The Decision between Tender Offers and Open Market Bond Repurchases: Do Bond Issuers Time the Market?

Hagit Levy

Zicklin School of Business
Baruch College, CUNY
One Bernard Baruch Way
New York, NY 10010
Tel: (646) 312-3199
Email: Hagit.Levy@baruch.cuny.edu

Ron Shalev

Stern School of Business
New York University
44 West Fourth Street
New York, NY 10012
Tel: (212) 998-0418
Email:rshalev@stern.nyu.edu

We thank Kodjo Apedjino (PNC BANK), Andrew Dubinski (Goldman Sachs), Tomer Berkovitz (JP Morgan-Chase), Yakov Amihud, Ohad Kadan, Pepa Kraft and seminar participants at Baruch College (CUNY), Washington University in St Louis, IESE and New York University for their comments and suggestions. All errors are our own.

The Decision between Tender Offers and Open Market Bond Repurchases: Do Bond Issuers Time the Market?

Abstract: We analyze the observed increase, at times of capital market crises, in the number of firms repurchasing their bonds in the open market, a stealthy method to repurchase bonds, in which bondholders are not aware of the buyer's identity, and the observed decrease in the number of firms using a tender offer, a transparent method to repurchase bonds, in which issuers pre-announce their repurchase intentions, and provide evidence consistent with issuers timing the bond market. Specifically, we find that at times of heightened uncertainty, during which bond prices tend to be depressed, issuers are more likely to repurchase the bonds in the open market than via a tender offer. Analysis of both the one year-ahead returns on the repurchased bonds and the issuers accounting gains from the repurchase provides ex-post evidence that bond repurchased in the open market were executed at better term for the issuers than bonds repurchased via tender offers. Finally, we find that insider stock buys are more prevalent around times of open market repurchases.

The Decision between Tender Offers and Open Market Bond Repurchases: Do Bond Issuers Time the Market

I. *Introduction*

Recent years have seen a large increase in the volume of bond repurchases.[1] A public debt issuer can execute bond repurchases via two alternative methods, tender offer and repurchase in the open market. Whereas during a typical year firms are more likely to choose tender offers to repurchase their bonds - for every open market repurchase there are four tender offers - during the two financial crises of the last decade, the dot com and the housing bubble bursts, this ratio reversed such that for every tender offer there are four open market repurchases.[2] In this study we analyze the causes and effects of firms' choice of bond repurchase method and provide evidence consistent with issuers timing the market in bond repurchases.

Though very large in scale,[3] the corporate bond market is more fragmented and significantly less liquid than the stock market (Coffee and Klein, 1991; Bushman et al, 2010). As opposed to equity repurchases, in which firms typically pre-announce their repurchase intentions prior to both tender and open market repurchases, only bond *tender* offers are pre-announced and are usually executed at the price set in the offer, typically at a premium over the presiding market price.[4] Bond repurchases executed in the open market are generally not pre-announced by issuing firms. The transaction price is set in private negotiations between the

[1] Using data from the Mergent database of tender and open market repurchases only: in 1998 approximately 10 billion outstanding debt was repurchased by 56 firms whereas in 2007, 135 firms repurchased 45 billion in outstanding debt. 2009 represents the highest volume of repurchased bond over the last decade, reaching 212 billion dollars of outstanding debt.

[2] Figure I plots the number of repurchases over time in our sample as well as the percentage of repurchases using the tender and open market methods.

[3] Corporate bonds outstanding in the US amounted to 6.9 trillion dollars in 2009. (Source:http://www.sifma.org/research/statistics.aspx).

[4] The issuing firm typically issues a press release and sends an offer letter to all known bondholders inviting them to sell the bonds back to the firm.

buyer's dealer and the seller's dealer. While information on pricing of past transactions is available through TRACE, it is sparse and incomplete.[5] Because the bond market is very illiquid, relying on past transactions to price the bonds during negotiations can be challenging for bond holders and since the actual bond holder (seller) is not aware of whom the counterparty to the transaction is, she cannot incorporate information of the issuer's repurchase intentions into the pricing decision. Thus, the deal value is ultimately an approximation, sometimes very inaccurate, of market prices.

Economic literature suggests that capital market turbulence intensifies agency problems arising from adverse selection and moral hazard, making screening good borrowers from bad borrowers harder (Mishkin, 1997 and Mishkin and White, 2002), and increasing the likelihood of asset dislocations and mispricing. Given the corporate bond market structure, we conjecture that in times of increased market uncertainty, issuing firms will exploit their superior information when they believe the bonds are undervalued, and repurchase their debt securities in the open market, at a discount relative to the bonds' economic value. We develop a set of analyses to test our conjecture:

We start by validating our basic premise that at times of market turbulence bond prices are on average depressed due to increased uncertainty. For that purpose, we investigate whether the premium over the market price offered in a tender offer is different at times of market turbulence than it is at times of low volatility. If at times of heightened market uncertainty the increase in uncertainty concerning firms' default risk depresses bond prices, a signal that the firm can actually repay its debt (i.e. a tender offer) is likely to be of higher information content with

[5] The Trade Reporting and Compliance Engine (TRACE) provides information about over the counter corporate bonds transactions since 2002. From inception in 2002 reporting on TRACE was gradually expanded to include more bonds and became complete in February 2005 (Bushman et. al 2010). TRACE provides information about transaction size, price (inclusive of any markups, markdowns and commissions) and date, but does not identify the buyer, the seller or even the dealer that executes the transaction.

respect to the firm's credit worthiness and therefore, will likely have a stronger effect on bond prices compared to times of a relatively stable information environment. Thus, at times of heightened uncertainty, bondholders will require higher premium to sell their bonds in a tender offer than in ordinary times. We use two alternative market level measures to capture levels of uncertainty and information asymmetry in capital markets: 1) the implied volatility of the S&P 500 stock index, commonly known as the VIX index (VIX), and 2) the credit spread between Baa rated corporate bonds and US treasury bonds (SPREAD). Analysis suggests that premiums over market price in tender offers are positively associated with both the implied volatility in the stock market and the credit spread in the bond market.[6] This result suggests that the benefits to the issuer of repurchasing bonds in the open market at market price relative to using a tender offer increase in times of heightened uncertainty.

Second, we analyze the connection between repurchase method and level of uncertainty in capital markets. We conduct a quarterly time series analysis of the association between the two measures of uncertainty and information asymmetry described above (VIX and SPREAD) and the ratio of open market bond repurchases to total bond repurchases, and find that this ratio increases in both measures. We also perform a firm level analysis of the choice between open market repurchase and tender offer, controlling for other factors affecting the choice, and find that the likelihood of choosing to repurchase bonds in the open market versus tendering the bonds increases in both measures. These tests suggest that at times of uncertainty and high information asymmetry, issuers tend to use the open market to repurchase their bonds as opposed to using a tender offer.

[6] It should be noted that it is not the level of information asymmetry that is relevant for the test but changes in information asymmetry, as the firms' specific level of information asymmetry is assumed to be priced in the bond at initiation. If the market is volatile, however, there is a general increase in information asymmetry between firms and outsiders which will affect the probability of mispricing.

Third, in order to corroborate our interpretation of results as market timing in bond repurchases, we investigate whether repurchases in the open market are executed under more favorable terms to issuers than tender offers. We perform two tests: 1. a return analysis comparing the one year ahead returns on the bonds repurchased (or comparable bonds in case the entire series was repurchased) and find that after controlling for year, and industry fixed effects and the firm's credit rating, the returns on bonds following open market repurchases are higher than returns following tender offers, and 2. an analysis of the impact of each repurchase method on issuers' income statement. Unlike stock repurchases, bond repurchases have a direct effect on issuers' income statement as "gains/losses from extinguishment of debt".[7] We hypothesize and find a positive association between the choice to repurchase bonds in the open market and gains from extinguishment of debt recognized in the income statement. Both of the above findings support the hypothesis that managers time the market and exploit bond holders by repurchasing their bonds in the open market.

Finally, we provide additional evidence consistent with managers possessing private information prior to bonds' repurchases. We rely on extensive literature which documents that insiders' trades are based on superior knowledge (Piotroski and Roulstone, 2005, Beneish and Vargus, 2002, Rozeff and Zaman, 1998) and predict that if open market bond repurchases are based on superior insider information and are associated with wealth transfers from debt holders to shareholder, they will be accompanied by increased purchases of the firm's stock by insiders.

[7] Gains and Losses from extinguishment of debt are calculated as the difference between the payment made to extinguish the debt and the book value of the debt, and do not necessarily reflect the market value of the gain. However, unless there is a systematic difference in the book values between debt repurchased using tender offers and debt repurchased using the open market method, results would be consistent with both economic and accounting gain.

Consistent with the above prediction, we find an abnormal increase in insider trading around the period in which issuers make bond repurchases in the open market.[8]

As periods of market turbulence can be accompanied by liquidity shocks, an argument can be made that during times of liquidity contractions, firms may not want to commit the larger amounts of funds needed for a tender offer, and instead use open market repurchases to adjust their debt ratios. The repurchase method could also reflect change in market power between seller and buyer (during times of illiquidity, sellers may be looking for buyers as opposed to buyers looking for sellers). To rule out illiquidity as an alternative explanation to our findings we perform two sensitivity analyses: 1) we verify that our measures of the level of uncertainty (VIX and SPREAD) do not capture also illiquidity levels by replacing both uncertainty measures in the analysis with the residuals of a regression of these measures on the Amihud (2002) market illiquidity measure, and 2) we rerun all of the analyses excluding year 2008 observations from the analysis. All results remain qualitatively intact.

