Convertible Security Design and Contract Innovation

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Abstract

This paper studies convertible security design for a sample of 814 issuers over the years 2000 through 2007. We examine the determinants of the choice of fixed income claim and the method of payment using a nested logit regression model. We find that firms select security designs that reduce corporate income taxes, minimize refinancing costs, and help mitigate managerial discretion costs. Convertible debt issuers frequently select payment methods that permit them to report higher diluted earnings per share. Some of these firms also adopt simultaneous financial strategies (share repurchase programs and call spread overlays) that inflate reported earnings. Firms that adopt these earnings management strategies are more likely to choose certain investment banks.

JEL Classification Codes: G32, L22

Key Words: Convertible security financing; Convertible debt; Convertible preferred stock; External finance; Security choice decision; Security design; Cash settlement; Net share settlement; Mandatory conversion.

1 Introduction

Compared to other securities, there has been and continues to be a significant amount of innovation in the design of convertible securities. The rapid rate of innovation in convertible security design is particularly interesting in the context of the theories that explain company motivations for issuing convertible debt. The existing theoretical literature suggests that managers can design convertible debt to mitigate a variety of debt- and equity-related costs of external finance, including asset substitution problems (Green (1984)); financial distress and asymmetric information problems (Stein (1992)); risk uncertainty (Brennan and Schwartz (1988)); and over-investment problems (Mayers (1998)). A common feature of these theories is the prediction that information and agency problems limit the ability of issuers to raise capital efficiently and to fund profitable investment opportunities.[1] Since convertible debt issuers face different external financing costs, firms are expected to choose distinct security designs to mitigate these problems.

In this paper, we analyze three distinct decisions that issuers make when designing convertible securities: 1) the selection of conversion characteristics, 2) the type of fixed income claim, and 3) the method of payment. The interaction among these choices determines whether particular designs are effective at mitigating external financing costs.

Conversion characteristics include the conversion ratio, maturity date, call period, and time to first call. Taken together, they determine how closely a convertible security resembles debt or equity. Lewis, Rogalski, and Seward (1999) consider whether actual security designs correspond to theoretical explanations that predict whether a convertible security substitutes for debt or equity. They find that debt-like issues replace straight debt in order to mitigate debt-related agency costs, and equity-like designs substitute for common equity when firms face adverse selection problems.

The choice of a fixed income claim is a simple decision. An issuer either selects straight debt or preferred stock. A decision to issue straight debt entails the specification of a coupon rate (possibly zero), maturity date, call features, and call protection. By contrast, preferred stock is essentially a perpetual bond that pays investors fixed periodic dividends and possibly has redemption features.

A significant innovation in the design of fixed income claims occurred in 1985 when Merrill Lynch introduced Liquid Yield Option Notes (LYONs). Compared to plain-vanilla convertible

[1] It should be noted that these theories are not mutually exclusive. Since we expect firms to use convertibles as a means to control for both concerns simultaneously, the actual security designs should reflect the relative importance of the problems for each issuer.

debt, a LYON replaces a coupon paying bond with a zero-coupon bond. The key advantage of this particular design choice is that it exploits the Original Issue Discount (OID) provisions of the U.S. Tax Code, which allow firms to deduct interest expense as it accrues without requiring the issuer to actually make cash payments. A potential limitation associated with OID bonds is that investors must pay personal taxes on the accrued interest.[2] LYONs provide investors with more downside protection than is typically associated with a convertible security by including a number of put options. The puts are structured so that the holder may sell the bond back to the issuer at the original issue price plus accrued interest.

Convertible issuers also select a method of payment/conversion. This choice refers to the wide variety of settlement options that are currently in use. For convertible debt issuers, the main choice is whether to settle in stock, cash, or a combination of the two. Firms that choose partial cash settlement frequently pre-specify how much of the final payment is to be cash (typically the accreted value of the bond) although another popular settlement choice allows the issuer to pay a combination of stock and cash with the exact proportions to be decided at conversion. For preferred stock, issuers specify whether conversion is optional or mandatory. Compared to convertible debt, there are very few instances where convertible preferred stock is settled in cash.[3]

Compared to other aspects of convertible security design, the method of payment has changed the most. One of the first innovations was mandatory conversion. Bear Stearns introduced the so-called Preferred Equity Redemption Cumulative Stock (PERCS) in 1991. A PERCS is structured like preferred stock, but requires the issuer to exchange the preferred stock claim for common stock on a pre-specified date.[4] Given the initial success of PERCS, security offerings with mandatory conversion features were widely imitated by competing investment banks.[5]

In November 2000, Tyco Industries issued a modified LYON that became known as Contingent Convertible (CoCo). This Merrill Lynch product is similar to a LYON with the exception that holders may convert only if a certain knock-in threshold is reached. As argued by Marquardt and Wiedman (2005), the main benefit of this contingent conversion feature is that under State-

[2]Since these securities are primarily purchased by tax free institutions, this ultimately does not impose much of a personal tax penalty.

[3]There are four firms that issue convertible preferred stock with cash settlement features in our sample.

[4]These securities contain call provisions that provide the issuer with the opportunity to force conversion at dates prior to maturity, usually at a premium to the conversion value.

[5]Examples include ACES, DECS, ELKS, MIPS, PRIDES, SAILS, and STRYPES.

ment of Financial Accounting Standard (SFAS) 128, the shares can be excluded from diluted EPS calculations.[6]

A third innovation in the method of payment is the inclusion of cash settlement features for which at least a portion of the convertible security may be settled in cash upon conversion. Securities that contain cash settlement features include one of the following conversion choices. An issuer must: 1) pay the conversion value (the number of shares a bondholder is entitled to receive times the stock price at the conversion date) in cash (Instrument A), 2) choose to pay either cash or the number of shares a bondholder is entitled to receive (Instrument B), 3) pay cash for the accreted value (principal value plus accrued interest) and may satisfy the conversion spread (the excess of the conversion value over the accreted value) in either cash or equity (Instrument C or "net share settlements"), or 4) pay any combination of cash and equity (Instrument X).

Cash settlement features were incorporated into convertible offerings almost immediately after the FASB clarified the accounting treatment of fully diluted earnings as it relates to convertible securities. Specifically, the Financial Accounting Standards Board (FASB) amended Emerging Issues Task Force (EITF) 90-19 in January 2002 to allow for the exclusion of convertible shares in fully diluted earnings calculations. By the year 2007, cash settlement offerings were the most popular method of payment choice, representing over 86% (94 of 109) of all convertible issues. Reinforcing the notion that accounting treatment is an important design consideration, Marquardt and Wiedman (2007) find that 20% of CoCos are restructured into cash settlements after they lost their favorable accounting treatment in 2004.[7]

We study convertible security design using a nested logit model that treats design choices as a set of simultaneous decisions. We assume that convertible issuers decide on how "debt-like" or "equity-like" to structure an offering, the type of fixed income security (straight debt or preferred stock), and the method of payment (cash, stock, or a combination of the two).

Such an analysis presumes that firms will choose both debt- and equity-like security designs. Historically, this has been the case. For example, Lewis, Rogalski, and Seward (2003) report that, over the period 1978 to 1992, debt-like issues are a common design choice, representing 33.1% of

[6]Marquardt and Wiedman (2005) find that firms that are likely to experience large adjustments to fully diluted earnings because of the convertible issue are more likely to issue CoCos. They also show that firms are more likely to issue CoCos when managers' bonuses are based on fully diluted earnings.

[7]EITF 04-08 proposes recognizing CoCos in diluted earnings per share calculations. The FASB has ratified this proposal in the fall of 2004.

all convertible debt issues. More recently, the number of debt-like issues has declined significantly. For example, only 5 of the 819 issues are classified as debt-like in our sample, which covers the years 2000 through 2007.

Given the limited number of debt-like issues, it is not feasible to model conversion characteristics as a separate component of a nested logit model. While this limits our ability to test theoretical explanations specific to debt-like designs, their relative absence may simply indicate that these factors are not particularly important over our sample period. By conditioning on equity-like convertible securities, we eliminate what would have been the top level of our nested logit model. This results in a specification where the fixed income choice is the top level and the method of payment choice is the bottom level.

Our empirical analysis characterizes the determinants of the actual designs of convertible securities. With respect to the fixed income choice, we find that firms choose straight debt rather than preferred stock when they are best able to benefit from additional tax benefits, can minimize expected refinancing costs, and are most susceptible to agency costs associated with managerial discretion.

Issuers that choose convertible debt make method of payment choices that are consistent with the earnings management hypothesis. Firms choosing cash settlement were the ones that benefited the most from the favorable treatment associated with this accounting choice. Many of the firms in our sample augment this decision by taking additional steps to improve reported earnings. Two commonly adopted strategies are share repurchase programs and call spread overlays.[8]

Certain banks may develop reputations for facilitating innovative security designs. For example, Bank of America, Deutsche Bank, and JP Morgan are more likely to underwrite the offerings of firms that use cash settlements, call spread overlays, and/or share repurchases.

For firms that issue preferred stock, we consider the choice to include mandatory conversion provisions. This reflects the fact that mandatory conversion rapidly became a part of the security design "equation" following its introduction in 1991. Any firm that issues convertible preferred stock must consider this option. Mandatory convertibles are effectively delayed equity issues that increase debt capacity and decrease the chance of bankruptcy. We find that issuers that include

[8]Share repurchase programs reduce the number of shares outstanding and raise earnings per share. Call spread overlays use derivative securities to raise the effective conversion price. Since reported interest expense is based on the stated rather than effective conversion price, reported interest expense decreases, and firms are again able to report higher earnings per share.

mandatory conversion are especially concerned about debt capacity because their credit ratings are close to the investment-speculative grade cut-off.

The paper by Lewis, Rogalski, and Seward (1998) is the most closely related to ours. They use a simultaneous equations model to examine specific design elements (the dilution ratio, issue maturity, and call structure) and find that some issuers design convertible debt to control for risk shifting problems, while others design securities with the backdoor-equity explanation in mind. Lee and Figlewicz (1999) study the fixed income choice for 308 issues over the period 1977-1988, and find that convertible debt issuers have lower nondebt tax shields, lower risk, and greater free cash flows than firms that issue convertible preferred stock. Chemmanur, Nandy, and Yan (2004) study the mandatory conversion option. They examine 298 convertible issues over the period 1991-2001 and find that firms issue mandatory conversion features when they have low informational asymmetry but high probabilities of financial distress. We extend previous studies by jointly evaluating the choices in convertible security design. Moreover, we are the first to closely examine cash settlement features.

The remainder of this paper is organized as follows. Section 2 discusses theoretical explanations of convertible security design and characterizes testable hypotheses. Section 3 describes our sample and provides summary statistics based on the fixed income and method of payment choices. In Section 4, we describe the econometric specification of the nested logit model. Section 5 reports our empirical results. Section 6 provides additional analysis of the earnings management hypothesis and analyzes the method of payment choice in more detail. It estimates a multinomial logit model that treats different cash settlement options as independent choices. Section 7 concludes the paper.

2 Security Design Hypotheses

Security design decisions are important because they influence the cost and terms of raising new investment capital. Financial economists have offered explanations that stress how an appropriately designed convertible can reduce information and agency costs faced by companies when raising external capital. By exploiting a convertible's hybrid nature, a company can achieve different security designs simply by changing its contractual features.

One of the main concerns associated with testing security design hypotheses is the endogenous nature of the choice of different contractual features. The fact that different combinations of

contractual features can lead to very similar security designs makes it difficult to analyze specific features in isolation. For example, if a convertible bond is offered with a 30-year maturity but has no call protection, it may have a shorter effective maturity than an otherwise identical security with a 5-year maturity that offers three years of call protection. As a consequence, one must evaluate the effective security design by finding a systematic way to incorporate all of the relevant contractual features.

2.1 Conversion characteristics

The central theme that characterizes discussions about optimal security design is that convertible securities can be structured so that they substitute for debt or equity financing (Lewis, Rogalski, and Seward (1998, 1999)). The actual choice of the various contractual features determines whether the conversion characteristics produce a debt- or equity-like design. Prior research uses either the risk-neutral probability of conversion (Lewis, Rogalski, and Seward (1999, 2003)) or the hedge ratio ("Delta") embedded in the conversion option (De Jong, Dutordoir, and Verwijmeren (2007) and Loncarski, Ter Horst, and Veld (2007)).[9] We offer a third alternative for classifying security type that is based on the *actual* probability of conversion.

The problem with the risk-neutral probability of conversion ($RNPC$) is that it assumes the stock price grows at the risk free rate rather than the true expected rate of return. The $RNPC$ is therefore a downward biased estimate of the true probability of conversion. In addition, the $RNPC$ ignores call features. Since the optimal call policy is to force conversion as soon as the stock price exceeds the conversion price, there are times when conversion is forced that would not have resulted in conversion had the issuer waited until maturity.

Delta is preferable to the $RNPC$ because it is a direct estimate of how closely an offering resembles equity. As Delta approaches one, a convertible security effectively becomes a deferred equity issue. Conversely, as Delta approaches zero, a convertible security behaves like a fixed income claim. Unfortunately, it also ignores call features.

To address the bias associated with ignoring the optimal call policy, we estimate the actual probability of conversion (APC) via Monte Carlo simulation. Our approach eliminates bias concerns associated with $RNPC$ and $Delta$ by specifically considering the optimal call policy. To do

[9] The conversion Delta is defined as the partial derivative of the conversion option with respect to the stock price.

this, we assume that stock prices follow a geometric Brownian motion process. The drift rate is expected to grow at the annualized expected return from the Capital Asset Pricing Model.[10] The volatility rate is estimated with ten-years of monthly stock return data. We use a long-horizon for calculating the volatility rate because we want an estimate of volatility over the life of the bond.

We simulate 60,000 (antithetic) stock price paths that have 10,000 compounding periods over the life of the fixed income security. Since the optimal call policy is to force conversion as soon as the conversion option is in-the-money, we calculate whether the firm would have forced conversion prior to maturity subject to constraints that restrict the time to first call. The probability of conversion is then calculated for each convertible issue as the total number of price paths that result in conversion divided by the total price paths.

APC is used to classify securities as debt-like (issues with an *APC* below 0.5) or equity-like (issues with an *APC* above 0.5). We find that only 5 of the 819 issues are considered debt-like.[11] Although the scarcity of debt-like issues limits our ability to analyze conversion characteristics as a separate design choice, *APC* has sufficient cross-sectional variation that is used as a control variable in our regression analysis of the choice of payment for convertible bond issuers.[12]

2.2 Fixed Income Component

The choice of a fixed income claim is potentially motivated by corporate taxes and external financing costs related to financial distress, refinancing, and managerial discretion. We summarize our discussion of the testable implications in Table 1.

2.2.1 Corporate taxes

Interest payments generate a tax shield because they are deductible for corporate taxes. By contrast, preferred stock is generally considered equity for tax purposes and dividend payments are

[10] The expected return is calculated as the the yield on a ten-year U.S. Treasury bond plus a risk premium. The risk premium equals the equity beta times a market risk premium of 7.5%. The equity beta is estimated from a market model regression that uses the realized return from the CRSP equally-weighted stock index.

[11] We perform several robustness tests for our classification of equity-like convertible securities based on *APC*. First, we replicate our analysis assuming all 819 issues are equity-like. Second, we classify observations as equity-like when the risk-neutral probability of conversion is above 50%. Third, we classify observations as equity-like when Delta is above 50%. We obtain qualitatively similar results in all three cases.

[12] We do not use *APC* as a control variable for convertible preferred stock issues, since *APC* equals one for all mandatory preferred stock issues, and the cross-sectional variation is low for the other convertible preferred stock issues.

not tax deductible. Firms that are profitable, have low debt levels, and pay significant corporate taxes are expected to choose convertible debt rather than convertible preferred stock. DeAngelo and Masulis (1980) show that non-debt related tax shields, such as depreciation, can make interest redundant as a tax shield, reducing the incentive to use debt. Therefore, firms that have tax loss carryforwards and high levels of depreciation expense are expected to choose convertible preferred stock.

2.2.2 Reduction of financial distress costs

Firms with a relatively high probability of financial distress would not be expected to prefer convertible straight debt over convertible preferred stock, since convertible straight debt has a fixed maturity date that requires repayment of the principal if the conversion option is out-of-the money. Firms that would be vulnerable to financial distress costs are often characterized as high-growth firms. In addition they are relatively small, have significant amounts of financial leverage and low interest coverage ratios.

2.2.3 Refinancing and external financing costs

Firms that issue convertible debt must pay the accreted value in cash if the conversion option is out-of-the-money at maturity.[13] Since these firms have not performed well, cash reserves are likely to be low and current debt levels are likely to exceed their target capital structures. In this scenario, firms are unlikely to have sufficient capital on hand and are forced to refinance at market rates of interest. Since credit profiles are not expected to be particularly strong, it will be difficult to find additional capital at attractive rates. We predict that firms with low slack, bad credit ratings, low interest coverage ratios, and high debt levels will choose preferred stock rather than debt to avoid refinancing.

2.2.4 Managerial discretion and free cash flows

The existence of managerial discretion allows managers to pursue their own objectives, such as excessive firm growth, at the expense of shareholders. Straight debt creates less managerial discretion than preferred stock because it mandates the payment of the principal on the maturity

[13] Note that cash settlement features only apply if the conversion option is in-the-money.

date, whereas there is no principal associated with preferred stock. Therefore, firms with severe managerial discretion costs are expected to choose convertible straight debt. Firms facing managerial discretion problems are expected to have few positive NPV investment opportunities, and are characterized by low market-to-book ratios, good credit ratings, high interest coverage ratios, and low debt levels.

2.3 Method of Payment

Theories that explain the method of payment predict that the design choice is largely determined by the tradeoff between debt and equity-related financing costs. We examine theories related to financial distress, managerial discretion, staged investment, and earnings management. The expected relations between the method of payment choices and the explanatory variables are summarized in Table 1.

2.3.1 Reduction of financial distress costs

As discussed in the choice of fixed income claim section, firms that face relatively high financial distress costs are likely to choose preferred stock over straight debt because it places fewer financial constraints on the issuer. The big difference is that straight debt requires the repayment of the principal at maturity, while preferred stock is infinitely lived and requires no payment at "expiration."

The method of payment choice for convertible debt is also affected by financial distress costs. Variation in the level of financial distress might influence the choice of stock or cash settlement; convertible debt issuers that face relatively high financial distress costs are expected to avoid cash settlement.[14]

When firms issue convertible preferred stock because financial distress costs are high, they are likely to opt for mandatory conversion because it creates additional debt capacity regardless of the stock price. In effect, mandatory conversion is equivalent to deferred equity. Compared to non-mandatory conversion, mandatory convertible preferred stock allows for a reduction of leverage, even at times when share prices and cash reserves are relatively low. As noted above, firms that are

[14] Although convertible debt issues are expected to have lower financial distress costs relative to convertible preferred issuers, they can still be substantial. For example, Stein (1992) uses this to motivate the use of convertible debt instead of straight debt.

vulnerable to relatively high financial distress costs have high-growth rates, relatively small size, significant amounts of financial leverage, and low interest coverage ratios.

2.3.2 Managerial discretion and free cash flows

Not only does the managerial discretion explanation predict that firms will use convertible straight debt rather than convertible preferred stock, but it predicts that these firms will select cash settlement features as well. Compared to stock settlement, cash settlement features require firms to pay free cash flows following periods of good stock price performance, i.e. when managerial discretion is relatively high. As we note above, firms that face high managerial discretion costs tend to have poor growth opportunities, good credit ratings, high interest coverage ratios, and low debt levels.

2.3.3 Staged-investment and free cash flow

Mayers (1998) argues that firms with sequential financing needs can lower financing costs and avoid managerial discretion costs by issuing convertible securities. By setting the maturity of the fixed income claim or times to first call to coincide with the need for new funds, a convertible security creates debt capacity at the time a firm needs another round of financing. The benefit to shareholders is that the firm is obligated to repay the principal amount if it has not achieved its growth objectives. This eliminates managerial discretion at times when incentives to invest in unprofitable projects is relatively high.

Firms are expected to use mandatory conversion and stock settlement when they face significant managerial discretion costs because additional debt capacity can only be created if investors convert to common stock. Firms that plan to pay at least the principal amount in cash are not as concerned about staged investment.

We predict that firms with large future investment requirements plan to create additional debt capacity at times when they require another round of financing. Since future investment is unobservable, we assume that investment activity around the time of the offering can be used as a proxy for future investment activity. We predict that capital expenditures in the offer year are positively related to the choice of stock settlement and mandatory conversion.

2.3.4 Earnings management

In 2002, the FASB amended Emerging Issues Task Force (EITF) 90-19 to permit firms that pay the accreted value of the fixed income claim in cash to exclude convertible shares from fully diluted EPS, allowing them to report higher fully diluted EPS. Issues with potential cash settlements that have a stated policy of paying the accreted value in cash also receive this favorable accounting treatment.

We consider three main indicators that point to the possibility of earnings management. The first is the decrease in diluted earnings per share when the convertible shares are not excluded from the diluted EPS calculations. In effect, we consider whether firms are more likely to choose cash settlement when the potential decrease of diluted EPS is higher.[15]

The second indicator for earnings management is the adoption of share repurchase programs at the time of issue. A number of companies issue convertible securities with cash settlement features and use part of the proceeds to buyback common stock (see also De Jong, Dutordoir, and Verwijmeren (2007)). The convertible debt has a below-market interest rate (often 1%-2%, sometimes even 0%), which has minimal impact on reported earnings. By repurchasing shares with the proceeds from a cash settlement issue, an issuer can significantly reduce the number of outstanding shares with a minimal reduction to reported earnings from the increased debt balance. Firms following this strategy often achieve a substantial immediate boost to their basic and diluted earnings per share.[16]

The third indicator is the use of call spread overlays. This strategy uses equity derivatives to synthetically increase the effective conversion price of a convertible security. To see how this strategy works, consider a firm that issues a convertible with a low interest rate and then uses part of the proceeds to purchase call options on its own shares, struck at the conversion price. It then writes call options on its own shares at a higher strike price. The net effect of this combination of equity derivatives synthetically increases the strike price in the conversion option itself. Had the issuer simply offered the convertible bond with a higher conversion price initially, the interest rate would have been higher. By using call spread overlays, the issuing firm gets to report low interest

[15] This variable is based on the "Impact1" variable in Marquardt and Wiedman (2005).

[16] Hribar, Jenkins, and Johnson (2006) show that share repurchase programs do not necessarily boost earnings per share. These programs are accretive in the context of a concurrent convertible issue because the interest rates associated with convertible debt are very low. De Jong, Dutordoir, and Verwijmeren (2007) show that another incentive for the simultaneous stock repurchases is to mitigate the effect of short sales by convertible arbitrageurs.

expense for book purposes and a higher effective interest rate for tax purposes (i.e., Original Issue Discount provisions) because the convertible debt instrument and purchased call option are "linked" for tax reporting purposes.

We expect that firms are more likely to choose cash settlement features if the potential decrease in reported earnings is relatively large. Firms that concurrently adopt share repurchase programs and use call spread overlays are also more likely to choose cash settlement.

3 Sample description

This section describes our sample selection procedure (Section 3.1) and presents summary statistics (Section 3.2). Summary statistics are presented for each decision node in the nested logit model.

3.1 Sample selection

We collect convertible issuances from the Securities Data Company (SDC) for the period January 2000 to September 2007. Line (1) of Table 2 indicates that the initial sample consists of 1,326 convertible bond issues.

To be included in the final sample we impose a number of data filters. The first is a requirement that firms have an offering prospectus available on the SEC's Edgar database. This filter eliminates 197 issues.

Next, we delete a number of issues based on security design characteristics and industry affiliation. Specifically, we eliminate equity units (17 observations), purchase contracts (13 observations), utilities (38 observations) and financial institutions (151 observations). We also delete exchangeable securities (6 observations). Finally, we require issuer firms to have stock return information available on the Center for Research in Security Prices (CRSP) database, and financial statement information in COMPUSTAT, which eliminates an additional 85 observations. This results in a sample consisting of 819 convertible issues (line (10)).

Table 2 indicates that over our eight year sample period, the number of total issues per year ranges from a low of 113 to a high of 256. Although there is significant year-to-year variation in the number of issues, the market for convertible securities appears to have been robust with no obvious trends in issue activity. One aspect of security design worth noting is the tendency for issuers to switch from stock settlement to potential cash settlement structures. At the beginning

of our sample, 94.7% of all convertible debt issues in 2000 contained a stock settlement feature. By the end of our sample period, 86.2% are potentially settled in cash.

As discussed in Section 2.1, only 5 of the 819 convertible securities in our sample are classified as debt-like, which does not allow us to model conversion characteristics as a separate component of a nested logit model. Since the reasons for issuing these debt-like issues can be very different from issuing equity-like convertibles (Lewis, Rogalski, and Seward (1999)), we exclude the 5 observations from our sample.[17]

3.2 Summary statistics

We report summary statistics for our sample of convertible issuers based on financial characteristics, security design features, and industry affiliation. Financial characteristics include stock price performance (announcement period excess returns, pre-issue stock price run-up, dividend yield, and volatility), firm size (total assets, sales, and market value of equity), profitability (earnings before interest and taxes (EBIT) and free cash flow), tax status (tax payments, tax loss carryforwards, and depreciation), capital structure (book and market leverage, interest coverage, and decrease in diluted earnings per share), and asset structure (market-to-book, investments, and issue proceeds).[18] Calculation details including COMPUSTAT item numbers are reported in the associated tables.

Security design features and industry association are based on the percentage of issuers that conform to different classifications. Security design features include the percentage of issuers that include potential cash settlement, mandatory conversion, put rights, and call features. We also report the frequency that issuers adopt certain issue strategies that are used to report higher fully diluted earnings (stock repurchase programs and call spread overlays). The percentage of issues that are privately placed and have investment grade ratings are also reported.

3.2.1 Choice of fixed income component

Table 3 indicates that firms choosing convertible debt over convertible preferred stock have on average lower tangibility, lower leverage, and higher interest coverage. The observation that straight

[17] We replicate our analysis using all 819 issues in a robustness test. We obtain qualitatively similar results.

[18] We use Factiva to identify announcement dates. The event window used for estimating the excess returns is [-1; 0]; the estimation window we use is [-200; -30]. The market proxy is the CRSP Equally-weighted stock index.

debt issuers have more conservative capital structures may be an optimal response to having less collateral relative to issuers that choose preferred stock. Convertible debt issuers also have higher growth opportunities but invest less. In addition, they pay higher taxes, have more slack, and have higher free cash flows than convertible preferred stock issuers.

Panel A of Table 4 indicates that 43.10% of straight debt issuers include potential cash settlement features. A similar number of straight debt issuers also include put rights (42.97%). By contrast, the large majority of preferred stock issuers do not include cash settlement features (only four firms do). No convertible preferred stock issuer includes put options.

Another interesting distinction between security designs is that straight debt never includes mandatory conversion, whereas it is quite common for preferred stock issues (26.09%). Finally, we note that, although private placements are quite common regardless of the fixed income choice, straight debt issues employ this method much more frequently (84.64% vs. 43.48%).

Panel B of Table 4 reports the percentage of issues across industry groupings. For the most part, the issue rates are comparable. Still, issuers in the business equipment and health care industry tend to prefer convertible straight debt, while issuers in the energy business are more likely to choose convertible preferred stock.

3.2.2 Choice of method of payment for convertible debt issuers

Table 5 indicates that convertible debt issuing firms that choose stock settlement have lower announcement period excess returns and higher levels of pre-issue stock price run-up. On average, firms that select stock settlement are smaller (total assets and sales) and raise less capital. Stock settlement firms also have better growth prospects (market-to-book), and are characterized by higher volatility. These findings suggest that firms needing additional capital to finance the exercise of growth options are more likely to choose stock settlement.

A comparison of the credit risk profiles for convertible debt issuers across stock and cash settlement is somewhat ambiguous. Issuers that choose stock settlement have less debt, more financial slack, and pay lower dividends. Taken together, this would lead to a relatively favorable credit risk assessment. However, these firms also have lower interest coverage, are less profitable, and have lower free cash flows, which are mitigating factors.

The possibility also exists that firms choose cash settlement features in order to manage reported

earnings. Since the accounting treatment for cash settled securities is accretive for fully diluted earnings, one would expect firms to choose this type of security design if they need an earnings boost. Consistent with this argument, Table 5 indicates that cash settlement adopters face larger drops in earnings per share under the if-converted method. Also consistent with the earnings management hypothesis, Panel A of Table 6 reports that firms choosing cash settlement are more likely to implement strategies that increase reported earnings per share (additional stock repurchases and call spread overlays).

Panel A of Table 6 also indicates that stock settlement designs are less likely to include put rights (34.55% vs. 54.08%) and more likely to be callable (81.24% vs. 60.12%). It is interesting to note that, regardless of the payment choice, the majority of convertible debt issues are privately placed.

Panel B of Table 6 indicates that business equipment manufacturers and health care providers tend to be industries that choose a relatively large number of convertible security offerings with stock settlement features. Similar to our results for the choice of a fixed income claim in Table 4, we do not see much industry variation across the method of payment choice.

3.2.3 Choice of method of payment for convertible preferred stock issuers

Table 7 indicates that the difference between the announcement effects of convertible preferred stock issues with mandatory and optional (i.e. non-mandatory) conversion options are not statistically significant. Firms with lower stock price run-ups are more inclined to include mandatory conversions. This tendency to use mandatory conversion for firms that have not had strong recent performance is in line with their relatively poor growth prospects (market-to-book) and lower volatility. Firms issuing mandatory convertibles also have more assets and higher free cash flows.

With respect to specific design features, the most notable differences in Panel A of Table 8 are that issues with mandatory conversion are much less likely to include call features (25.00% vs. 85.29%) but are more likely to be publicly underwriten.

Panel B of Table 8 presents the distribution of firms choosing different methods of payment for convertible preferred stock across different industry groups. Manufacturing firms are more likely to include mandatory features, whereas firms in the energy industry are less likely to include mandatory features.

4 Econometric Specification

We use a nested logit model (McFadden (1981)) to test our various hypotheses related to convertible security design. The structure imposed by the nested logit model is appropriate for our analysis because it reflects the nature of the actual design choices faced by an issuer. The model assumes that a firm chooses the best outcome among the available alternatives. A Hausman specification test rejects the independence of irrelevant alternatives assumption, which indicates that a simple multinomial logit model is inappropriate for our analysis. Cronqvist and Nilsson (2005) use a similar approach to investigate the choice between rights offerings and private equity placements. Their analysis demonstrates the importance of simultaneously modeling joint decisions.

Adopting their notation, we assume that the objective function for choice j by firm i takes the form

$$V_{i,j} = \hat{V}_{i,j} + \epsilon_{i,j} \tag{1}$$

where $\hat{V}_{i,j}$ is the fitted value for the objective function based on observable firm characteristics and $\epsilon_{i,j}$ is an idiosyncratic component that reflects unmeasured characteristics.

The convertible design choices are illustrated in Figure 1. We partition the choice space into disjoint subsets. Firms make a choice of fixed income claim indexed by $j = 1, \ldots, F$ and method of payment indexed by $k = 1, \ldots, M_j$. We assume that lowest level objective functions are specified as:

$$V_{i,j,k} = \hat{V}_{i,j,k} + \epsilon_{i,j,k} \tag{2}$$

where $\hat{V}_{i,j,k}$ is linear in firm characteristics and additively separable into components that reflect method of payment $M_{i,j}$ and fixed income F_i choices. We assume that $\epsilon_{i,j,k}$ is generalized extreme-value distributed. The functional form for $\hat{V}_{i,j,k}$ is

$$\hat{V}_{i,j,k} = \alpha' A_{i,j} + \beta' B_{i,j,k} \tag{3}$$

where α and β are parameter vectors and $A_{i,j}$ and $B_{i,j,k}$ denote vectors of explanatory variables that correspond to choices j and k for firm i. Under the nested logit model, the joint probability of firm i choosing the security design choice j, k is

$$P_{i,j,k} = P_{i,j} \cdot P_{i,j,k|j} \tag{4}$$

where $P_{i,j}$ is the marginal probability of choosing straight debt or preferred stock and $P_{i,j,k|j}$ is the probability of choosing a particular method of payment if the choice was j at the previous level. The conditional probability $P_{i,j,k|j}$ of method of payment choice j, k is

$$P_{i,j,k|j} = \frac{exp\left(\beta' B_{i,j,k}\right)}{\sum_{M_j} exp\left(\beta' B_{i,j,k}\right)}, \tag{5}$$

and the marginal probability of the choice of a fixed income claim is

$$P_{i,j} = \frac{exp\left(\alpha' A_{i,j} + \lambda I_{i,j}\right)}{\sum_F exp\left(\alpha' A_{i,j} + \lambda I_{i,j}\right)} \tag{6}$$

where the inclusive values for fixed income choice j is defined as

$$I_{i,j} = log\left\{\sum_{M_j} exp\left(\beta' B_{i,j,k}\right)\right\}. \tag{7}$$

The inclusive value at a given level represents the expected value from a particular choice made at the next lower level.

We estimate the parameter vectors α, β, and λ using sequential maximum likelihood. Lower-level coefficients are consistently estimated by maximizing the conditional log-likelihood function. Inclusive values are estimated using the procedure in McFadden (1981). Upper level estimates are consistently estimated by sequential maximum likelihood.

5 Empirical results

Table 9 reports the estimated coefficients and their associated p-values for all levels of the nested logit model. Statistical significance is based on Huber-White standard errors. For ease of interpretation, the expected signs for the coefficients are carried forward from Table 1. We organize our discussion of the results according to the different design choices and the different hypotheses under consideration.

5.1 Choice of fixed income component

We test four hypotheses for the fixed income choice. These are the tax benefits hypothesis, the financial distress hypothesis, the refinancing hypothesis, and the managerial discretion hypothesis.

5.1.1 Corporate taxes

We find evidence that firms choose straight debt rather than preferred stock when interest expense can be used to shield income from corporate taxes. Firms that have higher interest coverage ratios (p-value = 0.004) are more likely to issue convertible debt. The relatively high credit ratings typically associated with these firms suggest that they have unused debt capacity and are likely to be underlevered. Firms with relatively low depreciation levels (p-value = 0.066) are also more likely to choose convertible debt. This is sensible because depreciation is a non-debt tax deduction that makes interest payments potentially redundant as tax shields. Tax payments and tax loss carryforwards also have the correct sign, but their effects are not statistically significant (p-values of 0.203 and 0.679, respectively).

5.1.2 Reduction of financial distress costs

Since convertible straight debt has a fixed maturity that requires repayment of the principle when the conversion option is out-of-the-money, we predict that firms with higher costs of financial distress choose convertible preferred stock. We find some evidence for the financial distress cost hypothesis in the fixed income decision. Firms with higher interest coverage ratios opt for convertible straight debt, which is in line with the financial distress hypothesis as these firms are better able to pay the principal. However, the effects of the other proxy variables (size, leverage, market-to-book ratio, profitability, and whether the firm has an investment grade rating) are not statistically significant in the fixed income regression.

5.1.3 Refinancing costs

We find evidence consistent with the hypothesis that firms choose a fixed income security in an attempt to minimize external financing costs. All of the coefficients in Table 9 have the correct sign. Firms that have stronger free cash flows (p-value < 0.001), higher interest coverage ratios (p-value $= 0.004$), and greater financial slack (p-value < 0.001) are more likely to choose convertible debt because they are more likely to be able to refinance principal balances with debt in the event that the conversion option is not exercised. Generally, firms prefer to refinance with debt because underwriting costs are much lower relative to equity issues, particularly when stock performance has not been as good as the firm anticipated at the time it was originally issued.

5.1.4 Managerial discretion

Straight debt does a better job mitigating managerial discretion costs because interest rates on debt tend to be higher than preferred stock dividend yields and interest payments are mandatory. Since preferred stock has no maturity date, the mandatory repayment of principal associated with debt forces firms to commit more of their free cash flows to the repayment of financial claims. Firms that have the greatest propensity to encounter managerial discretion problems are therefore the most likely to choose straight debt. Relatively speaking, the results for the choice of fixed income claim are strong. We find that firms with higher free cash flows (p-value < 0.001), higher interest coverage ratios (p-value $= 0.004$), and greater financial slack (p-value < 0.001) are more likely to choose straight debt.

5.2 Choice of method of payment for convertible debt issuers

Two of the hypotheses that potentially explain the fixed income choice also potentially explain the method of payment choice for convertible debt issuers. These are the financial distress hypothesis and the managerial discretion hypothesis. Table 9 also provides results for the staged investment and the earnings management hypotheses.

5.2.1 Reduction of financial distress costs

The financial distress cost hypothesis makes predictions regarding the choice of fixed income claim and the method of payment. Firms that choose convertible straight debt as the fixed income component can decide to settle in cash, stock, or a combination of cash and stock. We predict that firms with high costs of financial distress choose stock settlement. In line with this prediction, we find that high-growth firms choose stock settlement in the convertible straight debt sample. However, the other explanatory variables that relate to the financial distress hypothesis are not statistically significant.

5.2.2 Managerial discretion

The managerial discretion hypothesis also makes predictions about the method of payment choice assuming that the firm chooses convertible straight debt. We predict that firms seeking to mitigate managerial discretion problems are more likely to choose cash settlement. The evidence in Table

9 is mixed. As predicted, we find that firms with relatively poor growth opportunities (p-value = 0.003) are more likely to choose cash settlement. However, despite a greater propensity for managerial discretion, firms that have higher stock price run-ups (p-value = 0.038) are more likely to choose stock settlement, which is inconsistent with our predictions.

5.2.3 Staged investment

The staged investment hypothesis makes predictions about the method of payment choices for convertible straight debt and convertible preferred stock. The results for convertible straight debt issuers are mixed. Consistent with our predictions, we find that firms with significant growth opportunities (p-value = 0.003) are more likely to choose stock settlement. This finding indicates firms attempt to preserve debt capacity in case additional rounds of financing are needed to complete an investment project. However, inconsistent with the hypothesis, firms with higher investments are not more likely to choose stock settlement.

5.2.4 Earnings management

Our results strongly support the predictions of the earnings management hypothesis. According to this hypothesis, firms wanting to report higher fully diluted earnings choose cash settlement. Cash settlement is accretive for fully diluted earnings per share because the shares that would be included in an "as-if" converted calculation had the issuer chosen stock settlement instead are ignored.

Firms often take additional actions that exacerbate this effect. For example, some firms use part of the offer proceeds to repurchase shares. Although not all share repurchase programs are accretive with respect to fully diluted earnings, the relatively low interest rates that are typically associated with convertible bonds are sufficient for the net effect to be positive.

Other firms select call spread overlays. Under this strategy, a firm issues convertible debt and simultaneously eliminates the equity component by taking an offsetting position in call options. The net effect is to synthetically increase the conversion price. It is accretive with respect to reported earnings because the interest expense that is recognized for financial statement reporting purposes is lower than it would have been had the firm issued the convertible at the synthetic conversion price. Since the firm selects cash settlement (the shares are not reflected in fully diluted earnings), the strategy is accretive for reported earnings.

Consistent with our predictions, firms that repurchase additional shares (p-value < 0.001) and firms that adopt call spread overlays (p-value < 0.001) are more likely to choose cash settlement features. The decrease in fully diluted earnings per share also has the predicted sign, but is not statistically significant (p-value of 0.158).

5.3 Choice of method of payment for convertible preferred stock issuers

We have two hypotheses that potentially explain the mandatory conversion choice: the staged investment hypothesis and the financial distress hypothesis. A potential third hypothesis would be related to tax benefits, since some mandatory convertible preferred stock issues provide tax advantages (for example, the dividend payments of Feline PRIDES are tax deductable). However, since none of the mandatory convertible securities in our sample are taxed-advantaged, we focus on the staged investment and financial distress hypothesis.

5.3.1 Staged investment

Firms are expected to use mandatory conversion when they want to align their convertible securities with their future financing needs. We predict that capital expenditures in the offer year are positively related to the choice of mandatory conversion. However, Table 9 shows that the effect of capital expenditures on the decision to add mandatory conversion is not significant. In fact, none of the variables that are statistically significant have the expected sign for the staged investment hypothesis.

5.3.2 Reduction of financial distress costs

The financial distress hypothesis predicts that firms with high financial distress costs will choose preferred stock rather than straight debt. As discussed in Section 5.1.2, Table 9 provides some evidence consistent with this hypothesis.

Conditional on choosing preferred stock, the financial distress hypothesis also predicts that firms with the highest financial distress costs select mandatory conversion features. These firms are expected to be characterized by smaller size, higher market-to-book ratios, lower profitability, and relatively poor credit profiles (high debt, speculative grade bond ratings, and low interest coverage ratios). However, the evidence in Table 9 does not support our additional conjectures related to

the method of payment.

One possible explanation may be that the marginal increase in the likelihood of financial distress associated with optional conversion relative to mandatory conversion is rather small. That is, there may not be much power to test the financial distress hypothesis for convertible preferred stock issuers. This is especially relevant since preferred stock issuers have relatively high probabilities of default to begin with. For example, Table 3 reports that preferred stock issuers have more debt in their capital structures than convertible debt issuers: the median market leverage ratios are 37.3% and 15.4%, respectively.

To further examine whether the costs of financial distress have an effect on the mandatory choice, we focus on the actual credit ratings of firms rather than whether the firm has investment grade debt. The reason for this additional analysis on credit ratings is that mandatory convertible preferred stock helps a firm's credit rating. Since issuers do not have to repay the principal and the securities automatically convert into common equity within a limited period of time, the instrument is relatively similar to common equity. Therefore, the choice of mandatory convertible preferred stock has the lowest probability of default among all possible convertible security choices.

Firms that are most concerned about their credit ratings are likely to be close to the investment-speculative grade cut-off. Credit ratings above BB represent investment grade ratings (i.e. ratings AAA, AA, A, and BBB), whereas lower credit ratings (BB, B, CCC, CC, C, and D) represent speculative grade ratings. The cut-off between investment and speculative grade ratings is important because speculative grade ratings substantially increase the cost of debt. Grinblatt and Titman (2002), for example, argue that many bond portfolio managers are restricted from owning speculative grade bonds.

Consistent with this conjecture, we find that all of the mandatory convertible preferred stock issuers in our sample have ratings that fall in the range BBB-B at the time of the offering. Hence, all mandatory convertible preferred stock issuers are close to the speculative grade cut-off. In fact, 75% of the mandatory convertible preferred stock issuers have BB ratings. Financial distress costs are clearly a concern for these firms. An examination of issue announcements indicates that all but one of the mandatory convertible preferred stock issuers plan to use (part of) the issue proceeds to reduce indebtedness.[19] When we compare the actual credit ratings of firms that issue mandatory

[19] When we look at the credit ratings of the firms issuing mandatory convertibles two years after the issue, we find that 55% of the credit ratings have improved. From the issuers with a speculative grade rating, 20% manages to

convertible preferred stock to other convertible issuers, the percentage of issuers within the BBB-B range is much lower for other convertible issuers. The percentage of regular convertible preferred stock issuers with a rating between BBB and B is 56% (29% has a BB rating), and this percentage is 49% (20% has a BB rating) for convertible bond issuers.

6 Earnings management and the method of payment choice

Most of the hypotheses we examine are based on the premise that managers choose particular security designs to maximize long-run shareholder value. Consistent with this viewpoint, our evidence finds support for the tax minimization, refinancing costs, and managerial discretion hypotheses for the fixed income decision. However, not all of our hypotheses are grounded in the shareholder value paradigm. Specifically, firms that use cash settlement features to manage earnings are not necessarily interested in maximizing shareholder value, since future cash flows are not affected by changes in reported diluted earnings per share.

Given that we find evidence consistent with the earnings management hypothesis, this section explores this possibility more carefully. We begin our analysis by providing an expanded description of the relevant accounting issues related to convertible debt and earnings. Since particular investment banks may be responsible for contract innovations that are linked to particular security designs, we then characterize the distribution of underwritten offerings by different investment banks. The idea is to shed light on whether firms desiring particular security designs are more likely to choose investment banks that have expertise in this area. The third part of our analysis is to characterize the type of firms that adopt share repurchase programs and call spread overlays. For our sample, there are 79 (75) instances where firms repurchase shares (call spread overlays). In addition, there are 31 cases where firms adopt both strategies simultaneously. We examine the use of these strategies by estimating a logit regression model of the determinants of earnings management. Finally, we estimate a multinomial logit model to characterize the use of cash settlement features.

obtain an investment grade rating within these two years.

6.1 Accounting for convertible debt and the calculation of fully diluted earnings per share

The basic regulations for calculating fully diluted earnings can be found in Statement 128 (1997). Paragraph 26 indicates that:

> *The dilutive effect of convertible securities shall be reflected in diluted EPS by application of the if-converted method. Under that method*:
>
> 1. *If an entity has convertible preferred stock outstanding, the preferred dividends applicable to convertible preferred stock shall be added back to the numerator.*
> 2. *If an entity has convertible debt outstanding, (1) interest charges applicable to the convertible debt shall be added back to the numerator, (2) to the extent nondiscretionary adjustments based on income made during the period would have been computed differently had the interest on convertible debt never been recognized, the numerator shall be appropriately adjusted, and (3) the numerator shall be adjusted for the income tax effect of (1) and (2).*
> 3. *The convertible preferred stock or convertible debt shall be assumed to have been converted at the beginning of the period (or at time of issuance, if later), and the resulting common shares shall be included in the denominator.*

This treatment recognizes the dilutive nature of convertible securities and requires that potential shares be included in the total shares calculation and that firms add any interest or preferred dividends to income. This treatment can lead to substantial reductions in fully diluted earnings per share estimates relative to undiluted EPS.

In 1991, the application of this approach to convertible securities that contain cash settlement features was considered an emerging issue by the FASB's Task Force when investment banks began discussing potential issuances. The Task Force released EITF Issue 90-19 (Convertible bonds with issuer option to settle for cash upon conversion).[20] The discussion in 90-19 provides guidance regarding securities that can potentially be settled in cash and is contained in Paragraph 29 of Statement 128:

[20] It is not clear whether there were in fact any such instruments issued prior to EITF 90-19. If so, we believe that they were used on a very limited basis.

If an entity issues a contract that may be settled in common stock or in cash at the election of either the entity or the holder, the determination of whether that contract shall be reflected in the computation of diluted EPS shall be made based on the facts available each period. It shall be presumed that the contract will be settled in common stock and the resulting potential common shares included in diluted EPS (in accordance with the relevant provisions of this Statement) if the effect is more dilutive. A contract that is reported as an asset or liability for accounting purposes may require an adjustment to the numerator for any changes in income or loss that would result if the contract had been reported as an equity instrument for accounting purposes during the period. That adjustment is similar to the adjustments required for convertible debt in paragraph 26(b). The presumption that the contract will be settled in common stock may be overcome if past experience or a stated policy provides a reasonable basis to believe that the contract will be paid partially or wholly in cash.

In January 2002, the Task Force amended EITF 90-19. The amendment makes a distinction between three security types:

1. *Instrument A: Upon conversion, the issuer must satisfy the obligation entirely in cash based on the fixed number of shares multiplied by the stock price on the date of conversion (the conversion value).*
2. *Instrument B: Upon conversion, the issuer may satisfy the entire obligation in either stock or cash equivalent to the conversion value.*
3. *Instrument C: Upon conversion, the issuer must satisfy the accreted value of the obligation (the amount accrued to the benefit of the holder exclusive of the conversion spread) in cash and may satisfy the conversion spread (the excess conversion value over the accreted value) in either cash or stock.*

The amended guidance in Issue 90-19 provides more favorable EPS treatment for Instrument C ("net share settlements") than before: it concludes that the if-converted method should not be used for Instrument C, due to the cash-settled portion. The conversion spread of Instruments C should be included in diluted earnings per share based on the provisions of paragraph 29 of Statement

128.[21]

For our sample, approximately half of the cash settlements can be settled in any combination of cash and stock at the option of the firm. This security is not considered in (amended) EITF 90-19, and is referred to in practice as Instrument X; a term initially used in a speech by Robert Comerford of the SEC at the AICPA National Conference on Current SEC and PCAOB Developments in December 2003. Although Instrument X offerings have the option, upon conversion, to settle for any combination of equity and cash, companies have analogized to the accounting guidance in Issue 90-19 (as amended in 2002), and have accounted for such instruments based on the guidance in paragraph 12 of APB 14. Additionally, many issuers of "Instrument X" securities have adopted a "stated" policy to pay the principal in cash and the conversion spread in equity (that is, even though they are legally entitled to settle the if-converted value in any combination of cash and shares, they adopt a policy to settle the principal amount of the instrument in cash upon conversion). Specifically, entities apply the guidance in paragraph 29 of FAS 128, which indicates that the presumption of share-settlement can be overcome if an entity has a past practice or "stated policy" of settling an instrument in cash. Because of their policy to settle the principal in cash, they do not apply the if-converted method of computing diluted EPS for Instrument X securities. Rather, they apply a treasury stock-type method whereby only the net shares that would be issuable if conversion occurred at the current stock price are included in diluted EPS. Because such instruments are typically issued with a conversion feature that is significantly out-of-the-money, there is often no diluted EPS impact at all for several years.

Since the 2002 amendment of 90-19, cash settlements have become very popular, which led to new discussions on the subject. The Task Force has questioned whether the accounting guidance in (amended) 90-19 "appropriately reflects the economics of those instruments."[22] As a result, the FASB has issued APB 14-1 in May 2008, because "the Board believes that the inconsistency between the accounting for Instruments C (as convertible debt) and the diluted earnings-per-share treatment (as debt issued with detachable warrants) can provide misleading information to investors." Under APB 14-1, convertible bonds that are potentially (either partially or wholly) settled in cash, will be divided into separate debt and equity components. The value of the debt component is estimated

[21] The revised guidance for Instruments C should be applied to instruments issued after January 24, 2002.

[22] EITF 07-2 (Accounting for convertible debt instruments that are not subject to the guidance in paragraph 12 of APB Opinion 14, March 2007 and June 2007) provides a historical perspective of the issues.

using the interest rate that would apply to a similar debt instrument without a conversion option (i.e., the fair value of the liability component can be estimated by calculating the present value of its cash flows using the market rate of interest for similar notes that have no conversion rights). The value of the equity component is the remainder. For firms with cash settlements outstanding, this accounting change will increase reported interest expense, which reduces net income and earnings per share.

The accounting for convertible securities has also been revisited as part of the FASB's and IASB's agreement to work together toward the convergence of global accounting standards. The FASB and the IASB have had an earnings per share convergence project on their agenda for the past several years. One of the proposed changes to U.S. GAAP (FAS 128) in that project is to eliminate an entity's ability to overcome the presumption of share settlement based on a past practice or stated policy.

6.2 Distribution of underwriters by security design choice

When a firm decides to issue a convertible security, it must obtain the services of an investment bank to facilitate the transaction. Investment banks develop expertise in designing certain types of transactions and are likely to attract underwriting business because of their reputation.

Table 10 reports the distribution of investment bank participation across different methods of payment. Panel A reports the total number of issues by investment bank. The totals represent counts based on proportional participation. For example, Bank of America and Bear Stearns are credited with 0.5 issues if they are both identified as lead underwriters in the SDC database.

Credit Suisse First Boston (CSFB), Goldman Sachs, Merrill Lynch, and Morgan Stanley account for 48.5% of all issue activity.[23] By contrast, Bear Stearns was only credited with 2.71% of total issue activity over our sample period. This is somewhat surprising given the firm's reputation as a design innovator in this area.

Panel B reports the proportion of issues for each method of payment choice by investment bank. The proportion of stock settlement issues is highest for Solomon Smith Barney (18.92 of the 21.92 issues, which is 86%). Panel C indicates the degree to which banks specialize in issuing particular security designs. It reports the ratio of this proportion to the average proportion across

[23] CSFB, Goldman Sachs, Merrill Lynch, and Morgan Stanley respectively made 83.23, 87.08, 117.73, and 84.75 issues out of 768 convertible bond issues over our sample period.

all investment banks. For example, the proportion of Instrument C issues for Bank of America is twice the industry average (41% compared to 21%).

6.3 Earnings management regressions

Table 11 reports the results for our logit analysis of the determinants of the adoption of share repurchase programs and call spread overlays. The dependent variable is a dummy variable that takes the value one if the firm repurchases shares (Model (1)) or uses a call spread overlay (Model (2)). We also consider the case where either the firm repurchases shares or uses a call spread overlay (Model (3)). Model (4) is an expanded version of Model (3) that includes underwriter dummy variables.

We find that large firms with relatively poor recent stock performance and speculative grade debt are more likely to adopt an earnings management strategy. Issuing firms are more likely to repurchase shares if free cash flows are high, and more likely to use call spread overlays if they have relatively low investment requirements and high interest coverage ratios. Firms that face larger potential decreases of reported diluted EPS under the if-converted method are more likely to adopt a call spread overlay. The coefficient estimate for the decrease in earnings per share is 8.769 (p-value < 0.001).

Table 11 indicates that the Bank of America, Deutsche Bank, and JP Morgan are more likely to handle the underwriting for firms that adopt earnings management strategies. By contrast, issues underwritten by Salomon Smith Barney are less likely to coincide with attempts to manage earnings.

6.4 Specific cash settlement options

The security design model we estimate in Table 9 does not distinguish among alternative cash settlement features. Since different cash settlement choices may be useful at resolving different financing problems, we consider an alternative specification for the choice of settlement features that distinguishes between Instrument B, C, and X designs.[24] Table 12 reports the results of a multinomial logit regression model, and Table 13 reports the corresponding marginal effects. These marginal effects are calculated by applying a one standard deviation shock to the mean of each

[24] Our sample includes only one Instrument A issue. We combine this issue with Instrument C issues, based on the large portion of the value that is assured to be settled in cash for both Instruments A and C.

explanatory variable, while holding all other explanatory variables at their sample means. Dummy variables are set to zero for these calculations. Marginal effects for dummy variables are calculated by setting the dummy variables to one.

The tables provide a number of interesting insights. We hypothesized that pre-specified partial cash settlements (Instruments C) or stated policies to settle in cash (Instruments X) are useful security designs for reducing managerial discretion costs associated with free cash flows. This follows because issuers commit future free cash flows to pay the accreted value in cash. Consistent with this prediction, we find that firms choosing an Instrument X-style settlement are more likely to have relatively high levels of free cash flows (marginal effect of 0.416 with a p-value of 0.046) and poor growth opportunities (marginal effect of -0.028 with a p-value of 0.009). The marginal effects of these variables are not significant for Instrument C issuers.

Firms that want to manage earnings are hypothesized to favor Instrument C settlements. We indeed find that firms choosing Instrument C settlements face the largest decreases in diluted EPS under the if-converted method (marginal effect of 1.050 with p-value of < 0.001). In unreported analysis, we find that Instrument C issuers are most likely to use stock repurchases and call spread overlays (29.56% and 33.96%, respectively). For Instrument X issuers, these percentages are 12.42% and 7.84%, whereas no Instrument B issuer uses stock repurchases or call spread overlays.[25]

7 Conclusion

This paper examines convertible security design for a sample of 819 issuers over the years 2000 through 2007. We find that almost all of the firms in our sample issue equity-like convertibles. Hence, the probability that the securities will be converted is relatively high for almost all issues in our sample. For these equity-like convertible issues, we examine the determinants of the choice of the fixed income claim and the method of payment using a nested logit regression model. For our sample of 814 issues of equity-like convertible securities, we find that firms select a fixed income claim - either a bond or preferred stock - based on incentives to reduce corporate income taxes, minimize refinancing costs, and mitigate managerial discretion costs.

We further find that convertible debt issuers frequently select payment methods that permit

[25]The regression specification in Tables 12 and 13 does not include dummies for stock repurchases and call spread overlays to reduce the number of variables compared to the number of observations (only 18 observations for Instrument B).

them to report higher earnings. Especially net share settlements, which are convertible securities for which at least the principal will be settled in cash, are popular instruments to manage earnings. Some of the firms also adopt concurrent financial strategies that inflate reported earnings. The first strategy is to simultaneously repurchase stock, which reduces the number of outstanding shares and hence dilution. The second strategy is to use a call spread overlay, which reduces reported interest expenses by synthetically increasing the strike price of the conversion option. The recent changes in accounting standards make it more difficult to use convertible debt as an earnings management device. A direction for future research is to determine whether the use of cash settlement features declines following the adoption of APB 14-1.

Given the significant amount of innovation in the design of convertible securities, we also examine the role of the underwriters of the convertible securities. We find that the Bank of America, Deutsche Bank, and JP Morgan are more likely to be the underwriters of firms that use cash settlements, stock repurchases, and/or call spread overlays than other investment banks.

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Table 1: Predicted signs based on different hypotheses for the design of convertible securities.

The table presents the expected signs for the different hypotheses that are tested using a nested logit model.

						Method of payment choice							
	Choice of fixed income security (Straight debt vs. Preferred stock)					Straight debt (Stock vs. Cash)					Preferred stock (Mand. vs. Optional)		
Description	Taxes	Financial distress	Refinancing costs	Mgr. discretion	Net effect	Financial distress	Mgr. discretion	Staged inv.	Earnings mgt.	Net effect	Financial distress	Staged inv.	Net effect
Constant													
Log(market value)		+			+	-				-	-		-
Book leverage	-	-	-	-	-	+	+	+		+	+	+	+
Market-to-book ratio		-		-	-	+	+	+		+	+	+	+
EBIT	+	+		+	+	-	-	-	+	?	-	-	-
Free cash flow			+	+	+		-	-		-		-	-
Stock price run-up			+	+	+		-			-			?
Investment grade	+	+	+	+	+	-	-	-		-	-	-	-
Interest coverage	+	+	+	+	+	-	-			-	-		-
Slack			+	+	+		-			-			
Tax payments	+				+								
Tax loss carryforwards	-				-								
Depreciation	-				-								
Proceeds/market value					?								
Investment								+		+		+	+
Probability of conversion						+	-	+	-	?			
Decrease diluted EPS									-	-			
Call spread overlay									-	-			
Additional stock repurchase									-	-			

Table 2: Number of convertible security issues over time.

The table presents the number of convertible issues by security type over time. Total issues (SDC) are all reported U.S. convertible securities in the SDC database, which includes convertible debt, convertible preferred stock, equity units, and purchase contracts. Prospectuses are obtained from the SEC Edgar database. Purchase contracts vary in their characteristics (Upper Decs, Prides, Pacs, Spaces). CoCos are Contingent Convertibles. Exotics issues represent other specific types of convertible bonds (e.g., Carz, