mergers and Acquisitions Database

Table 6: Total Number of Repurchasing Firms and Number of Repurchasing Firms with Outstanding Bonds

Year	Repurchasing Firms	Repurchasing Firms with Outstanding Bonds
2005	225	32
2006	207	48
2007	214	38
2008	139	18
2009	68	10
2010	127	40
2011	112	32
2012	36	18
2013	34	9
2014	72	26
2015	56	30
2016	49	23
2017	18	11
2018	15	7
2019	2	0
Total	1374	342

Table 5 shows number of OMR announcement and value of OMR in the US during 2005-2019. The value of share repurchases reached a peak in 2007 then gradually decrease until 2019. Table 6 shows that there are 1374 repurchasing firms, whereas the repurchasing firms that have active outstanding bonds are only 342 firms.

Table 7: Bond Category, Firm Rating and Size of Share Repurchase

Payment Rank	Frequency	Percent
Secured Bond	36	2%
Unsecured Bond	2142	98%
Total	2178	100%

Firm Rating	Frequency	Percent
Investment Grade	1906	88%
Non-Investment Grac	271	12%
Unrated	1	0%
Total	2178	100%

Bond Rating	Frequency	Percent
Investment Grade	1785	82%
Non-Investment Grac	233	11%
Unrated	160	7%
Total	2178	100%

Maturity	Frequency	Percent
Long Term Bond	708	33%
Short Term Bond	1470	67%
Total	2178	100%
Mean	7.40	
Median	4.88	
Min	0.00274	
Max	54.47	
SD	7.79	

Size	Frequency	Percent
Large	562	26%
Small	1616	74%
Total	2178	100%
Mean (%)	37.61%	
Median (%)	15.82%	
Min (%)	0.0038%	
Max (%)	7997.31%	
SD(%)	246.39%	

According to table 7, there are 2178 bond observations. The majority of bond payment rank are unsecured bonds as they are accounted for 98% while secured bonds are accounted for only 2% of overall bonds. For firm rating, most of the them are investment grade, 88%, while non-investment grade bonds are only 12%. In accordance with firm rating, most of bond rating are investment grade, 82% while non-investment grade bonds and unrated bonds are 11% and 7% respectively. For bond maturity, an average year until maturity was 7.40 years. The maximum and minimum years until maturity were 54.47 years and 0.00274 years respectively. I used

average 7.40 years as cut-off point to determine long-term and short-term bonds. Long-term bonds are accounted for 33% while short-term bonds are accounted for 67%. An average size of repurchase was 37.61%. The maximum and minimum size of repurchase were 7997.31% and 0.0038% respectively. I used average 37.61% as cut-off point to determine large and small size of share repurchase. Large size of share repurchase are accounted for 26% whereas small size of share repurchase are accounted for 74%.

Table 8: Descriptive Statistics

	N	Mean	Median	Min	Max	SD
Bond Characteristic						
Change in Yield Spread (%)	2178	-0.013	-0.027	-6.646	7.107	0.389
Firm Characteristic						
LNTA	342	9.782	9.613	6.386	14.447	1.536
BTMg (%)	342	10.995	-3.422	-3417.335	6135.456	398.686
FCFTA (times)	342	0.097	0.087	-0.233	0.381	0.074
Leverage Ratio (times)	342	4.311	2.914	-688.679	419.111	45.723
Coverage Ratio (times)	342	15.229	6.913	-11.164	1416.304	79.619
Revnue Growth (%)	342	5.840	6.197	-333.823	88.308	23.921

Table 8 summarizes the bond and firm characteristics. There are 2178 bond observations from 342 OMR announcements. The mean (median) change in yield spread is -0.013% (-0.027%). The minimum (maximum) change in yield spread is -6.646% (7.107%) and the standard deviation is 0.389% BTMg which is defined as percentage change in book-to-market ratio is quite volatile as the mean (median) is 10.995% (-3.422%). The minimum (maximum) percentage change in book-to-market ratio is -3417.335% (6135.456%) and the standard deviation is 398.686%. FCFTA is free cash flow divided by total asset where free cash flow is calculated by subtracting capital expenditure from operating income before depreciation and amortization. The mean (median) of free cash flow ratio is 0.097 (0.087). The minimum (maximum) of

free cash flow ratio is -0.233(0.381) and the standard deviation is 0.074. On average, leverage ratio, coverage ratio, and one-year revenue growth of repurchasing firms are 4.311 times, 15.229 times, and 5.840% respectively.