Our study contributes to the existing body of research in several ways. First, it extends evidence of the market timing literature by suggesting that market timing exists for debt repurchases and firms exploit situations in which bonds are likely undervalued to repurchase them in the open market. The evidence provided is important especially in light of the costs of timing the market in repurchasing debt: 1. Given that the bond market is fragmented, illiquid and hosts fewer, more sophisticated players, a bond holder is more likely than a stock holder to know post-factum that the issuing firm took advantage of market conditions (and thereby bondholders) without disclosing it ex-ante. In a repetitive game, borrowers will take these actions into account when pricing the firm's future debt, thus increasing the borrowing costs of the firm. 2. Legal

[8] We also find an increase in insiders' purchases of stocks before tender offers, however the increase is statistically smaller than the increase around open market repurchases.

bulletins commonly warn repurchasing firms about violating insider trade and anti-fraud laws (rule 10b-5) and regulation FD. Open market bond repurchases are not pre-announced and thus may involve higher legal risks.[9]

Second, bond repurchases offer a cleaner setting than stock repurchases to identify firms' motivation to time the market in repurchasing their securities. Extant literature in accounting and finance document positive abnormal returns and subsequent long term run up in stock price following stock repurchase announcement (Ikenburry et al 1995). Researchers have interpreted these findings to be consistent with firms timing the market to repurchase their stock when they believe it to be undervalued. Researchers, however, also provide theory and empirical evidence associating stock repurchase announcements with managers signaling their private information (Vermaelen, 1981, Dann, 1981, Vermaelen, 1984, Ofer and Thakor, 1987, and Persons, 1994). In a multi-period world, if firms that announce stock buyback as a signal of private information want their future signals to be credible, they would act on the current signal and actually repurchase the stocks. Thus, empirically separating market timing from credible signaling as a motivation for the security repurchases may prove a tall order. Furthermore, Dittmar and Dittmar 2007 suggest that stock repurchase waves actually do not coincide with times of stock market undervaluation. Bond repurchases, therefore, offer a cleaner setting to identify firms' motivation to time the market in repurchasing securities. Unlike stock repurchases, public debt repurchases in the open market are not pre-announced and in most cases bondholders are not aware that the firm actively repurchases its public debt, which rules out signaling as a motivation for the security repurchase.

[9] When certain conditions are met, an open market repurchase may be classified as a tender offer forcing issuers to give favorable terms to all bond holders.

Third, this research extends our understanding of factors motivating debt repurchases and the implications of the choice of repurchase method. Bond repurchase research has so far focused on tender offers and suggested factors such as deleveraging, the cost of debt overhang, and tax considerations as motivations for public debt repurchases. Our study provides evidence consistent with firms considering their own debt as a good investment and timing the market in repurchasing it.

The rest of this study is organized as follows: Section 2 provides institutional background about transactions in the secondary bond market. Section 3 discusses related research. Development of the hypotheses is presented in Section 4. Section 5 presents sample selection procedures and empirical results. Section 6 concludes.

II. *Secondary Bond Market and Bond Repurchase*

The secondary bond market is fragmented and significantly less liquid than the stock market (Coffee and Kline, 1991, Bushman et al., 2010). Most market participants are sophisticated investors, and retail/individual investors do not play a major role. Insurance companies hold approximately 33 percent of total corporate bonds outstanding and the lion share of the rest is held by funds (Bushman et al., 2010). Corporate bond transactions in the open market are normally executed between two dealers, mostly over the phone. Neither the bondholder nor her agent are aware of who the end counterparty to the transaction is, namely whether the dealer that buys the bond acquires it for her own portfolio or she serves as an agent for a different buyer. The transaction price is privately negotiated between the two dealers.

The market information available to bond holders for the purpose of bond pricing is thin and incomplete. Corporate bond transactions are relatively sparse and the information on these transactions, though improved in recent years, is limited. As of 2002, dealers, members of the

Financial Industry Regulatory Authority ("FINRA"), are required to report deal information on bond transactions to the Transaction Reporting and Compliance Engine ("TRACE"). From February 2005, all transactions are reported through TRACE (Bushman et al. 2010). Until 2008, the information provided through TRACE included only the bond identifier, the price *inclusive* of any mark-up, mark-down or commissions, the quantity, the yield, and the time of execution. In July 2008 FINRA approved a proposal to expand disseminated data to include whether the reporting dealer is acting on behalf of a buyer, a seller or on her own behalf (the dealer identity, however, is not reported on TRACE). The proposal,[10] the comments by market participants, and FINRA's response to the comments shed light on the information environment in the bond market:

The main reason behind the additional data, as suggested by FINRA in its proposal, is that the new data allows both dealers and investors to better understand the reported prices and therefore facilitate price comparisons. The following correspondence between a member dissenting the proposal and FINRA, however, reveals FINRA's view of the usability of information provided by TRACE for the purpose of bond trading. The dissenting comment was summarized by FINRA as follows:

> "(the new data) would hamper the ability of investors trying to accumulate or dispose of positions without moving the market (as noted above) and would: (i) permit market participants to discern the trading intent of others and consequently trade in a manner that is harmful to the identified investor; (ii) permit others to intrude upon the trading strategies of an investor; (iii) increase investor costs; and, (iv) as noted above, potentially reduce liquidity….
> …. The commenters stated that such investors must be able to execute block trades and dealers must be able facilitate such trades without signaling the market because prices in the securities market are driven by supply and demand and if an institutional investor or a dealer tries to sell, or facilitate the sale of, a block without having the ability to shroud their activity, it might cost more. In addition, other market participants might try to raise prices, by buying some of

[10] SR-FINRA-2007-026, text of the Proposed Rule Change, http://www.finra.org/Industry/Regulation/RuleFilings/2007/P037552

> the desired bonds, or conversely, might try to lower prices, by selling some of the desired bonds."

FINRA responded to the comment as follows:

> "…it is unclear how, even with this additional information, a consumer of disseminated information will know who is behind a trade, the nature and extent of their strategy, and the size of the total debt position being disposed of or acquired"

Michael Lewis, an author and former bond dealer provides an illuminating description of the information environment under which bond holders operate:

> "…but in many cases the only way to determine if the price some bond trader had given you was even close to fair was to call around and hope to find some other bond trader making a market in that particular obscure security. The opacity and complexity of bond market was, for big Wall Street firms a huge advantage. The bond market customer lived in perpetual fear of what he didn't know. If Wall Street bond departments were increasingly the source of Wall Street profits, it was in part because of this: In the bond market it was still possible to make huge sums of money from the fear, and the ignorance of customers." (Michael Lewis, The Big Short, P. 62)

Furthermore, unless an issuer is willing to disclose its repurchase intentions to all investors, it has to be careful not to disclose this information to any of the bondholders in order not to violate regulation FD. The lack of information on the bondholder's side allows firms to take advantage of mispricing in the market to buy back their debt at a discount, relative to its economic price, as perceived by the issuing firm's managers.

While it may seem that repurchasing bonds in the open market is always the dominant strategy when compared to tendering the bonds, this activity is not without costs. Though unaware of the fact that the issuer is the counterparty to the transaction at the time of the sale, bondholders, being sophisticated investors, are likely to realize it ex-post. In many cases when the issuer repurchased the bond without a pre-announcement, the information about the repurchase was disclosed in the following financial statements (firms report gains and losses

from extinguishment of debt in the income statement and sometimes disclose more information in the notes[11] or in conference calls[12]). As bond issues are much more frequent than equity and because of a limited pool of investors in these securities, the notion of a multi-period game is much stronger. Investors are therefore likely to take into account "stealthy" behavior of the issuers when pricing future issuances. This means that the benefit from the repurchase in the open market has to be high enough to justify the potentially higher cost of issuing future bonds.

III. *Literature Review*

Empirical literature has focused on firms timing the market in both issuance and repurchase of their equity securities. Seyhun (1990) provides evidence on insiders' ability to time share transactions and Loughran and Ritter (1994) provide evidence of timing of seasoned equity offering, the reverse action to stock repurchases. In the context of repurchase, DeAngelo et al. (2009) provide a list of factors that motivate managers to engage in equity repurchase. Specifically, they mention: "correct market undervaluation and/or exploit outside investors by buying shares when the market price of the firm's shares is below inside-managers assessment of intrinsic value". Two stories emerge from these motivations; (1) signaling and (2) market timing. Academic literature provides support for both. Vermaelen (1981), Dann (1981), Vermaelen (1984), Ofer and Thakor (1987), and Persons (1994) provide theory and evidence consistent with stock repurchases being signals of managers' private information of security undervaluation.

[11] For example: "During December 2008 and early 2009, we used cash on hand to repurchase $100.5 million of principal face amount 2028 Notes in the open market at approximately 49.1% of their principal face value, plus accrued and unpaid interest. *Should market conditions continue to be advantageous to us, we intend to repurchase additional 2028 Notes in the open market during 2009.*" (Health Management Associates, 2008 10-k)

[12] For example: "Yeah, sure. Happy to do so, as you mentioned given the difficult economic environment we are in and the lack of visibility in terms of how deep the recession will go or how long it will last having more cash than less is a paramount now. So, we are comfortable despite the lower earnings that cash receives these days, a good use of the proceeds is sitting in cash right now, *having said that we will opportunistically seek further bond repurchases if they make sense*." (Joseph Lovejoy, CFO of Fisher Communications, Q4, 2008 Earnings Call)

Ikenberry et al. (1995) provide evidence of positive abnormal returns for "value stocks" of 45.3% over the four years following repurchase announcements. Baker and Wurgler (2002) suggest that firms' capital structure is the result of past attempts to time the equity market. In a survey paper by Brav et al. (2005), managers cite market timing as a major motivation for equity repurchase. However, because all stock repurchases are pre-announced, empirically separating between the two motivations, namely whether managers are merely acting based on the signal they made (the repurchase announcement) in order to maintain credibility, or they are timing the market, is a tall order. The problem of separating signaling from market timing is portrayed in DeAngelo et al (2009):

> "…theoretically investor exploitation cannot provide a viable stand-alone explanation for the decision to buy back stock. Specifically, if managers' only motivation for buying back stock is to exploit outside investor by repurchasing stock on the cheap, no investors will *knowingly* sell the stock to the firm because any attempt to repurchase stock fully reveals that the offer price is too low."

