

Why do convertible issuers simultaneously repurchase stock? An arbitrage-based explanation

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Abstract

In 2006, one-third of the U.S. convertible debt issuers simultaneously repurchased their own stock. This paper explores the motivations for these combined transactions. We argue that convertible debt issuers buy back their stock in order to facilitate short selling by convertible debt arbitrageurs, thereby mitigating the negative stock price reaction at the convertible debt issuance date. In line with this prediction, we find lower issue-date open-market short selling and less negative issue-date abnormal stock returns for combined offerings than for uncombined convertible issues. We also show that convertible arbitrage explains both the size and the actual execution of the stock repurchases.

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1. Introduction

Convertible debt issuance by U.S. firms has increased dramatically over the past fifteen years, from \$7.8 billion in 1992 to \$50.2 billion in 2006 (Securities Data Company New Issues Database).¹ Over the last few years, a substantial percentage of the U.S. convertible debt issuers have announced a stock repurchase simultaneously with their convertible offering. In 2006, one-third of the convertible issues were combined with a stock repurchase. On average, the stock buybacks account for 43.2% of the proceeds of the convertible bond issue.

The combinations of convertible debt offerings with stock repurchases (“combined offerings”) are intriguing. In the end, why would a firm on the one hand issue an equity-linked security, and on the other hand reduce its equity base by repurchasing its own stock?

Our goal in this paper is to obtain more insight in what motivates firms to combine convertible debt offerings with stock repurchases. Based on informal talks with investment bankers and CFOs of companies that executed a combined offering, we hypothesize that the recent surge in combined convertible debt offerings and stock repurchases can be explained by the influence of convertible debt arbitrageurs. Over the past decade, arbitrageurs (i.e., mostly hedge funds, but also institutional investors) have

¹ Similar to equity and straight debt issuance volumes, convertible debt issuance volumes have declined since the summer of 2008 due to the financial crisis. It is expected, however, that convertible issuance will pick up again when market conditions improve. As mentioned in *Euromoney*: “*If there is one asset class that is poised to bounce back when the market stabilizes, it is convertibles*” (Koh, 2008).

become strongly involved in convertible issues. Convertible arbitrage funds are widely believed to purchase around 75% of the primary issues of convertible debt (Arshanapalli et al., 2004; Mitchell, Pedersen, and Pulvino, 2007). To exploit underpriced convertible issues, these arbitrageurs buy the convertibles and short the common stock of the firms that issue convertibles. The increased open-market short-selling creates a downward pressure on the stock price of the convertible debt issuer (Arshanapalli et al., 2004; Loncarski, ter Horst, and Veld, 2008).

We argue that the combinations of convertible debt offerings with stock repurchases result from the convertible debt issuer's wish to mitigate the negative stock price impact of open-market short selling around the convertible debt issue date. In a first step, the issuer sells the convertible to a convertible debt arbitrageur via an underwriter. Subsequently, the arbitrageur borrows issuer shares and sells them to the underwriter at a pre-agreed-to price. The underwriter then sells the shares back to the issuing firm, thereby completing the stock repurchase. The issuer benefits from the combination because, by privately crossing the arbitrageur's trades, he avoids concentrated open-market short sales by convertible debt arbitrageurs and their associated negative stock price effect. The arbitrageur, in turn, does not have to short stock in a market that is crowded by other short sellers at an uncertain price. Investment bankers therefore refer to this combination of a convertible issue and a stock repurchase as a "Happy Meal". In the academic literature, this popular transaction has thus far been ignored, however.

Using a sample of uncombined convertible offerings, uncombined stock repurchases, and combined convertible debt-stock repurchase offerings made by U.S. firms over the period from 2003 to 2006, we obtain the following four pieces of empirical evidence

consistent with our main hypothesis. First, *ceteris paribus*, open-market short sales are significantly lower around combined convertible debt offerings than around single convertible offerings. This finding can be explained by the fact that, in combined offerings, short-selling positions of arbitrageurs are established in a private negotiation with the underwriter. Second, average issue-date abnormal stock returns are significantly less negative for combined offerings (-0.87%) than for single convertible offerings (-4.48%). Third, there is a strong correlation (i.e., 0.88) between the number of stocks that the convertible issuers announce to repurchase and the number of shares expected to be shorted by arbitrageurs, assuming that these arbitrageurs adopt a delta-neutral hedging strategy. This finding is in line with our assumption that convertible issuers anticipate the short-selling behavior of convertible debt arbitrageurs. Finally, the typical firm engaged in a combined offering repurchases 85.5% of the announced number of shares in the first quarter after the announcement, whereas for uncombined stock repurchases this percentage is much lower (2.5%). The immediate execution of stock repurchases is consistent with arbitrageurs setting up their positions.

We also examine several alternative explanations for the combinations of convertible offerings with stock repurchases. We analyze whether firms engage in combined offerings to reduce earnings per share (EPS) dilution, to signal their true value to the market, to move closer to their target debt ratio, or to finance a stock repurchase program. We do not find evidence for these alternative motivations.

Our contributions to the literature are threefold. First, we contribute to the literature on the impact of short selling on corporate actions. Prior studies have focused on the influence of short selling on liquidity (Agarwal et al., 2007; Choi, Getmansky, and

Tookes, 2008) and on stock returns (Arshanapalli et al., 2004; Loncarski, ter Horst, and Veld, 2008). Lamont (2004) documents various actions undertaken by firms to reduce short-selling activity, e.g., stock splits, lawsuits, or letters encouraging stockholders not to lend out their shares. Our findings add to this literature by showing that, instead of trying to impede short selling, firms can also adjust their corporate finance actions to cater to the specific needs of arbitrageurs.

Second, our paper adds to a number of recent studies that examine innovations in convertible debt design. Hillion and Vermaelen (2004) describe the use of floating conversion prices, Korkeamaki (2005) documents the inclusion of different call features, and Marquardt and Wiedman (2005, 2007) examine the use of a contingent conversion feature.² The combinations of convertible debt issues and stock repurchases are yet another illustration of the creativity with which convertible debt issuers deal with their (changing) environment, notably with the negative impact of arbitrage-related short selling on their stock returns over recent years.

Third, we contribute to the literature on stock repurchases. Prior studies have shown that stock repurchases are used to signal good prospects (see, e.g., Bhattacharya, 1979; Vermaelen, 1984; Louis and White, 2007), to reduce the amount of free cash flow at management's disposal (Jensen, 1986), to bring the firm closer to its optimal debt ratio (Dittmar, 2000), and to deter takeovers (Bagwell, 1991; Billett and Xue, 2007). We add another important motivation for repurchasing stock, being the mitigation of negative stock returns associated with open-market short-selling activity.

² The Investment Dealers' Digest actually states that "*Convertibles are reinvented more times than Madonna*" (O'Connor, 2006).

The remainder of this paper is organized as follows. Section 2 provides the theoretical background. Section 3 describes the data and explanatory variables. Section 4 shows the empirical results in favor of our main hypothesis. Section 5 investigates alternative explanations. Section 6 concludes.

2. Theoretical background

This section reviews the literature on the motivations for convertible debt issuance and develops the main hypothesis and testable predictions.

2.1. Why do firms issue convertible debt?

Prior literature provides different rationales for issuing convertible debt. These include mitigating asset substitution problems (Green, 1984), resolving the disagreement between managers and bondholders regarding the risk of a firm's activities (Brennan and Kraus, 1987; Brennan and Schwartz, 1988), providing backdoor-equity financing when conventional equity issuance is difficult due to asymmetric information (Stein, 1992), and reducing the issuance costs of sequential financing while at the same time mitigating overinvestment (Mayers, 1998). Popular press articles also cite the speed at which convertible debt financing can be raised as an important factor in the decision to opt for this hybrid financing form (see, e.g., Bedell, 2006). Together, the rationales on convertible debt imply that convertibles are a suitable financing tool for firms with high costs of attracting standard financing instruments. Empirical studies indeed find that

convertible debt issuers tend to be small, high-growth, unrated companies with high debt- and equity-related financing costs (Kang and Lee, 1996; Lewis, Rogalski, and Seward, 1999, 2003; Dutordoir and Van de Gucht, 2007).