EMPIRICAL RESULT

1.Change in Yield Spread

Univariate Analysis

Table 9: Excess Changes in Yield Spread around OMRs

	Median Excess Change in Yield Spread	Mean Excess Change in Yield Spread
Overall	-0.026% ***	-0.007%
Payment Rank		
Secured Bond	0.086% **	0.102% ***
Unsecured Bond	-0.027% ***	-0.009%
Firm Rating		
Investment Grade	-0.028% ***	-0.017% ***
Non-Investment Grade	-0.001%	0.061%
Unrated	-0.192%	-0.192%
Bond Rating		
Investment Grade	-0.029% ***	-0.017% **
Non-Investment Grade	0.010%	0.056%
Unrated	0.000%	0.001%
Maturity		
Long Term Bond	-0.030% ***	-0.015% **
Short Term Bond	-0.025% ***	-0.003%
Size		
Large	-0.032% ***	-0.008%
Small	-0.023% ***	-0.007%

This table reports excess change in yield spread during open market repurchase announcement. Excess change in yield spread is calculated by methodology developed by Maquieira, Megginson, and Nail (1998) also used by Nishikawa, Prevost, and Rao (2011). Statistical significance of median excess change in yield spread are calculated using the nonparametric Wilcoxon test while mean excess change in yield spread are calculated using paired samples statistics T-Test. *,** and *** denote significance at the 10%, 5%, and the 1% level respectively.

Full Sample

Table 9 shows that bondholders are favorable in OMR announcements. The median excess change in yield spread is -0.026% which is significant at the 1% level while the mean excess change in yield spread is -0.007% which is insignificant. Since the bond market has favorable view of OMR announcements, the initial result is inconsistent with wealth transfer hypothesis which is documented by Maxwell and Stephens (2003). Before making conclusion, we may observe wealth redistribution effect from different bond attributes. I further classify bondholder into five groups and see how different types of bondholder react to OMR announcements.

Payment Rank

When the issuers are unable to repay their debt, unsecured bondholder are not secured by specific asset and have lower priority claim on asset after secured bond holder. If the wealth transfer effect holds, OMR announcements should be severe for unsecured bondholder than secured bondholders.

For secured bond, the median (mean) excess change in yield spread is 0.086% (0.102%) which is significant at the 5% (1%). On the contrary, for unsecured bond, the median excess change in yield spread is -0.027% which is significant at the 1% level but the mean excess change in yield spread is insignificant. The results imply that OMR announcements is good news for unsecured bondholders but bad news for secured bondholders. The findings are not consistent with my hypothesis.

Firm Rating

Since non-investment grade firms are considered as high default risk therefore the bond holder of non-investment grade firms should react negatively to share repurchase announcement and I should observe positive change in yield spread for non-investment grade firms.

For investment grade firm, the median (mean) excess change in yield spread is -0.028% (-0.017%) which is significant at the 1% (1%) level. For non-investment grade and unrated firm, the median (mean) excess change in yield spread is not statistically significant. My findings do not support wealth transfer effect.

Bond Rating

Non-investment grade bond or junk bond is rated at low credit quality therefore have high default risk. In other word, non-investment grade bondholders have more potential for wealth redistribution from bondholders to shareholders. If the wealth transfer effect holds, I should observe positive change in yield spread for non-investment grade bond.

For investment grade bond, the median (mean) excess change in yield spread is -0.029% (-0.017%) which is significant at the 1% (5%) level. For non-investment grade and unrated bond, the median (mean) excess change in yield spread is not statistically significant. The results are not in line Maxwell and Stephens (2003) who find that non-investment grade debt face greater negative excess bonds return than investment grade debt. The findings do not support wealth transfer hypothesis.

Maturity

Since long-term bondholders may lack of the flexibility to withdraw their money hence, they face the high default risk when firm return cash to shareholders prior to bondholders. If the wealth transfer effect holds, I should observe positive change in yield spread for long-term bond.

For long-term bond, the median (mean) excess change in yield spread is -0.030% (-0.015%) which is significant at the 1 % (5%) level. For short-term bond, the median excess change in yield spread is -0.025% which is significant at the 1% level but the mean excess change in yield spread is insignificant. The findings are not consistent with my hypothesis.

Size

The funds that are used to buy back shares could reduce firm's collateral for bondholders therefore the larger size of repurchase, the more potential for wealth losses for bondholders. If the wealth transfer hypothesis holds, I should observe positive change in yield spread for large size of repurchase.

For large size of repurchase, the median excess change in yield spread is -0.032% which is significant at 1% level but the mean excess change in yield spread is insignificant. For small size of repurchase, the median excess change in yield spread is -0.023% which is significant at 1% but the mean excess change in yield spread is insignificant. The results are not consistent with Maxwell and Stephens (2003) who report that the larger sizes of share buyback lead to greater wealth

redistribution from bondholders to shareholders. My findings are not supportive of a wealth transfer effect.

Up to this point, the findings show that there is no evidence supports wealth transfer hypothesis. However, only univariate analysis is not enough to conclude the absence of wealth redistribution effect. There might be other factors that influence bond market reaction to OMR announcements. The next part will further analyze multivariate setting to explore the wealth transfer hypothesis and control for signaling hypothesis and free cash flow hypothesis.

Multivariate Analysis

First, I run OLS equation (1) without interaction terms between independent variables and control variables as shown in table 10 column (1), there is no statistically significant positive change in yield spread. The results imply that payment rank, bond rating, bond maturity, and size of repurchase are unaffected by OMR announcements.

Second, I one-by-one add interaction terms: bond dummies (bond rating, payment rank, bond maturity and size of repurchase) with BTMg and FCFTA into equation (1) as shown in table 10 column (2,3,4,5) respectively. The interaction terms will give more confidence that how the wealth transfer effect, signaling effect, free cash flow effect influence different types of bond.

Table 10: Multivariate Analysis

			ΔYS		
Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Unsecured	-0.01127	-0.02081	-0.12111	-0.01044	-0.00467
	(0.04890)	(0.04875)	(0.12906)	(0.04871)	(0.04981)
NIG Firm	-0.00594	-0.02986	-0.00414	-0.00646	-0.00768
	(0.06301)	(0.05955)	(0.06372)	(0.06321)	(0.06045)
Unrated Firm	0.00417	0.00173	0.00552	0.01179	-0.04518
	(0.06790)	(0.06237)	(0.06814)	(0.06961)	(0.06980)
NIG Bond	-0.01488	-0.21897*	-0.01600	-0.01599	-0.01960
	(0.07171)	(0.12422)	(0.07161)	(0.07184)	(0.07116)
Unrated Bond	-0.00752	-0.00451	-0.00684	-0.00808	-0.00516
	(0.02805)	(0.05308)	(0.02777)	(0.02794)	(0.03012)
LT Bond	-0.00392	-0.00726	-0.00346	-0.02854	-0.00248
	(0.01427)	(0.01385)	(0.01432)	(0.03018)	(0.01457)
Large	0.00498	0.00334	0.00479	0.00593	-0.07275
	(0.03069)	(0.03019)	(0.03070)	(0.03090)	(0.05996)
LNTA	-0.01234	-0.01458	-0.01217	-0.01256	-0.01566
	(0.01177)	(0.01148)	(0.01179)	(0.01187)	(0.01062)
BTMg	-0.00063	-0.00215	-0.12166	-0.00088	-0.02206
	(0.00347)	(0.00390)	(0.13560)	(0.00382)	(0.03602)
FCFTA	-0.04712	-0.29323	-1.08482	-0.15510	-0.24343
	(0.29825)	(0.35155)	(1.30765)	(0.39102)	(0.32085)
Year FE	Yes	Yes	Yes	Yes	Yes
NIGBond_BTMg		0.03591			
		(0.02616)			
UnratedBond_BTMg		0.00986			
		(0.00968)			
NIGBond_FCFTA		2.92241**			
		(1.37408)			
UnratedBond_FCFTA		0.02302			
		(0.37179)			
Unsecured_BTMg			0.12104		
			(0.13575)		
Unsecured_FCFTA			1.04373		
			(1.31218)		
LTBond_BTMg				-0.00086	
				(0.00184)	
LTBond_FCFTA				0.26320	
				(0.27959)	
Large_BTMg					0.02484
					(0.03596)
Large_FCFTA					0.72464
					(0.45433)
Observations	2,178	2,178	2,178	2,178	2,178
R-squared	0.05370	0.07067	0.05397	0.05429	0.05882

This table shows the result of the OLS regression from equation (1). All variables are defined in table 2. And also add interaction variables : bond rating with BTMg and bond rating with FCFTA in column(2) , interaction variables : payment rank with BTMg and payment rank with FCFTA in column (3), interaction variables : bond maturity with BTMg and bond maturity with FCFTA in column(4) and interaction variables : size of repurchase with BTMg and size of repurchase with FCFTA in column(5). Standard errors are clustered at fir level are shown in parentheses. *,** and *** denote significance at the 10%, 5%, and 1% level respectively.

From table 10 column (3,4,5), there is no statistically significant coefficient for all variables. Post-announcement yield spread is insignificantly different from pre-announcement yield spread. Bondholders of secured/unsecured bond, long-term/short-term bond, large/small size of repurchase react indifferently to OMR announcements. These findings suggest the following bond characteristics: payment rank, bond maturity and size of share repurchase are not captured by wealth transfer effect. From table 10 column (2), regarding bond rating, unrated bond has insignificant negative change in yield spread. Only non-investment grade bond has statistically significant negative coefficient at the 10 % level. The negative change in yield spread means that non-investment grade bondholders are favorable in OMR announcements. The evidences are not consistent with the wealth transfer hypothesis.

For signaling hypothesis, the coefficient of BTMg alone is statistically insignificant in every types of bond. Even though I add the interaction terms to enhance the power of signaling effect, the coefficient signs again are statistically insignificant. There is no evidence support signaling hypothesis. These findings are consistent with Nishikawa, Prevost, and Rao (2011). They use change in ROA one year and two years following OMR announcements to be proxies of signaling hypothesis and find insignificant coefficients. Bondholders are less likely to have positive signaling effect from share repurchase announcement.

For free cash flow hypothesis, the coefficient of interaction terms between unrated bond and FCFTA is insignificantly positive compared to investment grade bond. Unrated bondholders react insignificantly negative to repurchase announcement when FCFTA increase. However, the coefficient of interaction terms between non-

investment grade bond and FCFTA is 2.92241 which is statistically significant at the 5% level compared to investment grade. Non- investment grade bondholders react significantly negative to repurchase announcement when FCFTA increase. The logic behind this is that the issuers of investment grade bond have higher credit quality and have stronger capacity to meet their financial commitments. Moreover, share repurchase could reduce the scope of wasteful investment as documented by Jensen (1986). Share repurchase can also convince investors that firms would generate more cash in the future. Therefore, investment grade bondholders have higher probability to get back their principal and interest in the future (good news). But issuers of non-investment grade bond might not have enough capacity to meet their financial commitments therefore non-investment grade bondholders have higher exposure to default risk. When issuers have higher FCFTA and distribute cash to shareholder instead of debt holder, non-investment grade could have lower probability to get back their money (bad news). This evidence supports free cash flow hypothesis for investment grade bond but not for non-investment grade bond. These findings are also consistent with Nishikawa, Prevost, and Rao (2011) who report free cash flow effect for bondholders.

2.Change in Issuer Rating after OMR announcements

In this part, I further analyze the wealth transfer hypothesis by examining change in firm rating after OMR announcements. Since share repurchase distribute cash to shareholders prior to debtholders, it reduces firm's cash that available to repaid debt obligation therefore the default risk of repurchasing firms increases. The wealth transfer hypothesis suggests that shareholders expropriate wealth from

bondholders when firm announce share repurchase, therefore repurchasing firm are more likely to be downgraded than upgraded. First, I analyze issuer rating of repurchasing firm compared to non-repurchasing firm. Second, I examine the portion of non-investment grade bonds that may affect firm rating downgrade.

Table 11: Change in Firm Rating of Repurchasing Firms VS Non-Repurchasing Firms

Independent Variables	Change in Firm Rating (1) ThreeMonths	(2) SixMonths	(3) NineMonths	(4) TwelveMonths
Rep	-0.249	-0.505*	-0.718**	-0.811***
	(0.29700)	(0.25400)	(0.23900)	(0.22500)
Lev	0.000993	0.000698	0.000403	-0.00104
	(0.00154)	(0.00157)	(0.00137)	(0.00079)
RevG	-0.0566	-0.88	-0.613	-0.537
	(0.40400)	(0.52700)	(0.45000)	(0.43300)
Cov	-0.00341	-0.0000823	0.00105	0.000626
	(0.00216)	(0.00009)	(0.00174)	(0.00184)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	957	1069	1067	1048
pseudo R-sq	0.121	0.148	0.148	0.157

This table shows the result of the logistic regression from equation (2):

$$\log(\frac{p}{1-p}) = \beta_0 + \beta_1 \text{Rep}_{j,t} + \beta_2 \text{Lev}_{j,t} + \beta_3 \text{RevG}_{j,t} + \beta_4 \text{Cov}_{j,t} + \delta_l + \delta_t + \varepsilon_t$$

The dependent variable is changes in firm rating from one month before share repurchase announcement to three months column(1), six months column(2), nine months column(3), and twelve months column(4) after repurchase respectively. j index firms , l index industries , and t index years. All variables are defined in table3. Standard errors are clustered at firm level are shown in parentheses. *,** and *** denote significance at the 10%, 5%, and the 1% level respectively. Note that the number of observation in column(1) is less than column (2,3,4) because year fiexed effect can perfectly predict change in firm rating within three months. Hence those observations were dropped in regression results.

If wealth transfer hypothesis holds, we should observe more rating downgrades than upgrades. The evidence in table 11 show that firm rating of repurchasing firm in three months after repurchase is not significantly downgraded. Moreover, firm rating of repurchasing firm in the six months, nine months, twelve months after repurchase are less likely to be downgraded at the 10%,5%, and 1% significant level respectively compared to non-repurchasing firm. The results are inconsistent with wealth transfer effect.

Table 12: Change in Firm Rating of Repurchasing Firms Based on NIG Bond

Independent Variables	Change in Firm Rating (1) ThreeMonths	(2) SixMonths	(3) NineMonths	(4) TwelveMonths
NIG	0.128	0.662	0.909	0.671
	(0.69400)	(0.67800)	(0.60400)	(0.60200)
Lev	-0.000206	-0.000186	-0.000104	-0.0014
	(0.00192)	(0.00182)	(0.00194)	(0.00209)
RevG	-0.218	-1.569*	-1.339*	-1.554
	(0.60500)	(0.79300)	(0.62500)	(0.97300)
Cov	-0.00131	0.00844	0.00533*	0.0062
	(0.00147)	(0.00692)	(0.00223)	(0.00492)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	209	262	270	267
pseudo R-sq	0.09	0.175	0.15	0.189

This table show reports the result of the logistic regression from equation (3):

$$\log(\frac{p}{1-p}) = \beta_0 + \beta_1 \text{NIG}_{j,t} + \beta_2 \text{Lev}_{j,t} + \beta_3 \text{RevG}_{j,t} + \beta_4 \text{Cov}_{j,t} + \delta_l + \delta_t + \varepsilon_t$$

The dependent variable is changes in firm rating from one month before share repurchase announcement to three months column(1), six months column(2), nine months column(3), and twelve months column(4) after repurchase respectively. j index firms , l index industries , and t index years. All variables are defined in table4. Standard errors are clustered at firm level are shown in parentheses. *,** and *** denote significance at the 10%, 5%, and 1% level respectively. Note that the number of observation in column(1,2) is less than column (3,4) because year fiexed effect can perfectly predict change in firm rating within three months and six months. Hence those observations were dropped in regression results.

Repurchasing firms which have higher portion of non-investment grade bonds comparing to total outstanding bond should be more likely to be downgraded as those firm have higher exposure to default risk. The evidence in table 12 show that percentage of non-investment grade bonds do not significantly affect firm rating downgrade no matter three months, six months, nine months, or twelve months after repurchase announcements. My findings do not support wealth transfer effect.

CONCLUSION

There are several conventional analyses of share repurchases. Most of literatures focus on signaling hypothesis and free cash flow hypothesis since share repurchases are directly related to shareholders. However, share repurchases also affect debtholders as well. Share repurchase may result in conflict of interest between shareholders and debtholders as stock repurchases reduce firm's cash available to meet debt obligation therefore the default risk of repurchasing firm increases. The wealth transfer hypothesis suggests that share repurchases are destructive to debtholders.

The previous academic research has conflicting evidence of the wealth transfer hypothesis. Dann (1981) find no evidence supporting wealth transfer hypothesis. Maxwell and Stephens (2003) find negative bond returns. They find more portion of bond rating downgraded after share repurchases. Jun et al. (2009) find that bondholders of firms that distribute executive options experience significantly negative return while Nishikawa et al. (2011) find that bondholder are favor in OMRs announcement.

I reinforce the power of testing wealth transfer hypothesis by further classify bond characteristics into five subsamples which are sensitive to the wealth redistribution effect: payment rank, issuer rating, bond rating, bond maturity, and size of repurchase. For univariate test, except for secured bond subsample, the other subsamples do not support the wealth transfer hypothesis. For multivariate analysis, I do not find negative bond market reaction to share buyback announcement. Moreover, non-investment grade bondholders who are the most sensitive to default risk do welcome the OMR announcements. These findings are inconsistent with the wealth transfer hypothesis. For additional analyses, I do not observe the more probability that firm ratings are downgraded no matter in three months, six months, nine months, twelve months after repurchase. My results suggest that bondholders do not react negatively to OMR announcement. I leave this issue to future research to investigate other bond characteristics that are subject to wealth transfer motivation.

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APPENDIX

Appendix 1: Long-Term Credit Rating by Agency and Nominal Scale

S&P	Moody's	Nominal Scale	
AAA	Aaa	22	Investment Grade
AA+	Aa1	21	
AA	Aa2	20	
AA-	Aa3	19	
A+	A1	18	
A	A2	17	
A-	A3	16	
BBB+	Baa1	15	
BBB	Baa2	14	
BBB-	Baa3	13	
BB+	Ba1	12	Non-Investment Grade
BB	Ba2	11	
BB-	Ba3	10	
B+	B1	9	
B	B2	8	
B-	B3	7	
CCC+	Caa1	6	
CCC	Caa2	5	
CCC-	Caa3	4	
CC	Ca	3	
C	C	2	
D	/	1	

Appendix 2: Repurchasing Firms Classified by Fama French 12 Industries.

Fama French, 12 Industires	Frequency	Percent
Business Equipment -- Computers, Software, and Electronic Equipment	23	7%
Chemicals and Allied Products	17	5%
Consumer Durables -- Cars, TV's, Furniture, Household Appliances	4	1%
Consumer NonDurables -- Food, Tobacco, Textiles, Apparel, Leather, Toys	33	10%
Finance	77	23%
Healthcare, Medical Equipment, and Drugs	18	5%
Manufacturing -- Machinery, Trucks, Planes, Off Furn, Paper, Com Printing	50	15%
Oil, Gas, and Coal Extraction and Products	15	4%
Other -- Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment	32	9%
Telephone and Television Transmission	11	3%
Utilities	4	1%
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	58	17%
Total	342	100%

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