This separation is important also in light of evidence in Dittmar and Dittmar (2007) that suggests that repurchase waves do not coincide with times of low stock valuations.

Compared with the abundance of evidence on stock repurchases, evidence on the drivers of debt repurchase is scant and focuses mainly on tender offers. Chattergee, Dhillon and Ramirez (1995) compile a sample of 16 tender offers and 30 exchange offers of distressed firms to analyze the effectiveness of coercive techniques in alleviating the holdout problem. They find that coercion is not necessarily detrimental to bondholders. They report a positive stock price and bond price reaction to the tender announcement and suggest that for distressed firms, both bond holders and shareholders benefit from coerced repurchases as the costs of court restructuring are avoided. They also report that the severity of the holdout problem affects the decision of whether to use tender offers or exchange offers. In their discussion, though not specifically referring to

open market repurchases, the authors point to an important difference between tender offers and open market repurchases; the holdout problem is less likely to exist when using open market repurchases because bondholders do not know who the buyer counterparty is and therefore the price the buyer will have to pay in an open market repurchase is likely to be lower than in a tender offer. Indeed, Mann and Powers (2007) document an average premium of 5.55% over market bond prices in tender offers.

Julio (2007) compounds a sample that includes both tender offers and open market bond repurchases and conducts a detailed investigation of the agency cost of debt overhang as a motivation for debt repurchase. He finds that agency cost of debt overhang is an important consideration in a firm's decision to repurchase debt. He argues that the agency cost of debt overhang is only one of the drivers of the decision to repurchase debt and suggests that another potential motivation is that managers may view their firms' bonds as underpriced and as such, a good investment.[13]

Recently, Kruse Nohel and Todd (2009) documented positive stock returns around firms' announcements of bond tender offers. The authors provide evidence suggesting that the reaction to the announcement depends on factors such as the cost of binding protective covenants and financial distress, the firm's capital structure, the source of repurchase financing, and tax effects.

[13] This view is also supported by anecdotal evidence provided to us in discussions with corporate finance groups at large banks that provide corporate finance advisory services to industrial firms.

IV. *Data and Descriptive Statistics*

We base our sample of bond repurchases on the Mergent database which contains details on issuance as well as changes in series of corporate bonds.[14] The database includes information on bond characteristics as well as changes in traded series of bonds due to maturity, call, exchange, tender, repurchase, etc. We are interested only in the tender and open market repurchase classifications in the database. The database contains 1,895 observations of bond repurchases executed in the open market or via tender offer between 1998 and 2009. We first eliminate observations of bonds repurchased due to a put option exercised by bond holders. We also eliminate any government agency bonds as well as bonds originating in the financial industry, which reduces our sample to 440 firms. Requiring the availability of financial data from Compustat reduces the sample 332 observations. Specific requirements by different analyses (e.g. gains and losses from extinguishment of debt, bond price data) reduce the sample for each particular analysis. Data on credit spreads is taken from Federal Reserve of St Louis (FRED) website, bond prices are taken from TRACE, *VIX* data is taken from CBOE, and data to calculate the Amihud (2002) illiquidity measure is taken from CRSP. Table I summarizes the sample filter procedures.

[Insert Table I here]

Table II reports the distribution of our sample across 2-digit SIC industries. The number of repurchases range from 34, or 8 percent of our sample firms (Electric, gas, and sanitary services) to 1, or 0.3 percent of the sample (13 different industries). Overall repurchases

[14] We acknowledge that the Mergent database in not complete as noted in Julio (2007), however, when we compare our statistics to those provided in Julio (2007) who manually collected data on additional repurchases, we do not find evidence that would lead us to be concerned of a systematic bias due to sample selection issues.

are distributed across a fairly wide range of industries and do not reflect major clustering in specific industries.

[Insert Table II here]

Table III, Panel A reports descriptive statistics on repurchasing firms by method of repurchase. Statistics suggest an interesting difference between firms that repurchase bonds in the open market and those that repurchase via tender offer: Firms that repurchase bonds in the open market are less cash constrained. This may suggest that open market repurchasing firms have more slack to repurchase debt. Tendering firms are generally larger than firms repurchasing their bonds in the open market (median size of 3.6 B$ Vs 1.6 B$). The leverage of the median tendering firm is slightly higher than that of the open market repurchase firm (43% Vs 38%). Firms in our sample are mostly not distressed (median cash to short term debt of around 3.3 for both open market and tender offers). Both tender offers and open market repurchase firms experience as a group a year of relatively weak performance prior to the repurchase. The median ROA is close to zero for both groups suggesting that on average firms that repurchase their debt did not perform well in the year leading to the repurchase. Finally, the median firm that repurchased its debt in the open market reports a gain from extinguishment of debt whereas the median firm that repurchased debt via tender offers reports a loss.[15]

[Insert Table III here]

[15] Gains and losses from extinguishment of debt are not limited to open market and tenders and include all types of bond buybacks, such as put option exercised by the holders and call option exercised by the issuers.

Table III, Panel B reports descriptive statistics of repurchase characteristics. Open market repurchases are smaller in size, both absolute (median of 130 M$ for tender offers compared with 50 M$ for open market repurchases) and as a ratio of the repurchasing firm's total assets. Tender offers also retire a larger portion of the issue (median portion retired of 91% in tender offers compared with 47% in the open market repurchases). There is no marked difference between the two methods with respect to the initial maturity and the remaining maturity of the repurchased debt.

V. *Empirical Analysis*

(a) Bond Repurchase in Times of Market Turbulence

Calomiris and Hubbard (1990) suggest that when balance sheets are initially weak, high potential losses accentuate adverse selection problems, making lenders uncertain whether a borrower is of a high or low credit risk. Mishkin (1997) and Mishkin and White (2002) suggest that stock market crashes heighten informational problems arising from adverse selection and moral hazard. Bernanke and Gertler (1989) suggest that stock market crashes that reduce net worth accentuate moral hazard problems. As pointed out in Mishkin and White (2002):

> "Uncertainty, which often accompanies a stock market crash in the form of increased volatility of asset prices, will also make it more difficult for lenders to screen out good from bad firms"

This statement implies that at times of market turbulence, when uncertainty makes it harder for bondholders to distinguish good firms from bad firms, mispricing is prevalent such that a larger portion of bond securities may be traded below the economic value. Our conjecture is that in turbulent times, managers of good firms will want to take advantage of downward

mispricing to repurchase their bonds at a discount relative to their beliefs of the bonds' value. We therefore predict a positive association between the level of uncertainty and the likelihood of bond repurchases in the open market as opposed to a tender offer.

To test our prediction we use two variables to capture the level of uncertainty in capital markets: 1. The Chicago Board Options Exchange Market Volatility Index (*VIX*) which measures the implied volatility of S&P 500 option index. This measure is often referred to as the *fear index* or the *fear gauge*. 2. The credit spread between BBB rated corporate bonds and the risk free rate (*SPREAD).* Duffie and Lando (2001) and Cetin et al (2004) model the term structure of credit spreads under incomplete information and both suggest that increasing information risk and increasing information asymmetry lead to wider credit spreads. *VIX* / *SPREAD* are measured as the average level in the month prior to an announcement of a tender offer or the month prior to an open market repurchase. In cases in which either the announcement date of a tender offer is unknown or the actual date of the open market repurchase is unknown, the VIX / SPREAD used correspond to month t-3 relative to the effective date in the database.[16] Both variables are market level measures of capital market turbulence.[17]

Univariate Analysis

Figure I plots the number of repurchases in our sample over time as well as the percentage of repurchases using the tender and open market methods. The graph displays a sharp increase in

[16] Announcement dates of tenders are hand collected. If the date was not found we use the average of 45 days between announcement and culmination of the deal as a benchmark and therefore use the average of the VIX / credit spread in the month prior to these 45 days (month t-3). In the event that the specific date of the open market repurchase is unknown, the Mergent database uses the end of the quarter as its "effective date" of repurchase. We therefore take the last month of the previous quarter in our analysis. Using this approach eliminates the forward looking bias that may be associated with using contemporaneous quarterly data of the variables and the decision to repurchase. However, as a robustness test we also use the contemporaneous quarterly data. Results are robust to this change.

[17] We use market level measures for level of uncertainty of an individual firm because we do not have data and therefore cannot control for the bond holding dispersion which is arguably a factor in the choice between a tender offer and an open market repurchase. We do not expect this missing variable to affect our analysis as it is reasonable to assume that holding dispersion is orthogonal to *VIX* and *SPREAD*, the market-level explanatory variables we use in the analysis.

the number of bond repurchases over the years from 15 in 1998, the first year of our sample to 77 in 2009, the last year of the sample. Consistent with expectation, the time series suggests that while generally the vast majority of debt repurchases are performed via tender offers, in years of market turbulence, open market repurchases are more common. In years characterized by relatively low market volatility the number of open market repurchases (49) out of total bond buybacks (238) in our sample is 21%. In the three years of market turbulence (2002, 2003, and 2008) the fraction of open market repurchases out of total repurchases increases to 65%. The most striking increase in the percentage of open market repurchases occurs in 2008 (70% of total bond repurchases).

[Insert Figure I here]

Regression Analysis

Though we build on extant economic literature that suggests that increased uncertainty at times of capital market turbulence depresses bond prices, we first validate that this maintained premise holds true in our setting. If bonds are truly undervalued due to increased uncertainty, a signal that resolves some of the uncertainty about the issuer's ability to repay its debt is likely to be more valuable than at times of lower uncertainty. Specifically, since a tender offer announcement is a signal that reduces uncertainty, it is likely to be more valuable when uncertainty is high than when uncertainty is low. If the value of a signal is higher in times of heightened uncertainty, firms tendering their bonds will be required to offer a higher premium over market price in order to repurchase their bonds making the benefits of stealthy behavior greater.

We measure the premium offered in a tender offer ($PREM_{i,t}$) as the difference between the offer price and the mean execution price of transactions in the bond over a period of 30 days

before the tender announcement date deflated by the pre-announcement mean execution price and predict a positive association between the two measures for uncertainty in capital markets (*VIX and SPREAD*) and the premium offered in the tender. Results are reported in Table IV.[18] Consistent with our prediction, the coefficients on *VIX and SPREAD* are both positive and significant (*VIX*: coefficient=0.01, t-stat=6.02, *SPREAD*: coefficient=0.04, t-stat=4.25). Results suggest that at times of market turbulence bond prices are depressed due to increased uncertainty, such that a positive signal on issuers' ability to pay the debt results in a larger revision to the presiding price which forces issuers tendering their bonds to offer a higher premium over the market price. In other words, the cost of a tender offer, in terms of premium over the market price, is higher in times of market turbulence than it is at times of low volatility in asset prices.[19]

[Insert Table IV here]

Next we analyze the relation between uncertainty in capital markets and the choice of repurchase method. We develop the following model to test our prediction above:

$$(1) \quad OMR_{i,t} = \alpha + \beta_1 ACTIONSIZE_{i,t} + \beta_2 PCT\_SERIES_{i,t} + \beta_3 CASH_{i,t-1} + \beta_4 OCF_{i,t-1} + \beta_5 OCF_{i,t} + \beta_6 LNTA_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 LEV_{i,t-1} + \beta_9 INC\_LEV_{i,t-1} + \beta_{10} VIX_{t-1}/SPREAD_{t-1} + \varepsilon_{i,t}$$

[18] We include all the control variables of the main model of the repurchase method choice in the analysis of the premium as these factors that affect the method choice may also affect the premium an issuer is willing to offer in a tender.

[19] The number of observations in this analysis includes only tender offers and is reduced due to data availability on bond prices. Due to data availability we begin this analysis in year 2004.

The dependent variable, $OMR_{i,t}$, is an indicator variable equal to 1 if the bonds were repurchased in the open market and 0 if they were repurchased using a tender offer. The model is estimated using a logistic regression and we predict a positive association between the explanatory variables and the likelihood of repurchase in the open market. The first nine RHS variables represent control variables and are included in the model to capture factors that may affect the choice between a tender offer and an open market repurchase of bonds. Holding differences in the expected costs (i.e. execution price) of the repurchase methods constant, issuers will generally prefer a tender offer when they are interested in retiring the whole series or a large portion of it, when they want to eliminate covenants of the series and for that purpose want to use coercive techniques, and when bond holders are dispersed and finding and negotiating with them may be costly. Since tender offers require a cash commitment and are frequently larger in size than open market repurchases, availability of cash may also play a role. We therefore include the following control variables: $ACTIONSIZE_{i,t}$: repurchase size, measured as the ratio of the repurchase amount to the firm's total assets. If the issuer wishes to repurchase relatively large amounts of debt, the efficient to do that will be through a tender offer. Hence, we predict β_1 to be negatively associated with the choice to repurchase debt in the open market. $PCT\_SERIES_{i,t}$ is the percentage of the outstanding series repurchased. Open market repurchases involve a one on one negotiation with each of the bond holders making it more complicated to repurchase complete series of bonds. Issuers that want to repurchase a large percentage of the series will prefer a tender offer. We therefore expect β_2 to be negative. $CASH_{i,t-1}$ (the ratio of cash to total assets (Compustat *che/at*)), $OCF_{i,t-1}$ (operating cash flow in the year prior the repurchase (Compustat *oancf/at*)), and $OCF_{i,t}$ (operating cash flow in the year of the repurchase) are three variables that control for the repurchasing firm's availability of cash. We do not have directional

predictions for these variables. On the one hand, the higher levels of cash required for tender offers suggests a prediction of negative coefficients. On the other hand, if a motivation of the repurchase in the open market is to exploit market conditions that depress bond prices of good firms, coefficients may be positive or not play a role in the choice at all.

Though our sample includes only firms that had made the decision to repurchase debt, we also add to the regression factors identified in prior literature to affect a firm's decision to repurchase debt in order to account for the possibility that the decision to repurchase debt is correlated with the method of repurchase. $LNTA_{i,t-1}$, the natural logarithm of total assets (Compustat *at*), controls for any firm size effect on the choice. $ROA_{i,t-1}$ (return on assets) controls for firm performance in the year leading to the repurchase. $LEV_{i,t-1}$ is firm leverage measured as total debt to total asset (Compustat (*dlc+dltt)/at*). The more highly levered the firm, the higher the likelihood of being closer to a violation of restrictive covenant and therefore, the higher the likelihood that the issuer would like to repurchase bonds to de-lever. $INC\_LEV_{i,t-1}$ is a dummy variable equal to 1 if the issuer's leverage increased in the year prior to the repurchase, and zero otherwise. An increase in leverage may bring firms closer to violating their covenants and therefore drive firms to repurchase debt. We expect these factors to primarily affect the decision to repurchase debt and not to influence the choice of repurchase; therefore we do not have directional prediction on their effect on the choice of repurchase method. All estimations are run using year dummies and 2-digit SIC codes industry fixed effects.

Table V reports results of the choice analysis. Columns 1 and 2 present results of the uncertainty proxies, *VIX* and *SPREAD* respectively. Coefficients on our control variables are generally in line with expectations. When issuers retire a large portion of the series they will tend to choose a tender offer over an open market repurchase. Consistent with descriptive evidence,

tendering firms tend to be larger in size. Consistent with our prediction, both *VIX* and *SPREAD* coefficients are positive and significant at the 1% level (*VIX*: coefficient=0.09, z-stat=2.71, *SPREAD*: coefficient=0.61, z-stat=2.53). These results are economically significant. One standard deviation in the *VIX (SPREAD)* measure is equivalent to a 15% (20%) change in the likelihood that the firm would repurchase the bond in the open market and not via a tender offer.

[Insert Table V here]

Next, we test whether open market repurchases are more common than tender offers at times of market turbulence. We run a time series regression using the 48 quarters from 1998 to 2009 in which our dependent variable is the ratio of open market repurchases to total number of bond repurchases and the explanatory variable is either *VIX* or *SPREAD*[20]. Results are reported in Table VI. Consistent with our prediction, we find a statistically significant positive association between both *VIX* and *SPREAD* and the proportion of bond repurchases that are executed in the open market (*VIX*: coefficient=0.018, t-stat=4.81, *SPREAD*: coefficient=0.123, t-stat=3.37). These results suggest that in periods of stock market turbulence the balance between the two repurchase methods shifts from tender offers towards open market repurchases.

[Insert Table VI here]

Taken together, the above evidence is consistent with the notion that at times of heightened market uncertainty, firms motivated by market timing tend to prefer to repurchase their debt in the open market, taking advantage of potential mispricing.[21]

[20] For this specification we use the contemporaneous quarterly average of the VIX / SPREAD.

[21] It may be argued that an alternative explanation to these results is that uncertainty drives firms to be more reluctant to use tender offers because the firm has to commit to a cash outlay, whereas when purchasing debt in the open market the firm retains the flexibility to stop at any time. Although we cannot rule out the later as the sole

(b) Effects of the Choice of Bond Repurchase Method:

Returns Analysis:

If indeed the ability to exploit superior information to time the market is the motivation for repurchasing bonds in the open market as opposed to tendering for the bonds, we should observe higher long term returns on bonds repurchased in the open market than on bonds repurchased via tender offers. Consistent with that notion we predict a positive association between the use of open market repurchase and the ex-post bond return. We use the following model to test our prediction:

(2) $ANNUAL\_BOND\_RETURN_i = \alpha + \beta_1 OMR_i + \beta_2 FIRM\_RATING_i + \varepsilon_i$

Where $ANNUAL\_BOND\_RETURN_i$ reflects the one year ex-post return on bonds for the firm repurchasing debt. We follow Bessembinder et al. (2009) and calculate actual 1-year forward returns of the repurchased bonds or, if the entire series was repurchased, the median of the repurchasing firm's traded bonds' return in the period. We control for the credit rating of the firm by incorporating $FIRM\_RATING_i$, a variable reflecting the long term S&P rating of the firm. This control variable is important as riskier bonds will yield higher returns (given survival of the firm). We follow Sharpe and Nguyen (1995) and construct the credit rating variable by assigning each of the observations a number between 1-5 where 1 corresponds to the highest rating and 5 corresponds to unrated firms.[22] OMR_i is our explanatory variable - a dummy

explanation for the choice of the open market method, this is unlikely given: 1) that tender offer firms hold less cash than open market repurchases firms, 2) our analysis of the insider trade activity below, and 3) the fact that our results hold when we exclude year 2008 from the analysis.

[22]Sharpe & Nguyen (1995) use individual dummy variables for each group. We pool the dummy variables into one credit rating variable. Our results are robust to individual groupings as well.

variable equal to one for an open market repurchase, and zero for a tender offer. We also include year and industry fixed effects to control for time variation and industry effects.

Panel C of Table III reports descriptive statistics of the returns in our sample. Overall, returns data is available for 150 firms of which 93 are tender offers and the remaining 57 are open market repurchases. Both mean and median of open market repurchase bonds' returns are higher than of tendering firms bonds' returns. Regression analysis, reported in Table VII, provides consistent evidence. After controlling for the firm's rating year and industry fixed effects, bonds of firms using the open market repurchase method yield on average 18% higher returns than bonds of firms using the tender offers.

[Insert Table VII here]

Gains and Losses from Extinguishment of Debt:

Debt repurchases directly affect issuers' reported earnings through "gains and losses from extinguishment of debt". When firms repurchase their own debt they record a gain (loss) from extinguishment of debt if the carrying value of the debt is higher (lower) than the repurchase price. It is not ex-ante clear whether open market repurchases would result in larger gains than tender offers. On the one hand tender offers are much larger in scale, extinguishing a larger portion of the series of bonds (annual median size of 178 M$ for tender offers compared with 67 M$ for open market repurchase). On the other hand, tenders are usually offered at a premium over the presiding market price. A positive association between open market repurchases and income statement gains relative to tender offers, however, would suggest that open market repurchases result in higher reported income than tender offers. We estimate the following model in order to test the impact of the choice of bond repurchase method on issuers' income statement:

(3) $GAIN_{i,t}=\alpha+\beta_1 LNTA_{i,t-1}+\beta_2 LEV_{i,t-1}+\beta_3 ROA_{i,t-1}+\beta_4 OMR_{i,t}+\varepsilon_{i,t}$

Where $GAIN_{i,t}$ is extraordinary gains/losses from extinguishment of debt deflated by total assets (Compustat *dtep/at*).[23] We control for factors that are likely to affect the gains / losses from extinguishment of debt. $LNTA_{i,t-1}$ - larger firms tend to have more outstanding debt than smaller firms making them more likely to repurchase debt and to recognize gains or losses. $LEV_{i,t-1}$ - highly levered firms are more likely to engage in repurchase activities and generate gains or losses. $ROA_{i,t-1}$ - controls for issuers' performance a year before the repurchase. Firms' accounting based performance may affect their need to repurchase debt as it affects the likelihood of the firm violating covenants used in debt contracts. The explanatory variable, $OMR_{i,t}$, is a dummy variable equal to one for an open market repurchase, and zero for a tender offer. If open market repurchases result in higher gains from extinguishment of debt we expect β_4 to be positive and significant. In two additional specifications we add ACTIONSIZE and an interaction of ACTIONSIZE and OMR as explanatory variables.

Table VIII reports results of the three alternative OLS specifications analyzing the gains and losses from extinguishment of debt. In Column 1 we report coefficients of the baseline regression that does not control for the size of the repurchase. In column 2 we add the size of the repurchase as a control variable and in column 3 we add an interaction between the method of repurchase and its size. In all regressions the dependent variable is the income statement gains/losses from extinguishment of debt. Consistent with our expectation, β_4 is positive and significant (coefficient=0.02, t-stat=3.17), suggesting a positive association between the choice to repurchase debt in the open market versus via tender offer and gains from extinguishment of

[23] Gains and losses from extinguishment of debt (Compustat *dtep*) includes all gains and losses from firms buying back their debt and therefore it is a noisy measure for gains and losses from open market or tender offer. This noise, however, has the effect of attenuating our results.

debt in the income statement. Thus, from an income statement perspective, when compared with tender offers, open market repurchases increase the firm's net income. Furthermore, columns 2 and 3 report that after the inclusion of the repurchase size, the association between the choice to repurchase in the open market and the gains from extinguishment of debt remains positive and significant at 1 percent level, suggesting that transactions of bond repurchase in the open market are executed at a larger discount relative to their book value than tender transactions.

[Insert Table VIII here]

Abnormal Insider Buys*:*

Insider trading has been associated in the literature with insiders taking advantage of their superior knowledge about the firm to generate personal gains. Piotroski and Roulstone (2005) suggest that insider trade is based on superior knowledge of future cash flows and security misevaluation, while Beneish and Vargus (2002) provide evidence consistent with insider trade based on superior knowledge as to the earnings quality and valuation implications of accruals. Rozeff and Zaman (1998) provide evidence suggesting that insider trading increases at times of market overreaction.

In the context of our study, if issuers time the market by repurchasing debt in the open market, and they are willing to sacrifice cash on hand to do so, it suggests that insiders believe that the company's debt at current market price constitutes an investment with expected returns higher than the current expected returns implied by the company's stock price. Therefore, they would be actively buying the firm's stock. Since tender offers of the firm's public debt could signal positive information about the firm, insider trades may also increase before bond tender announcement. However, as tender offers are offered at a premium over the market price, and

because we expect opportunism to occur when expected returns are high given the costs associated with bond repurchase, we also expect insider trading to be more pronounced during open market repurchases.

To test our prediction we follow Core et al. (2006) and test the following model:

(4) $INSIDER_{i,q}=\alpha + \beta_1 LNTA_{i,q-1} + \beta_2 INSIDER_{i,q-1} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 OPEN_{i,q} + \beta_7 TENDER_{i,q} + \varepsilon_{i,q}$

Where $INSIDER_{i,q}$ is the ratio of insider buys to total insider trades in quarter q $[Buy_{i,q} / (Buy_{i,q}+Sell_{i,q})]$ and $Buy_{i,q}(Sell_{i,q})$ is the number of shares purchased (sold) by the top five executives of firm i during calendar quarter q. $LNTA_{i,q-1}$ is the natural logarithm of total assets. $OPEN_{i,q}$ is a dummy variable equal to one if the firm repurchased debt in the open market in quarter q, and zero otherwise. $TENDER_{i,q}$ is a dummy variable equal to one if the firm announced a tender to repurchase debt in quarter q, and zero otherwise. We predict the coefficients on both $OPEN_{i,q}$ and $TENDER_{i,q}$ to be positive and that the $OPEN_{i,q}$ coefficient will be significantly larger than the $TENDER_{i,q}$. coefficient. We also include year / quarter dummy variables to address seasonality in insider trading behavior[24] and industry fixed effects[25].

Table IX reports results of the insider trading analysis. Column 1 reports the coefficients of a regression estimated using a sample that includes only firms that repurchased debt, column 2 reports results of a regression estimated using all firms that report insider trading activity. Results are qualitatively similar. Consistent with Core et al (2006) we find that insider trading in quarter q is positively associated with insider trading in quarter q-1 and negatively associated

[24] Core et al. (2006) use fiscal year and quarters. We use Calendar year and quarters in order to capture effects of external shocks such as the financial crisis.

[25] As a robustness test we also include the explanatory variables (OPEN and TENDER) in period t+1 to test whether any of the insider trades are initiated in anticipation of the repurchase a few months prior to the actual event. Results are insignificant and do not change the qualitative results presented of the explanatory variables in table IX.

with size. Consistent with our expectation, the coefficients on both open market repurchases and tender repurchases are positive and statistically significant (tenders with a coefficient=0.12, t-stat=2.83 and OMR with coefficient=0.36, t-stat=7.46) suggesting that periods of open market bond repurchase and periods prior to tender announcements are often accompanied by insiders trading on their private information by buying the company's stock. Interestingly, the coefficient on open market repurchase is almost three times as large as that of tender offers, with the difference between the two coefficients significant at the 1% level, suggesting that open market repurchases are more beneficial to shareholders and likely transfer more wealth from bondholders to shareholders. In an untabulated analysis we also include in the regression the average quarterly *VIX* to rule out the possibility suggested in Rozeff and Zaman (1998) that the abnormal insider trade is a result of market overreaction which is likely to occur in times of turbulence. Consistent with Rozeff and Zaman (1998) the coefficient on the *VIX* is positive and significant, however results for the open market repurchase and tender periods are qualitatively intact.

[Insert Table IX here]

(C) Robustness Tests and Additional Issues:

A. Liquidity Shock as an Alternative Explanation

Year 2008 is unique in almost every economic aspect. The magnitude of the financial crisis had not been seen since the great depression. For the purpose of our study, 2008 may have significant influence on the results as the capital market crisis was accentuated by a liquidity shock. Liquidity could potentially offer an alternative explanation to the information hypothesis developed in this study. One of the drivers of choosing the tender offer to repurchase bonds over the open market is that when bond holders are dispersed it may be difficult and costly for issuers

to identify them and negotiate with each of them separately. A liquidity shock turns the market into a "buyers' market" where bond holders, seeking to sell portfolios, look for a willing buyer and execute the transaction in the open market. Because both VIX and SPREAD spiked in 2008, it could be argued that they may be capturing an increased liquidity constraint, and not increased uncertainty.

However, illiquidity as an alternative explanation is not consistent with results in Table IV that suggest a positive correlation association between VIX and SPREAD and the premium offered in tenders. Absent asymmetric information, tenders are actually easier to complete at times of low liquidity when bondholders searching for liquidity become more willing sellers. Therefore, in times of illiquidity issuers are less likely to face the holdout problem and can offer lower premiums in tender offer. Thus, if our explanatory variables (VIX and SPREAD) do capture a liquidity constraint and not information asymmetry, the relation between them and the premium offered in a tender offer should be negative and not positive as presented in Table IV.

Nevertheless, we perform two additional sensitivity analyses in order to rule out illiquidity as the sole explanation of the results: First, we repeat all our analyses excluding calendar year 2008 observations. All our results and inferences are qualitatively intact. Second, we follow Amihud (2002) and construct an average market illiquidity measure using daily stock returns and trading volume data. We use a two stage estimation method to ensure that the measures used in this study to capture uncertainty (VIX and SPREAD) do not in fact capture illiquidity. In the first stage, we use a time-series regression, regress each of the variables VIX and SPREAD on the Amihud illiquidity measure, and compute the residuals from these regressions. These residuals are orthogonal to illiquidity and represent the information component of the VIX and SPREAD. In the second stage we re-estimate regression (1) to test

our main prediction of the choice of repurchase method replacing VIX and SPREAD with the residuals from the first stage regression. Results are reported in Table V columns 3 & 4. The coefficient on both alternative measures are significant, suggesting the liquidity component of the VIX and SPREAD, if exists, is not the sole driver of the results.

B. Firm-level measure of increased information asymmetry

Throughout the analysis we use market-level measures to gauge times of increased uncertainty and market turbulence. This approach has two advantages: 1) Market-level measures better capture situations of investors pooling good and bad firms which cannot be captured by firm-level measures. 2) Market-level measures are largely independent of firm level characteristics that may have been omitted from the analysis or not controlled for properly. For robustness purposes (untabulated) we replace the market level measures with a firm-level measure. We use a dummy variable equal to one if the firm experienced an increase in information asymmetry, measured as a positive change in firm's effective bid-ask spread, and zero otherwise, and find that the likelihood that a firm would use the open market to repurchase its debt rather than a tender offer increases with that measure.

VI. *Conclusion:*

This study focuses on an important firm activity that received relatively little attention in academic literature; that of the open market repurchases of public debt. We analyze the stark difference in the choice of bond repurchase method between times of market turbulence and times of relative calm and provide evidence that firms exploit the fragmented secondary market for corporate bonds and time their repurchases in the open market in a way that likely takes advantage of temporal mispricing.

First, we provide evidence that as costs of tender offers increase at times of heightened market uncertainty, issuers are more likely to repurchase their debt in the open market than through a more transparent tender offer. Second, we document that returns on bonds repurchased in the open market are higher than returns on bonds repurchased via tender offers and that open market repurchases result in higher accounting profits. Finally, we provide evidence that insiders take advantage of their private information by showing an abnormal volume of insider buys at times of open market repurchases.

The evidence in this study may have implications to enforcement agencies as it suggests that firms may use bond market imperfections to take advantage of inside information, exacerbated by uncertainty across capital markets. In these cases it may be argued that firms' intention to repurchase bonds in the open market is, in and of itself, material information that warrants disclosure ex-ante.

References

Amihud, Y., 2002. Illiquidity and Stock Returns: Cross Section and Time Series Effects. Journal of Financial Markets 5: 31-56.

Aneiro, M., 2009, Debt buybacks garner a tax incentive, Wall Street Journal, March 12.

Baker, M., and J. Wurgler, 2002. Market timing and capital structure. The Journal of finance 57: 1-32.

Beneish, M.D., and M.E. Vargus, 2002, Insider trading earnings quality and accrual mispricing, The Accounting Review 77: 755-791.

Bernanke B., and M. Gertler. 1989. Agency Costs, Net Worth and Business Fluctuations, The American Economic Review 79: 14-31.

Bessembinder, H., K.M. Kahle, W.F. Maxwell, and D. Xu. 2009. Measuring Abnormal Bond Performance, The Review of Financial Studies 22 (10): 4219-4258.

Brav, A., J. R. Graham, C. R. Harvey, and R. Michaely. 2005. Payout in the 21st century, Journal of Financial Economics 77: 483-527.

Bushman, R., A. Le, and F. Vasvari. 2010. Implied bond liquidity. Working paper, The university of North Carolina and London Business School.

Calomiris, C.W., and R.G. Hubbard, 1990, Firm heterogeneity, internal finance, and credit rationing, The Economic Journal 100: 90-104.

Cetin, U., R. Jarrow, P. Protter, and Y. Yildirim. 2004. Modeling credit risk with partial information. The Annals of Applied Probability 14: 1167-1178.

Chattarjee, S., U.S. Dhillon, and G.G. Ramirez, 1995, coercive tender and exchange offers in distressed high yield debt restructurings. An empirical analysis, Journal of Financial Economics 38:113-138.

Coffee, S., and W. Klein, 1991, Bondholders coercion: the problem of constrained choice in debt tender offers and recapitalizations, University of Chicago Law Review 58: 1207-1273.

Comment, R. and G.A. Jarrell, 1991, The relative signaling power of Dutch-auction and fixed price tender offers and open-market share repurchases, Journal of Finance 46: 1243-1271.

Core, J.E., W.R. Guay, S.A. Richardson, and R.S. Verdi, 2006, Stock Market Anomalies: What Can We Learn From Repurchases and Insider Trading? Review of Financial Studies 11: 49-70.

Dann, L.Y., 1981, common stock repurchases: An analysis of returns to bondholders and stockholders, Journal of Financial Economics 9:113-138.

DeAngelo, H., L. DeAngelo, and D. Skinner, 2009. Corporate Payout Policy. Foundation and Trends in Finance (3) 95-287.

Dittmar, A., and R., Dittmar. 2007. The timing of stock repurchases. Working paper, University of Michigan.

Duffie, D., D. Lando. 2001. The term structure of credit spreads with incomplete accounting information. Econometrica 69: 633-664.

Ikenberry, D., J. Lakonishok, and T. Vermaelen, 1995. Market underreaction to open market share repurchases. Journal of Financial Economics 39: 181-208.

Julio, B.R., 2007, Overcoming overhang: Agency costs, investment and the option to repurchase debt. Working paper London Business School.

Kruse, T., T. Nohel and S.K. Todd, 2009. The decision to repurchase debt. Working paper, Loyola University.

Lewis, M., 2010, The big short. W.W.Norton & Company Publishers.

Li, K. and W. McNally, 2004, Open market versus tender offer repurchase: A conditional event study. Working paper, University of British Columbia.

Mann, S.V, and E.A. Powers, 2007, Determinants of bond tender premiums and percentage tendered, Journal of Banking and Finance 31: 547-566.

Mishkin, F.S., 1997, The Causes and Propagation of Financial Instability: Lessons for Policymakers, *Maintaining Financial Stability in a Global Economy* (Federal Reserve Bank of Kansas City, Kansas City, MO.): 55-96.

Mishkin, F.S., and E.N. White, 2002, U.S. stock market crashes and their aftermath: Implications for monetary policy, NBER working paper.

Monks, M., 2008, Borrowers itch to re-coup loans, Financial Week, November 16.

Ofer, A. and A. Thakor, 1987, A theory of stock price responses to alternative corporate cash disbursement methods: Stock repurchases and dividends, Journal of Finance 42: 365-394.

Persons, J.C., 1994, Signaling and takeover deterrence with stock repurchases: Dutch auctions versus fixed price tender offers, Journal of Finance 49:1373-1402.

Piotroski, J.D., and D. Roulstone, 2005, Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations? Journal of Accounting and Economics 39: 55-81.

Rozeff, M.S., and M.A. Zaman, 1998, Insider trading: Evidence from growth and value portfolios, Journal of Finance 53: 701-716.

Sharpe, S.A., and H.H. Nguyen, 1995, Capital Market Imperfections and the Incentive to Lease, Journal of Financial Economics 39: 271-294.

Vermaelen, T., 1981, Common stock repurchases and market signaling: An empirical study, Journal of Financial Economics 9: 313-333.

Vermaelen, T., 1984, Repurchase tender offers, signaling and managerial incentives, Journal of Financial and Quantitative Analysis 19, 163-181.

Appendix: Variable definitions

All relevant variables are winsorized at 1% extreme observations.

Variable	Definition
GAIN	Gain/loss from extinguishment of debt (Compustat *dtep*) deflated by total assets (Compustat *at*)
OMR	A dummy variable equal to one if the bond repurchase was executed in the open market, zero if using a tender offer.
PREM	Premium over the presiding market price offered by the tendering firm. Measured as the difference between the offer price and the mean execution price of transactions in the bond over a period of 30 days before the tender announcement date deflated by the pre-announcement mean execution price.
INSIDER	The ratio of insider buys to the total insider trades in quarter q $[Buy_q / (Buy_q+Sell_q)]$ where $Buy_q(Sell_q)$ is the number of shares purchased (sold) by the top five executives of each firm during calendar quarter q.
LNTA	The natural logarithm of total assets (Compustat *at*).
ROA	Issuers' return on asset. Compustat $(oibdp/(at_t+ at_{t-1})/2)$.
LEV	Leverage measured as total debt to total asset (Compustat $(dlc+dltt)/at)$.
INC_LEV	A dummy variable equal to 1 if the issuer leverage increased in the year prior to the repurchase, and zero otherwise.
ACTIONSIZE	The ratio of the repurchase amount to the firm's total assets.
CASH	The ratio of cash to total assets (Compustat *che/at*)
OCF	Operating cash flow (Compustat *oancf/at*).
PCT_SERIES	The percentage of the series repurchased.
VIX	The Chicago Board Options Exchange Market Volatility Index that measures the implied volatility of S&P 500 option index. We use two specifications: monthly average and quarterly average.
SPREAD	The credit spread between BBB rated bond and risk free rate. We use two specifications: monthly average and quarterly average.
OPEN	A dummy variable equal to one if the firms repurchased debt in the open market in quarter q, and zero otherwise.
TENDER	A dummy variable equal to one if the firm announced a tender to repurchase debt in quarter q, and zero otherwise.

ILLIQ	A time series variable of stock market illiquidity following Amihud (2002). This measure is constructed as follows: for each stock we calculate the daily illiquidity measure as absolute return / volume of trade. We then average daily illiquidity for each stock over the quarter. We discard observations with insufficient trading days, price lower than 5 at the end of the previous quarter, no market cap data and 1 percent outliers. We then average the individual stock illiquidity measure of each quarter to calculate the average market illiquidity measure.
VIX_ILLIQ_RESID	Residuals of a time-series regression with VIX as the dependent variable and ILLIQ as the explanatory variable over the sample period
SPREAD_ILLIQ_RESID	Residuals of a time-series regression with SPREAD as the dependent variable and ILLIQ as the explanatory variable over the sample period
FIRM_RATING	Groups the firm's long term S&P credit rating into 5 groups. Receives the value 1 for firms rated between AAA and AA-, 2 for firms rated between A+ and A-, 3 for firms rated between BBB+ and BBB-, 4 for firms rated between BB+ and D, and 5 for unrated firms.
ANNUAL_BOND_RETURN	One year ex-post bond return calculated following Bessembinder et al. (2008). Return is calculated using trading data for repurchased bonds or, if entire series was repurchased, median of the firm's return on traded bonds over the year following the repurchase. The return is calculated using the following formula: Bond Return = $((P_t-P_{t-1})+AI)/P_{t-1}$ where AI is the accrued interest (stated coupon in our case).

Figure I: Bond Repurchase Activity: by Type and Calendar Year

This figure plots the number of bond repurchases by calendar year (solid line) from 1998 – 2009. The two dotted lines represent the percentage of open market repurchases and tender offers from total repurchases in each calendar year.

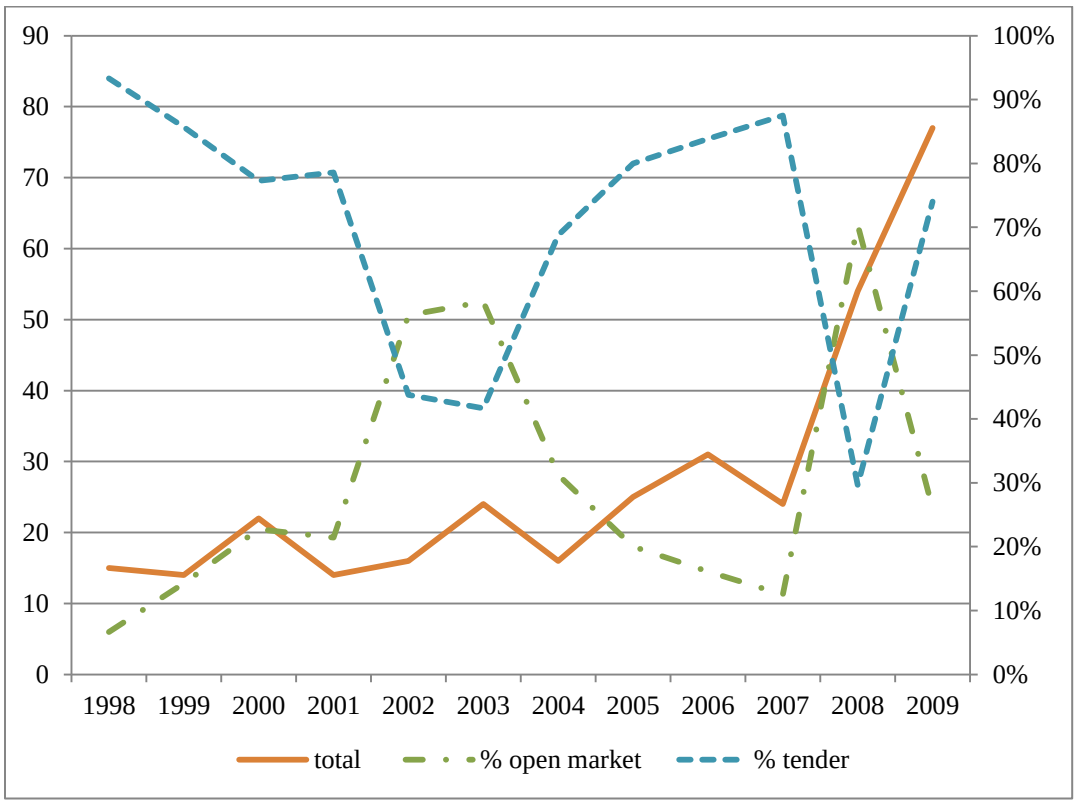

Table I: Sample filter procedure (1998 – 2009)

Mergent Database Tender (T) & Issue Repurchased (OMR)	1,895
Financial Firms (SIC 6000-SIC 6999)	(588)
Government Bonds	(37)
No CUSIP match	(649)
Put Options Exercised (hand collected)	(47)
Multiple actions per effective dates	(134)
# Observations	***440***
Availability of COMPUSTAT Financial data	108
Final Sample*	***332***

* Each of our regressions contains a subset of these observations, depending on availability of data.

Table II - Sample distribution across Industries and by method of repurchase

Industry acronym	Number of Open Market	Percentage of Sample	Number of Tenders	Percentage of Sample	Total	Percentage of Sample
Coal Mining			1	0.003	1	0.003
Oil and Gas Extraction	6	0.018	6	0.018	12	0.036
General Building Contractors	2	0.006	3	0.009	5	0.015
Special Trade Contractors			1	0.003	1	0.003
Food and Kindred Products			5	0.015	5	0.015
Tobacco Products			1	0.003	1	0.003
Textile Mill Products			1	0.003	1	0.003
Apparel and other Textile Products			1	0.003	1	0.003
Furniture and Fixtures			1	0.003	1	0.003
Paper and Allied Products	1	0.003	7	0.021	8	0.024
Printing and Furnishing	1	0.003	4	0.012	5	0.015
Chemicals and Allied Products	7	0.021	16	0.048	23	0.069
Petroleum and Coal Products	2	0.006	2	0.006	4	0.012
Rubber and Misc. Plastics Products			1	0.003	1	0.003
Leather and Leather Products			1	0.003	1	0.003

Primary Metal Industries			4	0.012	4	0.012
Fabricated Metal Products			4	0.012	4	0.012
Industrial Machinery and Equipment	9	0.027	9	0.027	18	0.054
Electrical and Electric Equipment	13	0.039	9	0.027	22	0.066
Transportation Equipment	3	0.009	8	0.024	11	0.033
Instruments and Related Products	10	0.030	6	0.018	16	0.048
Misc. Manufacturing industries			1	0.003	1	0.003
Railroad Transportation			3	0.009	3	0.009
Local and Interurban Passenger Transit			1	0.003	1	0.003
Water Transportation			2	0.006	2	0.006
Transportation by Air			4	0.012	4	0.012
Communications	9	0.027	23	0.069	32	0.096
Electric, Gas, and Sanitary Services	6	0.018	28	0.084	34	0.102
Wholesale Trade – Durable Goods	3	0.009	6	0.018	9	0.027
Wholesale Trade – Nondurable Goods	2	0.006	8	0.024	10	0.030
General Merchandise Store	3	0.009	4	0.012	7	0.021
Food Stores	1	0.003	2	0.006	3	0.009
Automotive Dealers and Service Stations	3	0.009		0.000	3	0.009
Furniture and Home Furnishing Stores	1	0.003	2	0.006	3	0.009
Eating and Drinking Places			3	0.009	3	0.009
Miscellaneous Retail			2	0.006	2	0.006
Hotels and Other Lodging Places	3	0.009	4	0.012	7	0.021
Personal Services	1	0.003	2	0.006	3	0.009
Business services	12	0.036	11	0.033	23	0.069
Auto Repair Services, and Parking			1	0.003	1	0.003
Motion Pictures			3	0.009	3	0.009
Amusement and Recreation Services	1	0.003	7	0.021	8	0.024
Health Services	5	0.015	10	0.030	15	0.045
Engineering and Management Services	4	0.012	3	0.009	7	0.021
Non-classifiable Establishments	2	0.006	1	0.003	3	0.009
Total	110	33.1	222	66.9	332	100

Table III: Descriptive statistics

Panel A – Firm characteristics by repurchase type

	Open Market Repurchase			*Tender*		
	# obs	Mean	Median	# obs	Mean	Median
Lag Cash / TA	110	0.14	0.09	206	0.08	0.05
Lag Assets (mil)	110	4,183	1,626	209	10,570	3,675
Lag ROA	110	-0.006	0.001	209	-0.001	0.004
Lag Total Debt / TA	110	0.44	0.38	208	0.47	0.43
Lag cash / STD	88	669.20	3.32	196	47.03	2.31
Lag Cash / TD	110	0.57	0.23	204	0.24	0.10
Gain/ Loss from extinguishment of Debt / TA	84	0.012	0.001	131	-0.008	-0.002

Panel B – Issue characteristics

	Open Market Repurchase		*Tender*	
	Mean	Median	Mean	Median
Repurchase Amount (thous.)	141,481	50,000	197,645	130,000
Proportion of Outstanding Amount Retired	0.56	0.47	0.72	0.91
Initial Maturity (years)	13.9	10.0	14.0	10.0
Remaining Maturity (years)	10.5	7.1	8.8	5.7
Yearly Repurchase Amount (thous.)	157,713	66,750	274,960	178,482
Yearly Repurchase Amount / TA	8.86%	4.16%	10.88%	4.82%
Premium offered over market price			0.66%	3.53%

Panel C – Firm Annual Bond Returns[26]

	All	Open Market Repurchase	Tender
Number of observations	150	57	93
Mean Return	19.2%	35.4%	9.3%
Median Return	9.7%	25.3%	7.0%

[26] The data is based on the 266 observations used in the choice model. Loss of observations in the raw return column is due to the following reasons: 44 are repurchases executed before 2002 (first year of trace); for 61 of the observations no bond trades were found in the event window; for 10 of the observations, TRACE data could not be found; 1 extreme observation of 1300% return is deleted from the analysis (open market repurchase observation).

Table IV: OLS Regression - Tender Premium

This table reports the estimation results of the premium OLS regression (regression 1).

$$PREMIUM_i=\alpha + \beta_1 LNTA_{i,t-1} + \beta_2 ROA_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 INC\_LEV_{i,t-1} + \beta_5 ACTIONSIZE_i + \beta_6 CASH_{i,t-1} + \beta_7 OCF_{i,t-1} + \beta_8 OCF_{i,t} + \beta_9 PCT\_SERIES_i + \beta_{10} EXPLANATORY_t + \varepsilon_{i,t}$$

The dependent variable is the premium over market price offered in a tender offer and the explanatory variable is either the VIX or the SPREAD monthly average for the last month information is known to managers when making the decision to repurchase debt. Control variables are defined in the appendix. Year and industry fixed effects are included. T-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests.

Independent Variables	Expected Sign	(1)	(2)
ACTIONSIZE	?	0.18	0.20
		(0.73)	(0.74)
CASH	?	-0.04	-0.09
		(-0.21)	(-0.42)
OCF_{t-1}	?	-0.05	0.02
		(-0.23)	(0.06)
OCF_t	?	0.21	0.16
		(0.95)	(0.62)
PCT_SERIES	?	-0.09	-0.12*
		(-1.61)	(-1.81)
LNTA	?	0.02	0.02
		(1.37)	(1.01)
ROA	?	-1.29**	-1.41**
		(-2.65)	(-2.55)
LEV	?	0.03	0.05
		(0.39)	(0.63)
CHA_LEV	?	0.00	0.01
		(0.01)	(0.37)
VIX	+	0.01***	
		(6.02)	
SPREAD	+		0.04***
			(4.25)
Constant	?	-0.29*	-0.17
		(-1.91)	(-1.03)
Adj R^2		0.50	0.36
Num Obs		92	92

Table V: Logit Estimation - The choice between tender / open market repurchase

This table reports the estimation results of choice Logit regression (regression 1).

$$OMR_i=\alpha + \beta_1 LNTA_{i,t-1} + \beta_2 ROA_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 INC\_LEV_{i,t-1} + \beta_5 ACTIONSIZE_i + \beta_6 CASH_{i,t-1} + \beta_7 OCF_{i,t-1} + \beta_8 OCF_{i,t} + \beta_9 PCT\_SERIES_i + \beta_{10} EXPLANATORY_t + \varepsilon_{i,t}$$

The dependent variable is a dummy variable equal to 1 if the firm used the open market to repurchase the bonds and zero if it used a tender offer. The explanatory variables in columns 1 and 2 are VIX and SPREAD. Columns 3 and 4 report results of the illiquidity analysis using the orthogonal residuals of regressions of VIX and SPREAD on the Amihud illiquidity measure. Control variables are defined in the appendix. Z-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests. Regression is run using industry fixed effects and year dummies. Loss of observations occurs because of all positive / negative outcomes within specific groups.

Independent Variables	Expected Sign	1	2	3	4
ACTIONSIZE	-	-1.25	-1.23	-1.33	-1.21
		(-0.7)	(-0.69)	(-0.75)	(-0.68)
PCT_SERIES	-	-3.78***	-3.82***	-3.79***	-3.82***
		(-4.26)	(-4.39)	(-4.27)	(-4.39)
CASH	?	4.34**	4.29**	4.20**	4.33**
		(2.16)	(2.13)	(2.10)	(2.15)
OCF_{t-1}	?	1.36	1.20	1.28	1.23
		(0.47)	(0.41)	(0.45)	(0.42)
OCF_t	?	0.84	1.30	0.85	1.28
		(0.30)	(0.46)	(0.30)	(0.46)
LNTA	?	-0.56***	-0.55***	-0.57***	-0.55***
		(-2.94)	(-2.87)	(-2.96)	(-2.87)
ROA	?	-15.23**	-15.73**	-14.94**	-15.8**
		(-2.08)	(-2.09)	(-2.06)	(-2.1)
LEV	?	-1.7*	-1.75*	-1.71*	-1.75*
		(-1.84)	(-1.87)	(-1.85)	(-1.87)
CHA_LEV	?	0.07	0.16	0.05	0.16
		(0.17)	(0.39)	(0.13)	(0.40)
VIX	+	0.09***			
		(2.71)			
SPREAD	+		0.61**		
			(2.53)		
VIX_ILLIQ_RESID	+			0.10***	
				(2.67)	
SPREAD_ILLIQ_RESID	+				0.60**
					(2.55)
Num Obs		266	266	266	266

Table VI: OLS - percentage of open market repurchase from total repurchases

This table reports results of a time series regression of 48 quarters starting with Quarter I 1998 and ending with Quarter IV, 2010. The dependent variable is the ratio of open market repurchases to total bond repurchases executed in quarter q and the explanatory variable is either the VIX or the SPREAD in that quarter. Year fixed effects are included. T-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests.

Independent Variables	Expected Sign		
VIX	+	0.02***	
		(4.81)	
SPREAD	+		0.12***
			(3.78)
Constant		-0.15	-0.31
		(-1.02)	(-1.76)
Adj R^2		0.54	0.45
Num Obs		47	47

Table VII: Annual bond return following repurchase

This table reports the estimation results of the return OLS regression (regression 2).

$ANNUAL\_BOND\_RETURN_i = \alpha + \beta_1 OMR_i + \beta_2 FIRM\_RATING_i + \varepsilon_i$

The dependent variable is the ex-post one year return on bonds repurchased. The explanatory variable is a dummy variable of whether the repurchase was done in the open market or by using a tender offer. A 5-rating scale is used to control for credit rating of the bond where 1-4 are rated firms and 5 represents the unrated firms. Year and industry fixed effects are included. T-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests.

Independent Variables	Expected Sign	
OMR	+	0.18**
		(2.55)
FIRM_RATING	+	0.11**
		(2.30)
Constant		-0.42
		(-1.91)
Adj R^2		0.13
Num of obs		150

Table VIII: OLS – Effect of repurchase choice on gain / loss from extinguishment of debt

This table reports the estimation results of the income statement effects of the repurchase method (regression 3).

$$GAIN_{i,t}=\alpha+\beta_1 LNTA_{i,t-1}+\beta_2 LEV_{i,t-1}+\beta_3 ROA_{i,t-1}+\beta_4 OMR_{i,t}+\beta_5 ACTIONSIZE_{i,t}+\beta_6 ACTIONSIZE_{i,t}*OMR_{i,t}+\varepsilon_{i,t}$$

The regression is estimated for firms that executed debt repurchases either in the open market or via a tender offer and that have Compustat item *dtep* ("Gain from Extinguishment of Debt) available. The dependent variable is the income statement gain from extinguishment of debt. The explanatory variables are a dummy variable of the open market repurchase method, the repurchase amount and an interaction between the two vairbales. Control variables are defined in the appendix. Industry and year fixed effects are included. T-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests.

Independent Variables	Expected Sign	(1)	(2)	(3)
LNTA	?	0.00	0.00	0.00
		(-1.62)	(-0.34)	(-1.18)
LEV	?	0.00	0.01	0.02
		(0.47)	(0.43)	(1.35)
ROA	?	0.06	0.11	0.24***
		(0.61)	(1.23)	(3.12)
OMR	+	0.02***	0.03***	0.00
		(3.17)	(3.69)	(-0.48)
ACTIONSIZE	?		0.07**	-0.09***
			(2.23)	(-2.83)
*ACTIONSIZE *OMR*	+			0.34***
				(8.39)
Constant		0.02	0.00	0.01
		(0.46)	(-0.11)	(0.43)
Adj R^2		0.06	0.08	0.36
Num Obs		213	213	213

Table IX: Insider trading during repurchase activity

This table reports the estimation results of the insider trading OLS regression (regression 4).

$$INSIDER_{i,q}=\alpha + \beta_1 LNTA_{i,q-1} + \beta_2 INSIDER_{i,q-1} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 OPEN_{i,q} + \beta_7 TENDER_{i,q} + \varepsilon_{i,q}$$

The dependent variable is the ratio of insider buys to total insider trades. The explanatory variables are OPEN and TENDER – two dummy variables of repurchases in the quarter. Column 1 reports coefficients for a sample that includes only firms that repurchased their public debt, and column 2 reports coefficients for the entire insider trade universe. Control variables are defined in the appendix. Year dummies and industry fixed effects are included. T-statistics are reported in parentheses below the coefficient estimates. ***, **, * indicate significance at 1%, 5%, or 10% level respectively, two-tailed tests.

Independent Variables	Expected Sign	(1)	(2)
Insider Trade$_{q-1}$	+	0.28***	0.22***
		(127.61)	(13.36)
Log Assets$_{q-1}$	-	-0.01***	0.00
		(-35.27)	(-0.40)
Quarter 1	?	-0.03***	-0.02
		(-13.80)	(-1.36)
Quarter 2	?	-0.02***	-0.02
		(-9.61)	(-1.48)
Quarter 3	?	0.00**	0.01
		(-2.24)	(0.36)
Open	+	0.33***	0.36***
		(6.38)	(7.46)
Tender	+	0.12***	0.12***
		(2.58)	(2.83)
Constant	?	0.26***	0.17***
		(65.29)	(3.92)
Adj R^2		0.12	0.14
Num Obs		190,482	3,538