2.2. Why do convertible debt issuers repurchase their own stock?

Our key research question is why, over recent years, many convertible debt issuers have combined their offering with a stock repurchase. Based on extensive exploratory talks with advisors and CFOs of companies that engaged in the combinations, we argue that the explanation for these combinations can be found on the demand-side of the convertible debt market. More particularly, we relate these combinations to the large increase in the importance of convertible debt arbitrageurs. Over the last decade, convertible debt arbitrageurs have become dominant players in the convertible debt market. In the U.S., these funds buy about three-quarters of the issues of convertible bonds (Arshanapalli et al., 2004; Mitchell, Pedersen, and Pulvino, 2007). While convertible arbitrageurs have been active since the early 1990s, Choi, Getmansky and Tookes (2008) show a dramatic increase in their importance from the beginning of this century onwards.

Convertible arbitrage opportunities arise either when convertibles are underpriced, or when arbitrageurs can exploit superior technology in managing convertible risk (Agarwal et al., 2007). Several studies have documented evidence of convertible debt underpricing (Kang and Lee, 1996; Ammann, Kim, and Wilde, 2003; Henderson, 2005; Loncarski, ter Horst, and Veld, 2008). Potential reasons for such underpricing include illiquidity, small

issue size, and complexities associated with the valuation of these hybrid securities (Lhabitant, 2002).³

Since convertibles embed a call option on the underlying stock, convertible debt arbitrageurs generally buy the (underpriced) convertibles and go short in the common stock of the issuing firm in order to hedge their positions. Brent, Morse, and Stice (1990), Ackert and Athanassakos (2005), and Choi, Getmansky, and Tookes (2008) indeed document that firms with convertible debt outstanding report higher monthly short equity positions than other companies.⁴

A number of theoretical studies predict a negative impact of open-market short-selling activity on stock prices. Miller (1977) argues that only informed traders with strong negative information will be willing to engage in short selling, as short selling is costly. Diamond and Verrecchia (1987) argue that rational market participants know that high levels of unexpected short sales are bad news, and incorporate this information into their trading decisions. Therefore, high levels of short selling should cause stock prices to drop.

³ Of course it could be questioned why a firm would ever want to issue an undervalued security. A potential explanation lies in the profile of the typical U.S. convertible debt issuer described earlier, i.e., a firm that has difficulties attracting standard debt or common equity financing.

⁴ Short sales are regulated by SEC Rules 240.10a-1 and 240.10a-2. Rule 240.10a-1(a) stipulates that short sales are prohibited when stock prices are declining according to the so-called up-tick rule. However, Rule 240.10a-1(e) states that the up-tick rule does not apply for owners of a convertible bond. This means that even if stock prices are declining, it will be possible for arbitrageurs who own convertible bonds to short sell the corresponding stock.

Various empirical papers indeed find a negative relation between short sales and stock prices. Senchack and Starks (1993) look at U.S. firms' reported monthly stock interest, and find weak support for the hypothesis that the market reaction to increased short interest is negative around the announcement date. Aitken et al. (1998) study the effect of short sales on instantaneous price changes by examining the Australian stock market, in which short sales are disclosed immediately. They find that prices react negatively. Ackert and Athanassakos (2005) argue that stock prices may also react when disclosure is not immediate, as in the U.S. and Canada. In line with their expectations, they find negative contemporaneous price effects for Canadian stocks. Cohen, Diether, and Malloy (2007) find that an increase in shorting demand for U.S. firms leads to negative abnormal returns of 2.54% in the following month.

Several studies also show evidence of a downward stock price pressure caused by arbitrage-related short selling. Bechmann (2004) reports that the announcement of convertible bond calls is associated with an average contemporaneous abnormal stock price decrease due to arbitrage-related short sales. Mitchell, Pulvino, and Stafford (2004) study stock price reactions to mergers, and find that nearly half of the negative price reaction for the acquirer reflects downward price pressure because of arbitrage-induced short selling. Most relevant for our study, Arshanapalli et al. (2004) and Loncarski, ter Horst, and Veld (2008) document that short-selling activity by arbitrageurs has a negative impact on the stock price of U.S. and Canadian convertible debt issuers, respectively.

We hypothesize that the combinations of convertibles with stock repurchases are driven by the convertible debt issuer's wish to mitigate this downward stock price impact.

In a first step, the issuer sells the bond to an underwriter in a private 144A offering.⁵ The underwriter subsequently resells the 144A security for a spread to qualified institutional buyers (QIBs). In a second step, these QIBs (henceforth labeled “arbitrageurs”) hedge their position by borrowing shares of the issuer and selling them to the underwriter at a pre-agreed-to price. The issuer then buys back these shares from the underwriter, thus avoiding the downward pressure resulting from open-market short sales. The transaction is also attractive from the arbitrageur’s viewpoint, since he quickly obtains his hedged position without having to engage in open-market short sales at an uncertain price. Figure 1 presents a graphical representation of the combined package, which can be executed as rapidly as overnight.

[Please insert Figure 1 here]

⁵ Combinations of convertible issues and stock repurchases were prohibited under Rule 10b-6 of the Securities Act of 1934 (Lowenfels, 1973). The restrictions of trading during distributions are relaxed in Regulation M, which has replaced Rule 10b-6 since December 1996. Regulation M allows the combination of convertible issues and stock repurchases for issues under Rule 144A. Rule 144A was issued in 1990 to improve the liquidity and efficiency of the private placement market by giving more freedom to institutional investors to trade securities. Securities issued under Rule 144A do not require registration with the SEC, but can be traded without restriction in the secondary market among qualified institutional buyers (i.e., institutions that own over \$100 million in assets).

2.3. Testable predictions

Convertible debt arbitrageurs are not required to report data regarding their transactions. Hence, similar to other studies (Choi, Getmansky, and Tookes, 2008; Loncarski, ter Horst, and Veld, 2008), we have to rely on indirect evidence regarding their activities. From our main hypothesis on the motivations for combined offerings, we derive the following four empirically testable predictions. First, issue-date open-market short sales should be lower for combined transactions than for uncombined transactions. The reason is that, in combined offerings, the underwriter and the arbitrageur set up the shorting position as a private transaction executed at a pre-agreed-to price. Second, due to the lower open-market short selling activity, issue-date abnormal returns should be less negative for combined offerings than for single convertible offerings. Third, since the combined repurchases result from an anticipation of the actions of convertible arbitrage funds, the number of shares that a convertible debt issuer announces to repurchase should closely match the expected short positions of arbitrageurs. Fourth, whereas normal stock repurchases often take a very long time to be effectively executed (Stephens and Weisbach, 1998), convertible debt issuers should repurchase their stock almost immediately after the repurchase announcement, in order to allow convertible debt arbitrageurs to set up their arbitrage positions.

3. Data set

We acquire information on convertible issues and share repurchases made by U.S. firms over the period from 1997 to 2006. We start in 1997 because Regulation M, which

made combined offerings legal, was introduced late 1996. We obtain a sample of non-mandatory convertible debt offerings from Securities Data Company (SDC)'s New Issues Database, and a sample of stock repurchase announcements from SDC's Mergers & Acquisitions Database. We exclude stock repurchases that SDC classifies as Dutch auctions or self-tender offers. We use Factiva to determine the announcement dates of the convertible debt offerings and the stock repurchases. A convertible issue is marked as a "combined offering" if the firm announces that it uses the proceeds to repurchase stock, or if both transactions are announced separately at the same date. We also search the window [-5, 5] relative to the convertible debt announcement date for stock repurchases, but this operation yields no additional observations.⁶

Panel A of Table 1 shows the number of convertible issues, stock repurchases, and combined offerings over the sample period.

[Please insert Table 1 here]

We find that the number of convertible debt issues fluctuates over time. In the period 1997 to 2006, convertible issuance peaks in 2003 (256 issues). The low point, 108 issues, occurs in 1999. After a decrease of convertible issuance in 2004 and 2005, the number of issues again increases in 2006. The number of stock repurchases has been fairly constant since 2000. The number of combined convertible debt issues and stock repurchases, in

⁶ A substantial number of the combined stock repurchases (48 out of 85) are not covered in SDC. The majority of the stock repurchases that are registered in SDC (23 out of 37) are marked as "Privately Negotiated Offers", which is consistent with our main hypothesis that these repurchases are negotiated with convertible debt buying institutions.

turn, exponentially increases over the years. Before 2003, these combined offerings are very scarce. In 2003 and 2004 they account for 3.9% and 5.0% of the total number of convertibles, respectively. In 2005, the combined offerings comprise 11.5% of that year's convertible issues. The year 2006 is the most popular year as 33.1% of the total number of convertible issues are combined with a stock repurchase.⁷

Overall, these findings indicate that there is an increasing trend to combine convertible issues with stock repurchases, and that this trend is not matched by a strong increase in the overall number of repurchases. Given the very low number of combined offerings prior to 2003, we will from now on limit our research window to the period 2003 to 2006.⁸ This leaves us with a sample of 613 uncombined convertible offerings, 2,257 uncombined stock repurchases, and 79 combined offerings.

Panel B of Table 1 compares the size of the convertible offerings with that of the stock repurchases. The proceeds of the convertible debt offerings and the size of the

⁷ The gradual increase in combined offerings suggests that these transactions are a financial innovation: since the introduction of Regulation M, the possibility and benefits of using a simultaneous convertible issue and stock repurchase have become known to more and more firms. We checked whether particular advisory firms are overrepresented in the sample of firms with combined offerings, because these advisors may drive the increase in combined offerings. We did not find a significant overrepresentation of any advisory firm in combined offerings, compared to the advisory firms involved in uncombined convertible issues.

⁸ In 2007, 35 or 22.7% of the 154 U.S. convertible issues were combined with a stock repurchase. Thus, the popularity of the combined transaction is not limited to the period 2005 to 2006. We have not updated our sample to the year 2007, since the NYSE TAQ data on daily short sales only cover the full years 2005 and 2006.

uncombined stock repurchases are obtained from SDC. The sizes of the stock repurchases that are not covered in SDC are retrieved from Factiva.

We find that the proceeds of the convertible issues tend to be substantially larger than the funds used to repurchase shares. The average (median) size of the stock repurchase represents 43.2% (36.9%) of the proceeds of the convertible issue. Still, in four firms the value of the announced repurchase exceeds the proceeds of the convertible issue. The minimum percentage of the proceeds used to repurchase shares, given that a firm opts for a combined offering, is 5.0%. On average, the stock repurchases represent 7.2% of firm's market value.

Panel C of Table 1 breaks down the sample by the Fama-French 12-industry classification. Most convertibles are issued by firms in the business equipment industry, the financial sector, and the healthcare sector. Firms that engage in combined offerings are spread among 10 of the 12 industries, although the wholesale, financial, and healthcare sector are slightly overrepresented.

4. Impact of arbitrageurs on convertible debt issuers' decision to repurchase stock

In this section, we test our hypothesis that combinations of convertibles and stock repurchases are driven by the wish to cater to the hedging needs of convertible debt arbitrageurs. Each subsection examines one of our four testable predictions.

4.1. Open-market short-selling activity for convertible issuers

To test our first prediction, we retrieve all open-market short sales flows for convertible debt issuers in 2005 and 2006 from the NYSE TAQ database's REG SHO file.⁹ We start the analysis in January 2005 as daily short-selling data are only available as from that month. We compute the total short sales per firm on a specific day by summing all short sales for that firm on that day. We follow Ackert and Athanassakos (2005) by scaling the daily number of short sales by the firm's daily trading volume (retrieved from CRSP). We also compute the change in short sales to capture the abnormal part of firms' short sales:

$$\text{Change in short sales} = \frac{\text{short sales issue date} - \text{normal short sales}}{\text{normal trading volume}}. \quad (1)$$

We calculate normal short sales (normal trading volume) by taking the average short sales (trading volume) over the period ranging from ten to four trading days before the issue date.

Panel A of Table 2 reports the results of a univariate analysis comparing average open-market short-selling activity for convertible issuers that simultaneously repurchase stock to short-selling activity of regular convertible debt issuers.

[Please insert Table 2 here]

⁹ While the REG SHO file allows us to see each individual short sale, the data do not flag the associated covering transactions (i.e., the borrowing of the stock) (see also Diether, Lee, and Werner, 2008).

For convertible debt issuers that simultaneously repurchase stock, issue-date short sales represent on average 20.7% of trading volume. For other convertible debt issuers, the average ratio of issue-date short sales to trading volume is 35.5%. This difference is significant at the 1% level. Our findings are similar when we compute the percentage of short sales relative to the number of shares outstanding (retrieved from CRSP). By contrast, short-selling activity prior to the convertible issue date is similar for combined and uncombined offerings. Both groups have a short sales to trading volume ratio of about 20% over the trading days [-10, -4], which is similar to findings reported by Diether, Lee, and Werner (2008) for NYSE stocks. The issue-date ratio of trading volume to shares outstanding is also not significantly different between both subsamples.

The lower issue-date open-market short sales for combined convertible offerings could be driven by the fact that these offerings are different with respect to other determinants that drive short-selling activity. We therefore incorporate the following potential short-sales determinants in our analysis:¹⁰

Delta: The delta of a convertible measures the convertible's sensitivity to small stock price changes (Calamos, 2003). The delta can be calculated as:

$$\Delta = e^{-\delta r} N(d_1) = e^{-\delta r} N \left\{ \frac{\ln\left(\frac{S}{X}\right) + \left(r - \delta + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}} \right\}, \quad (2)$$

¹⁰ Unless otherwise mentioned, these variables are measured at fiscal year-end preceding the convertible announcement date. Stock price variables are retrieved from CRSP, company accounts data are retrieved from Compustat, and convertible debt design data are obtained from SDC

where δ is the continuously compounded dividend yield, T is the maturity of the bond, $N(\cdot)$ is the cumulative standard normal probability distribution, S is the price of the underlying stock measured one week prior to the announcement date, X is the conversion price, r is the yield on a 10-year U.S. Treasury Bond, and σ is the stock return volatility per annum, estimated as the standard deviation of the monthly returns measured over the year prior to the issue date. By construction, the delta is in-between zero and one. Since the proportion of shares to be sold short to obtain a hedged position is directly proportional to the delta (Calamos, 2003), we expect higher short sales for convertibles with a higher delta.

Liquidity: The average trading volume divided by the average number of shares outstanding in the year prior to the offering. Arbitrageurs want to quickly establish or close positions, and therefore prefer more liquid shares (Calamos, 2003).

Dividend-paying: A dummy variable that equals one when the firm has paid a dividend in the fiscal year preceding the convertible announcement date, and zero otherwise. Calamos (2003) argues that short sellers have a preference for stocks that pay no dividends, since the dividend represents a cash outflow for them.

Stock runup: The firm-specific raw return calculated over the 75 trading days before the announcement date, as in Lewis, Rogalski, and Seward (2003). The stock runup serves as a proxy for the perceived overvaluation of the firm by the market. We expect a positive relation with short-selling activity, as overvalued stock is more likely to be sold short.

We also include some standard control variables for which we have no strong prediction on their influence on short sales:

Leverage: The ratio of the book value of long-term debt to total assets.

Market-to-book: The market price per share of common stock divided by the book value per share.

Total assets: The book value of total assets.

Proceeds: The total amount of money raised by issuing the convertible.

Private placement: A dummy variable that equals one when the convertible issue is privately placed under Rule 144A, and zero otherwise.

Panel B of Table 2 reports the results of a univariate comparison of these potential short-selling determinants for combined and uncombined convertible issuers. The only significant differences are that combined issuers are less likely to pay dividends, and that combined offerings are more often privately placed. The latter finding is not surprising given that it is not allowed to combine a publicly-issued convertible with a stock repurchase. It is remarkable that the offering proceeds of combined and uncombined convertible debt issues are not significantly different. In other words, combined issuers do not seem to compensate for the repurchase by issuing more convertible financing.

To examine whether open-market issue-date short-selling activity is still lower for combined offerings after controlling for potential short-selling determinants, we estimate an OLS regression analysis with the ratio of issue-date short sales to trading volume as dependent variable. On the right-hand side of the regression, we include a dummy variable that equals one for combined offerings and zero for other convertible issues. We also include the potential short-selling determinants described earlier, as well as industry dummy variables based on the Fama-French 12-industry classification. We take the normal level of short-selling activity into account by including the variable *Normal short*

sales, which registers average short-selling activity over the trading days [-10, -4] relative to the issue date. The regression results are presented in Model 1 of Table 3.

[Please insert Table 3 here]

In line with our first prediction, we find a significant negative impact of the *Combined offering* dummy variable on short-selling activity. Hence, even after controlling for other potential determinants, open-market issue-date short sales are still significantly lower for combined convertibles. Model 2 shows that the results are similar when we use *Change in short sales* as the dependent variable.

The regression results also indicate that a higher *Delta* and *Stock runup* are associated with a significantly higher short-selling activity. These results are in line with our expectations. *Normal short sales/trading volume* and *Leverage* have a significant positive impact on short-selling activity, while *Market-to-book* and *Total assets* have a significant negative impact.

To check the robustness of our finding that open-market short selling is significantly lower for combinations of convertible issues and stock repurchases, we perform the following additional analyses, which are not reported for parsimony. First, we scale short sales by shares outstanding, and obtain similar results. Second, we allow for the possibility that the decision to repurchase stock is endogenous. That is, there could be (unobserved) characteristics that influence both firms' decisions to repurchase stock and expected short sales. We use Heckman's (1979) two-step selection model, and still find a

significant positive impact of the *Combined offering* dummy variable.¹¹ Third, we re-estimate the analysis for short-selling activity in the period from one day prior to one day after the issue date. We find similar results. Fourth, we look at the influence of single (uncombined) stock repurchase announcements on short selling. We find that short-selling activity at repurchase announcement dates does not significantly differ from short-selling activity in prior periods. This result indicates that the reduction in open-market short selling activity is a characteristic of stock repurchases combined with convertible offerings, rather than a general feature of stock repurchases.

4.2. Issue-date abnormal stock returns

To test our second prediction, we calculate abnormal stock returns (AR) around the convertible debt issue date by means of standard event study methodology as described in Brown and Warner (1985). Our primary observation window is [-1, 0] with day 0 representing the issue day, and we estimate the normal return over the window [-200, -30]. The market return is the CRSP equally-weighted market index. Panel A of Table 4 presents the results.

[Please insert Table 4 here]

¹¹ The first step consists of estimating a probit regression with the dependent variable equal to one for combined offerings and equal to zero for uncombined offerings, and with the same explanatory variables as those included in Table 3 on the right-hand side. In the second step, we estimate the same models as those in Table 3, except that we include the inverse Mills ratio obtained from the first-step analysis as an additional explanatory variable.

For the sample of uncombined convertible issues, we find an average cumulative abnormal return of -4.48%. Excess returns for convertible debt issuers that combine their offering with a stock repurchase are less negative and not significantly different from zero, i.e., -0.87% on average. In unreported robustness checks, we obtain similar findings for other event windows. These results are in line with our hypothesis that convertible debt issuers use stock repurchases to avoid a highly negative issue-date abnormal return caused by open-market short-selling activity.

To formally test the influence of an increase in open-market short sales on issue-date stock returns, we regress abnormal returns for combined and uncombined offerings over the window [-1, 0] on *Change in short sales* and control variables defined earlier. Panel B of Table 4 presents the results of this regression. We find that *Change in short sales* has a significantly negative impact on the issue-date abnormal returns. This result is consistent with our conjecture that the differences in issue-date AR between combined and uncombined convertibles are driven by differences in open-market short-selling activity.

Since for the majority of the convertible offerings the announcement happens very close to the issue date, an alternative explanation for the abnormal return differences between combined and uncombined convertible offerings is that announcements of the former offerings signal a higher firm quality than announcements of the latter offerings.

We examine this alternative explanation in Section 5.2.¹²

With regards to the control variables, we find that the delta and the market-to-book ratio have a significant coefficient with a negative and a positive sign, respectively.

4.3. The number of shares announced to be repurchased

To calculate the expected number of shares sold short, we assume that convertible arbitrageurs follow a so-called delta-neutral hedging technique, which makes their positions invariant to small stock price movements. The comments accompanying several convertible bond issues effectively relate the simultaneous stock repurchases to the delta of the convertible, e.g.: *“Proceeds from the offering (of Medimmune) were used (...) to repurchase \$150m of stock on the deal; (...) the delta hedge is a common application to mitigate the impact of short selling”* (June 24th, 2006) and *“Generally, when you model a convertible, you allow for some slippage on the stock, but by buying back the delta, you are guaranteeing the hedge”* (convertible issue of Waste Connections, March 18th, 2006) (source: SDC). The expected number of shares that will be shorted using a delta-neutral hedging technique can be determined by means of the following formula:

¹² More specifically, for 93.0% of the uncombined convertible offerings, the announcement happens either on the trading date before the issue date or on the issue date itself. The reason is that the large majority (90.1%) of the offerings are privately placed, which means that they can be issued very quickly. For the sample of combined issues, 93.7% of the announcements happen either on the trading date before the issue date or on the issue date itself.

$$\text{expected common shares short} = \frac{\# \text{convertibles issued} * \text{face value} * \text{delta}}{\text{conversion price}}. \quad (3)$$

If the repurchase behavior in combined offerings is indeed influenced by arbitrage activities, we expect the correlation between the number of shares that should be repurchased according to the delta-neutral technique and the number of shares the firm effectively announces to repurchase to be high. For 50 of the firms engaging in a combined offering, we have all the information required to calculate the expected number of shares sold short.¹³ We find that the Pearson correlation coefficient between the common stock expected to be shorted and the common stock the firm announces to repurchase is as high as 0.88. The average ratio of shares announced to be repurchased to shares predicted to be repurchased is also high, i.e., 0.79. Given the uncertainty in the calculation of delta and the varying hedging techniques that can be used in practice, we interpret the findings in this section as evidence in favor of our main hypothesis.¹⁴

4.4. The speed with which common stock is repurchased

A fourth test relates to the speed with which shares are actually repurchased. An announcement of a stock repurchase does not precommit firms to acquire a specified number of shares. If convertible debt issuers buy back shares to help arbitrageurs obtain

¹³ To remove the influence of some outliers, we winsorize the expected number of shares sold short at the 5% and 95% percentiles.

¹⁴ Arbitrageurs may take other Greeks (gamma, vega) into account when deciding on their hedging positions. Still, most of the convertible arbitrage strategies build on the delta-neutral technique (Calamos, 2003).

their arbitrage positions, then we expect the stock repurchases to be executed very quickly after their announcement.

Stephens and Weisbach (1998) study a sample of 450 repurchase programs from 1981 to 1990. They find that firms on average acquire only 6.3% of the number of stocks announced to be repurchased in the same quarter of the repurchase announcement. Similar to these authors, we examine changes in shares outstanding obtained from CRSP. Among the combined issues, we have 48 observations with sufficient data to determine the changes in shares outstanding for the first quarter. We also estimate the percentage of shares that is repurchased for normal (uncombined) stock repurchases over our research window. We have 1,701 stock repurchase observations with sufficient data. In line with Stephens and Weisbach, we reset observations in which the number of shares increases to zero, since we are only interested in decreases.

Figure 2 shows the actual shares repurchased in normal stock repurchases and in combined offerings during the first quarter after the announcement date.

[Please insert Figure 2 here]

The white bars represent the percentage of stock repurchased in uncombined stock repurchases. More than 70% of the firms repurchase less than 20% of the announced repurchases in the first quarter. For calculating the average percentage of shares repurchased, we reset observations in which the number of shares repurchased exceeds the announced number to 100%. For normal stock repurchases, we find that on average 18.5% of the announced shares are repurchased in the first quarter (the median value

equals 2.5%). This percentage is higher than the 6.3% found by Stephens and Weisbach (1998), indicating that firms have increased their actual stock repurchases over time.

The black bars represent the percentage of stock repurchased in combined offerings. A relatively large number of firms (27 or 56.3%) perform more than 80% of the announced stock repurchase in the first quarter after the announcement. The average (median) percentage of shares repurchased in the first quarter is 63.6% (85.5%). Due to potential simultaneous increases in shares outstanding (e.g., caused by stock option exercises), the real percentages that are repurchased are expected to be even higher. Apparently, firms in a combined offering repurchase shares much faster than in normal repurchases, which is consistent with arbitrageurs obtaining their positions.

5. Alternative explanations and interpretation of results

In this section, we examine which other factors might induce firms to opt for a combined offering.

5.1. Mitigate earnings per share dilution

Combining convertible issues and stock repurchases mitigates the short-term earnings per share (EPS) dilution caused by the convertible issue. Under the “if-converted” method, the denominator of the diluted earnings per share needs to incorporate the shares that can be issued upon conversion of the convertible bonds, even though these

convertibles are not (yet) converted into stock. When stock is repurchased, the number of outstanding shares decreases and EPS dilution is mitigated.

The importance of EPS dilution for convertible issuance is illustrated by the popularity of contingent convertibles (“COCOs”) in the period 2000 to 2004. In this period, contingent convertibles did not have to be taken into account when calculating diluted earnings per share (Marquardt and Wiedman, 2005, 2007).¹⁵ After the elimination of the favorable treatment of COCOs in 2004, these instruments became much less popular.

To test the influence of EPS dilution on the decision to combine a convertible issue with a stock repurchase, we estimate a probit model in which the dependent variable is equal to one for combined offerings, and equal to zero for uncombined offerings. We use the following variables that relate to diluted EPS (both of which are based on variables used in Marquardt and Wiedman, 2005):

Decrease EPS: The change in diluted earnings per share that would occur without a stock repurchase. We calculate this change as one minus (diluted EPS_{t-1} adjusted for the convertible issue/diluted EPS_{t-1}), in which t-1 refers to the fiscal year-end preceding the announcement.

Bonus: The correlation between the change in the annual CEO cash bonus and the change in the diluted EPS by 2-digit SIC code for the fiscal year before the offering (only if the number of observations for each industry-year is larger than five). We obtain CEO cash bonus data from Execucomp. We expect that managers are more concerned with

¹⁵ COCOs are convertible securities that cannot be converted into shares of common stock until a pre-specified stock price is reached.

diluted earnings per share when their bonus plans relate to this measure, i.e., when *Bonus* is high. We also include control variables defined earlier, as well as industry dummy variables (based on the Fama-French classification) and year dummy variables.

[Please insert Table 5 here]

Model 1 of Table 5 reports the results of the probit analysis. The potential decrease in the diluted earnings per share does not play a statistically significant role in the decision to combine a convertible debt issue with a stock repurchase. The relation of the bonus plan of the executive officer to the diluted EPS, as captured in the variable *Bonus*, does not significantly influence firms' decisions to use a combined offering either. Hence, the avoidance of EPS dilution does not seem to be an important motivation for combining a convertible debt issue with a stock repurchase. With the exception of the stock return volatility (which is significantly smaller for firms engaging in combined offerings), the control variables are not significant. In other words, we find almost no differences in the characteristics of companies engaging in single versus combined convertible offerings. The relatively high pseudo R^2 of 23.1% can be explained by the significance of the year dummy variables (not reported for parsimony).

5.2. *Signal firm value*

Constantinides and Grundy (1989) suggest that the combinations of convertible debt offerings with stock repurchases might be inspired by signaling motivations. They

examine which security a firm should issue when it has private information about its own value. Interestingly, their model indicates that a company can reveal its true value to the market by combining a convertible debt offering with a stock repurchase. The underlying intuition is that, when issuing a convertible, firms have an incentive to overstate their true value. Convertible debt announcements should therefore have a negative impact on stock prices, which is confirmed by empirical findings of Davidson, Glascock, and Schwarz (1995), Lewis, Rogalski, and Seward (2003), and Marquardt and Wiedman (2005). The stock repurchase provides a countervailing incentive, since firms will be more likely to buy back stock when they are undervalued. Stock repurchase announcements should thus have a positive impact on stock prices, which is confirmed by findings of Asquith and Mullins (1986), Comment and Jarrell (1991), and Ikenberry, Lakonishok, and Vermaelen (1995).

Constantinides and Grundy's (1989) model implies that announcement returns should be less negative for convertible debt offerings combined with a stock repurchase than for uncombined offerings. However, since for the large majority of the convertible debt offerings in our dataset the announcement happens very close to the issuance, we cannot disentangle announcement effects from issuance effects. We therefore test the validity of the signaling explanation in an alternative way. We develop three proxy variables for a firm's need for signaling, and predict that these variables should have a positive impact on the likelihood of adding a stock repurchase to a convertible offering, if the signaling explanation holds.

The first proxy is the *Stock runup* variable defined earlier. When a firm has a high stock runup prior to an equity(-linked) offering announcement, the market is more likely

to think that the offering is inspired by firm overvaluation. For such companies, repurchasing stock might be a way to signal that their stock is in fact not overvalued. The other two proxies relate to the level of informational asymmetry regarding the firm. High informational asymmetry increases the need for signaling, and therefore the likelihood that firms will add a stock repurchase to their convertible offering. The variables are calculated as follows:

Information asymmetry 1: measures the firm-specific variation, *psi*, as constructed in Durnev et al. (2003). The measure is based on the assumption that a larger firm-specific variation in stock prices reflects more information getting into the stock price, and thus less informational asymmetry. The firm-specific stock return variation is obtained from the regression:

$$Firm\ return_t = \beta_0 + \beta_1 * market\ return_t + \beta_2 * industry\ return_t + \varepsilon \quad (4)$$

which is estimated for each firm using monthly returns measured over the previous calendar year. Industry returns are estimated based on 2-digit SIC-codes. The market and industry returns are value-weighted averages excluding the firm for which the regression is estimated. The variance of ε is scaled by the total variance of the dependent variables in the regression. This operation is equal to dividing the residual sum of squares by the total sum of squares, or $1 - R^2$. The resulting *psi* is a firm-specific return variability in a given year relative to the total return variability.

Information asymmetry 2: This measure is based on the quality of working capital accruals and earnings. Dechow and Dichev (2002) and Lee and Masulis (2007) argue that

accruals quality is a synonym of earnings quality. They construct a measure of accruals quality that maps accruals into cash flow realizations at time t-1, time t, and time t+1. Dechow and Dichev suggest that estimation errors in accruals are likely to reduce the beneficial role of accruals: the quality of accruals decreases when the standard deviation of the estimation errors increases. Since poor accounting quality raises investor uncertainty about a firm, the standard deviation of the estimation errors should be positively related to informational asymmetry.

We use McNichols' (2002) modification of the model, which is:

$$Ca_t = \gamma_0 + \gamma_1 * cfo_t + \gamma_2 * cfo_{t+1} + \gamma_3 * cfo_{t-1} + \gamma_4 * \Delta sales_t + \gamma_5 * ppe_t + v \quad (5)$$

where Ca are the total current accruals, cfo are the cash flows from operations, and ppe is the value of property, plant, and equipment. We are interested in the firm-specific variation of this residual v . We therefore take the standard deviation of v , with a minimum number of observations of four consecutive years, and a maximum of fifteen.

We test the effects of the three signaling proxy variables on the decision to combine a convertible debt offering with a stock repurchase in Models 2 and 3 presented in Table 5. The results show that none of the proxies has a significant influence on the decision to combine a convertible with a stock repurchase. Hence, we do not find evidence that firms combine convertible issues and stock repurchases to signal their true value to the market.

5.3. Optimize capital structure

The decision to add a stock repurchase to a convertible issue could be explained by firms wanting to move towards their optimal debt ratios. Repurchasing stock increases the debt ratio, which could bring firms closer to their target debt ratios if they were previously underlevered (Dittmar, 2000). If this explanation holds, then firms that combine their convertible issue with a stock repurchase should be more underlevered than other convertible issuers. Our findings are not consistent with this prediction. More particularly, Table 2 shows that combined and single convertible debt issuers are not significantly different with respect to their debt ratios. Moreover, they are similar with respect to other firm-specific characteristics (see Table 5) and come from the same industries (see Table 1), which casts doubt on the conjecture that they have different target debt ratios. To more formally examine the possibility that the combined offerings are motivated by static tradeoff considerations, we extend the probit analysis reported in Model 1 of Table 5 with two variables. The first variable captures the difference between firms' leverage and the industry median leverage, in which the industries are based on the Fama-French 12-industry classification. The second variable is the marginal tax rate of firms (before interest expenses), which is downloaded from John Graham's website. As repurchasing stock mechanically increases the firm's debt ratio, we expect a significant negative impact of the deviation from the target debt ratio and a significant positive impact of the marginal tax rate (due to the interest deductibility from taxes) on the decision to add a stock repurchase to a convertible debt offering. As can be seen in Model 4 of Table 5, none of these additional two variables is significant. We therefore conclude

that the decision to combine a convertible debt offering with a stock repurchase is probably not driven by static tradeoff considerations.

5.4. Issue convertibles to finance a stock repurchase

Throughout the paper, we have assumed that firms engaging in a combined offering add a stock repurchase to a convertible issue. One argument in favor of this reasoning is that, on average, the convertible issue is about twice the size of the stock repurchase. However, the possibility exists that the initial decision is to repurchase stock, and that the convertible issue is added simply to obtain funds for the repurchase. Therefore, we also examine the differences between pure stock repurchasers and firms that combine stock repurchases with convertible issues.

If the main motivation for the combined offerings is to repurchase stock, we predict that firms engaging in combined offerings have less financial slack (i.e., cash and marketable securities as a percentage of total assets) than normal stock repurchasers - otherwise, the former firms would not have to issue convertibles in order to obtain the necessary funding. A univariate comparison of the level of slack of combined issuers and regular stock repurchasers shows no significant difference, however (t-statistic for difference in means equals -0.32). We have also checked whether firms engaging in a combined offering regularly announce stock repurchases and are therefore expected to do so again. We find that, for the combined issuers, the number of announced stock repurchases over the five years preceding the convertible debt announcement does not

significantly differ from the numbers for separate stock repurchasers or uncombined convertible issuers.¹⁶

6. Conclusion and interpretation

In this study, we examine why convertible debt issuers add a stock repurchase to their offering. We argue that the combinations of convertible debt offerings and stock repurchases result from an interplay between convertible debt issuers and arbitrageurs. Convertible arbitrageurs generally short the issuers' common stock, which creates downward pressure on the stock price. The stock repurchase serves to cater to the hedging needs of convertible debt arbitrageurs, and thus reduce the negative stock price effect upon the convertible debt issuance.

We obtain strong evidence consistent with this hypothesis. First, open-market short selling activity around convertible debt issuance is lower for combined offerings. Second, issue-date abnormal returns are significantly less negative for combined issuers than for issuers that do not repurchase stock. Third, the number of shares that a firm announces to repurchase correlates strongly with the expected short positions of convertible arbitrageurs. Finally, the speed with which stock is repurchased is substantially higher in the combined transactions than in pure stock repurchases.

¹⁶ Detailed results regarding the comparisons between combined issuers and other stock repurchasers are not reported for parsimony, but can be obtained from the corresponding author upon request.

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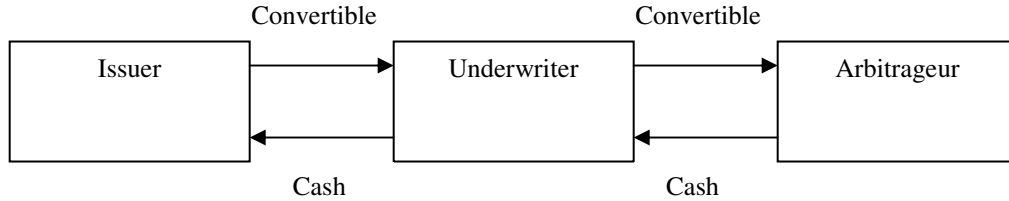
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Figure 1

Step 1: Convertible debt issuer sells a convertible debt offering, structured as a private Rule 144A offering, to an arbitrageur via an underwriter.



Step 2: Arbitrageur borrows a specific portion of the shares of the issuer and sells them to the underwriter at a pre-agreed-to price, thus obtaining a hedge against stock price movements. The underwriter then sells shares to the issuer, thereby completing the stock repurchase.

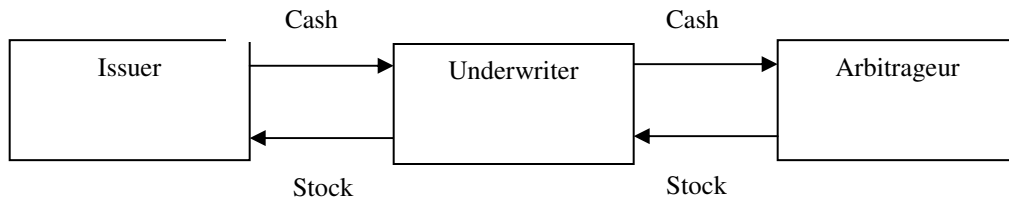


Figure 1. Mechanics of the “Happy Meal” transaction. This flow diagram provides a detailed overview of the hypothesized steps in the package consisting of a convertible debt offering and a stock repurchase.

Figure 2

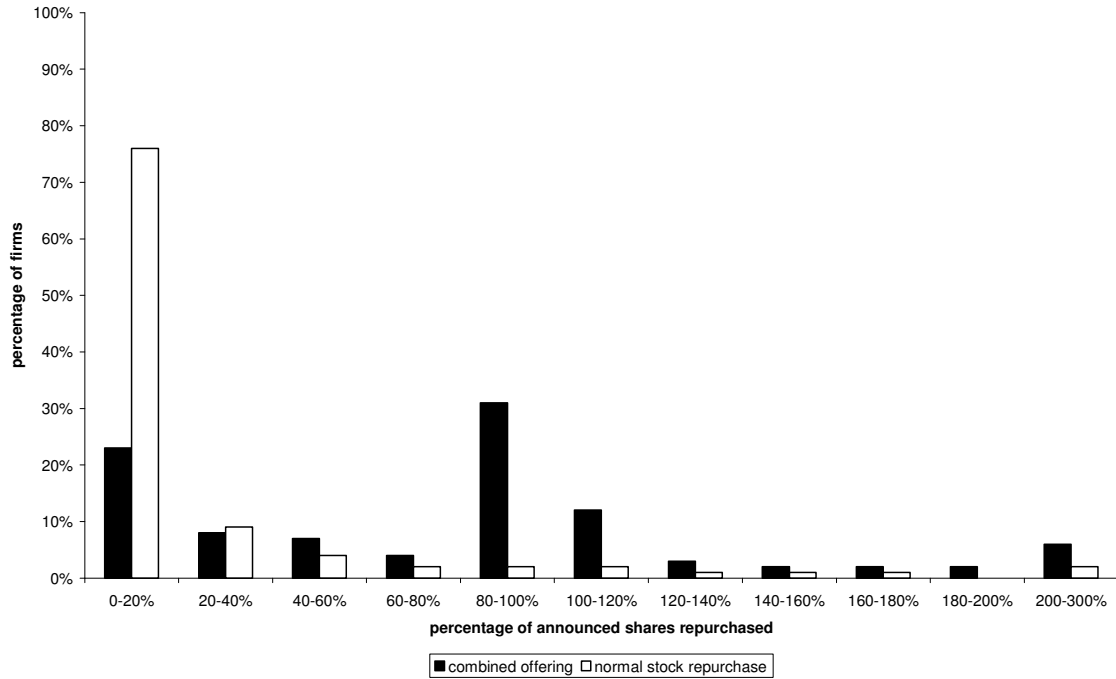


Figure 2. Percentages of actual repurchases in the first quarter after the announcement of a stock repurchase. This figure shows which percentage of an announced stock repurchase is actually repurchased within the first three months after the announcement. The sample period is 2003-2006. The black bars represent stock repurchases that are announced in combination with convertible bond issues. The white bars represent stock repurchases that are announced without a simultaneous convertible bond issue.

Table 1**Dispersion of convertible issues and stock repurchases over time, value of the transactions, and industrial dispersion.**

This table presents summary statistics. The sample period in Panel A is 1997-2006, the sample period in Panels B and C is 2003-2006. Panel A reports the number of convertible issues, stock repurchases, and combined offerings of convertible issues and stock repurchases per year. We label a convertible issue as a combined offering when the firm announces to use part of the proceeds of the convertible debt offering to repurchase stock, or when both transactions are announced on the same date. Panel B compares the proceeds of the convertible issue with the size of the announced stock repurchase. The proceeds of the convertible issue are obtained from SDC; the size of the stock repurchase is obtained from SDC or from the repurchase announcement. We also compare the announced size of the repurchase to firms' market values. We calculate a firm's market value by multiplying Compustat Item 25 with Item 199. In Panel C, we show the distribution of convertible issues over the Fama-French 12-industry classification.

| Panel A: Dispersion over time | | | | |
|--------------------------------------|----------------------------------|---------------------------------------|------------------------------------|--|
| Year | Number of convertibles issued | Number of repurchases announced | Number of combined offerings | Percentage combined offerings of total convertible issues |
| 1997 | 237 | 1,286 | 0 | 0.0% |
| 1998 | 145 | 1,934 | 0 | 0.0% |
| 1999 | 108 | 1,515 | 0 | 0.0% |
| 2000 | 153 | 806 | 1 | 0.7% |
| 2001 | 207 | 659 | 3 | 1.4% |
| 2002 | 117 | 469 | 2 | 1.7% |
| 2003 | 256 | 470 | 10 | 3.9% |
| 2004 | 181 | 563 | 9 | 5.0% |
| 2005 | 113 | 638 | 13 | 11.5% |
| 2006 | 142 | 586 | 47 | 33.1% |

Panel B: Value of the announced stock repurchases compared to the proceeds of the convertible issue and firms' market values

| | Mean | Median | Minimum | Maximum | Standard deviation |
|---|-------|--------|---------|---------|--------------------|
| Value repurchase / proceeds convertible issue | 0.432 | 0.369 | 0.050 | 1.111 | 0.276 |
| Value repurchase / market value | 0.072 | 0.054 | 0.004 | 0.489 | 0.070 |

Panel C: Industry classification

| Fama-French 12- industry classification | Firms that issue a convertible and repurchase shares | | Firms that issue a convertible without repurchasing shares | |
|--|---|--------|---|--------|
| | N | % | N | % |
| Consumer nondurables | 1 | 1.3% | 7 | 1.1% |
| Consumer durables | 2 | 2.5% | 9 | 1.5% |
| Manufacturing | 4 | 5.1% | 43 | 7.0% |
| Energy | 0 | 0.0% | 43 | 7.0% |
| Chemicals | 0 | 0.0% | 8 | 1.3% |
| Business equipment | 15 | 19.0% | 126 | 20.6% |
| Telephone | 1 | 1.3% | 29 | 4.7% |
| Utility | 1 | 1.3% | 20 | 3.3% |
| Wholesale | 9 | 11.4% | 46 | 7.5% |
| Healthcare | 16 | 20.3% | 107 | 17.5% |
| Financial | 16 | 20.3% | 103 | 16.8% |
| Other | 14 | 17.7% | 72 | 11.7% |
| Total | 79 | 100.0% | 613 | 100.0% |

Table 2

Univariate analysis of the differences in (determinants of) short-selling activity between combined and uncombined convertible issues

Panel A of this table presents different short sales measures for combined and uncombined convertible issues. The sample period is 2005-2006, and we only include convertible issuers for which we have short-selling data available. We label a convertible issue as a combined offering when the firm announces to use part of the proceeds of the convertible debt offering to repurchase stock, or when both transactions are announced on the same date. Short sales at the issue date are the sum of all short sales for that firm that day, as reported in the NYSE TAQ database's REG SHO file. We compute the change in short sales by dividing the difference between short sales at the issue date and short sales over trading days [-10, -4] by the trading volume over this same period. Daily trading volume and the number of shares outstanding are from CRSP. Normal short sales is a firm's daily short sales over trading days [-10, -4] divided by the trading volume over that same period. Panel B of this table presents the differences in potential short sales determinants between combined and uncombined convertible offerings. Delta is the convertible's sensitivity to small stock price changes. Liquidity is the average trading volume divided by the average number of shares outstanding in the year prior to the offering. Dividend-paying is a dummy variable registering whether a firm paid a dividend in the year prior to the offering, which can be established with Compustat Item 21. Stock runup is the firm-specific raw return over the 75 trading days before the announcement date, and is computed with CRSP Item RETX. Leverage (measured at fiscal year-end prior to the announcement date) is Compustat Item 9 divided by Compustat Item 6. The market-to-book ratio (measured at fiscal year-end prior to the announcement date) is computed as $(\text{Item 25} * \text{Item 199} - \text{Item 60} - \text{Item 6}) / \text{Item 6}$. Total assets (Compustat Item 6) are expressed in millions of dollars and measured at the fiscal year-end prior to the announcement date. Proceeds represent the total amount of money raised by the convertible issue in millions of dollars. Private placement is a dummy variable equal to one when the bond is privately placed, and equal to zero otherwise. t-statistics are for the difference in means between the combined and the uncombined samples. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Differences in open-market short-selling activity between combined and uncombined offerings

| | Combined offerings | | Uncombined offerings | | t-statistics |
|---|--------------------|-------|----------------------|-------|--------------|
| | N | Mean | N | Mean | |
| Short sales / trading volume at issue date | 29 | 0.207 | 83 | 0.355 | -5.00*** |
| Change in short sales | 29 | 0.227 | 83 | 1.714 | -5.33*** |
| Short sales / shares outstanding at issue date | 29 | 0.007 | 83 | 0.013 | -3.01*** |
| Normal short sales / trading volume | 29 | 0.198 | 83 | 0.199 | -0.06 |
| Trading volume / shares outstanding at issue date | 29 | 0.039 | 83 | 0.035 | 0.50 |

Panel B: Differences in potential open-market short-selling determinants between combined and uncombined offerings

| | | | | | |
|-------------------|----|--------|----|--------|---------|
| Delta | 25 | 0.874 | 53 | 0.902 | -0.57 |
| Liquidity | 29 | 0.010 | 83 | 0.010 | 0.01 |
| Dividend-paying | 28 | 0.393 | 82 | 0.573 | -1.66* |
| Stock runup | 29 | 0.001 | 83 | 0.001 | 0.99 |
| Leverage | 29 | 0.494 | 83 | 0.496 | -0.02 |
| Market-to-book | 29 | 1.660 | 83 | 1.623 | 0.19 |
| Total assets | 29 | 17,565 | 83 | 39,345 | -1.07 |
| Proceeds | 29 | 480 | 83 | 366 | 1.07 |
| Private placement | 29 | 1 | 81 | 0.901 | 2.96*** |

Table 3

Impact of adding a stock repurchase to a convertible offering on open-market short-selling activity

This table presents the results of an OLS regression analysis on the impact of adding a stock repurchase to a convertible issue on open-market short selling activity around the issue date. The sample period is 2005-2006. Short sales at the issue date are the sum of all short sales for that specific firm that day, as reported in the NYSE TAQ database's REG SHO file. We compute the change in short sales by dividing the difference between short sales at the issue date and short sales over trading days [-10, -4] by the trading volume over that same period. Daily trading volume is obtained from CRSP. We label a convertible issue as a combined offering when the firm announces to use part of the proceeds of the convertible debt offering to repurchase stock, or when both transactions are announced on the same date. Combined offering is a dummy variable equal to one for combined offerings, and zero otherwise. Delta is the convertible's sensitivity to small stock price changes. Log(Liquidity) is the natural logarithm of the ratio of the average trading volume to the average shares outstanding in the year prior to the offering. Dividend-paying is a dummy variable registering whether a firm paid a dividend in the year prior to the offering, which can be established with Compustat Item 21. Stock runup is the firm-specific raw return over the 75 trading days before the announcement date, and is computed with CRSP Item RETX. Leverage is Compustat Item 9 divided by Item 6. Market-to-book is computed as $(\text{Item 25} * \text{Item 199} - \text{Item 60} - \text{Item 6}) / \text{Item 6}$. Leverage and the market-to-book ratio are both measured at the fiscal year-end preceding the announcement date. Log(Assets) corresponds to the natural logarithm of Compustat Item 6 (measured at fiscal year-end preceding the announcement date). Log(Proceeds) represents the natural logarithm of the total amount of money raised by the convertible issue. Normal short sales/trading volume is a firm's daily short sales over trading days [-10, -4] divided by the trading volume over that same period. We also include industry dummies based on the Fama-French 12-industry classification. We report t-statistics calculated with Huber-White standard errors, to control for heteroskedasticity. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

| | Short sales at issue date / trading volume at issue date (1) | Change in short sales (2) |
|-----------------------------------|---|------------------------------|
| Combined offering | -0.143*** (-4.37) | -1.333*** (-2.71) |
| Delta | 0.173** (2.52) | 3.242*** (3.67) |
| Log(Liquidity) | -0.055 (-1.22) | -1.275 (-1.48) |
| Dividend-paying | -0.009 (-0.27) | -0.674 (-1.04) |
| Stock runup | 12.398** (2.08) | 150.913 (1.38) |
| Leverage | 0.146** (2.03) | 2.392 (1.23) |
| Market-to-book | -0.031* (-1.83) | -0.610** (-2.13) |
| Log(Assets) | -0.125*** (-3.74) | -1.703*** (-2.70) |
| Log(Proceeds) | 0.036 (1.45) | 0.764 (1.65) |
| Normal short sales/trading volume | 0.551** (2.17) | |
| N | 76 | 76 |
| R ² | 56.4% | 30.7% |

Table 4

Cumulative abnormal stock returns around the issue date

This table presents the cumulative abnormal returns at the issue date of (un)combined convertible debt offerings. We label a convertible issue as a combined offering when the firm announces to use part of the proceeds of the convertible debt offering to repurchase stock, or when both transactions are announced on the same date. The estimation window for determining the abnormal returns is $[-1, 0]$, with day zero representing the issue date. Panel A reports the average cumulative abnormal returns. The sample period in Panel A is 2003-2006. Panel B shows the results of OLS regression analyses examining the effects of various characteristics on the abnormal returns at the issue date. Given that we need short-selling data, the sample period is 2005-2006. We compute the change in short sales by dividing the difference between short sales at the issue date and short sales over trading days $[-10, -4]$ by the trading volume over that same period. Delta is the convertible's sensitivity to small stock price changes. Log(Assets) corresponds to the natural logarithm of Compustat Item 6 (measured at the fiscal year-end prior to the announcement date). Log(Liquidity) is the natural logarithm of the ratio of the average trading volume divided by the average shares outstanding in the year prior to the offering. Dividend yield is Compustat Item 21 divided by the market value, calculated as $\text{Item 25} * \text{Item 199}$ (measured at the fiscal year-end prior to the announcement date). Stock runup is the firm-specific raw return over the 75 trading days before the announcement date, and is computed with CRSP Item RETX. Leverage is Compustat Item 9 divided by Item 6. Market-to-book ratio is computed as $(\text{Item 25} * \text{Item 199} - \text{Item 60} - \text{Item 6}) / \text{Item 6}$. Leverage and market-to-book ratio are both measured at fiscal year-end prior to the announcement date. Log(Proceeds) represents the natural logarithm of the total amount of money raised by the convertible issue. We also include industry dummies based on the Fama-French 12-industry classification. We report t-statistics (calculated with Huber-White standard errors to control for heteroskedasticity) in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

| Panel A: Cumulative abnormal returns at the issue date | | | |
|---|--------------------|----------------------|---------------------|
| | Combined offerings | Uncombined offerings | Difference in means |
| Mean | -0.873% | -4.481%*** | 3.608% |
| Patell Z-statistics | -0.43 | -26.47 | |
| t-statistic for difference in means | | | 6.07*** |
| N | 73 | 531 | |

| Panel B: Impact of short sales, firm characteristics, and bond characteristics on cumulative abnormal returns | |
|--|---|
| | Cumulative abnormal returns at the issue date |
| Change in short sales | -0.008** (-2.10) |
| Delta | -0.049** (-2.05) |
| Log(Assets) | 0.023 (0.97) |
| Log(Liquidity) | -0.005 (-0.35) |
| Dividend yield | -0.099 (-0.47) |
| Stock runup | 1.741 (0.40) |
| Leverage | 0.051 (1.60) |
| Market-to-book | 0.015** (2.19) |
| Log(Proceeds) | 0.001 (0.04) |
| N | 76 |
| R ² | 30.7% |

Table 5

Impact of firm and bond characteristics on the decision to combine a convertible issue with a stock repurchase

This table presents the results of the estimation of a probit model estimating the impact of firm and convertible debt design characteristics on the likelihood of combining a convertible with a stock repurchase. The sample period is 2003-2006. The dependent variable is a dummy that equals one for combined offerings and zero for uncombined offerings. We label a convertible issue as a combined offering when the firm announces to use part of the proceeds of the convertible debt offering to repurchase stock, or when both transactions are announced on the same date. Decrease EPS is the change in diluted earnings per share that would occur without a stock repurchase. Bonus is the correlation between the change in annual CEO cash bonus (reported in Execucomp) and the change in diluted EPS by 2-digit SIC code for the year before the offering. Both Decrease EPS and Bonus are calculated as in Marquardt and Wiedman (2005). Delta is the convertible's sensitivity to small stock price changes. Log(Assets) corresponds to the natural logarithm of Compustat Item 6 (measured at fiscal year-end preceding the announcement date). Stock runoff is the firm-specific raw return over the 75 trading days before the announcement date, and is computed with CRSP Item RETX. Leverage is Compustat Item 9 divided by Item 6. Market-to-book ratio is computed with Compustat data as $(\text{Item 25} * \text{Item 199} - \text{Item 60} - \text{Item 6}) / \text{Item 6}$. Leverage and market-to-book ratio are measured at fiscal year-end preceding the announcement date. Volatility represents the stock return variance in the year prior to the issue date, and is estimated as the standard deviation of the monthly returns (reported in CRSP). Information asymmetry 1 measures the firm-specific variation in stock prices. Information asymmetry 2 measures the quality of working capital accruals and earnings. Deviation from industry median captures the difference between firms' leverage and the industry median leverage, in which the industries are based on the Fama-French 12-industry classification. Marginal tax rate measures the marginal tax rate of firms before interest expenses. This variable is downloaded from John Graham's website. We also include industry dummies based on the Fama-French 12-industry classification as well as year dummies. We report t-statistics (calculated with Huber-White standard errors to control for heteroskedasticity) in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

| | Combined offering | | | |
|--------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) |
| Decrease EPS | 2.236 (1.31) | 2.635 (0.92) | 0.859 (0.41) | 0.811 (0.29) |
| Bonus | -0.385 (-0.90) | -0.545 (-0.97) | -0.217 (-0.49) | -0.659 (-1.20) |
| Delta | -0.328 (-0.75) | -0.259 (-0.36) | -0.159 (-0.30) | -0.367 (-0.61) |
| Log(Assets) | -0.028 (-0.19) | 0.257 (1.11) | 0.031 (0.18) | 0.087 (0.48) |
| Stock runup | -26.383 (-0.87) | -72.929 (-1.41) | -39.547 (-1.26) | -29.937 (-0.06) |
| Leverage | -0.034 (-0.12) | 0.281 (0.62) | 0.018 (0.06) | |
| Market-to-book | 0.099 (1.59) | 0.107 (1.36) | 0.133* (1.74) | 0.140 (1.41) |
| Volatility | -3.063* (-1.96) | -4.601* (-1.80) | -2.196 (1.50) | -2.149 (-1.07) |
| Information asymmetry 1 | | -0.035 (-0.06) | | |
| Information asymmetry 2 | | | -1.391 (-0.86) | |
| Deviation from industry median | | | | -0.305 (-0.76) |
| Marginal tax rate | | | | 1.381 (1.09) |
| N | 425 | 282 | 347 | 193 |
| Pseudo R ² | 23.1% | 40.2% | 24.7% | 31.4% |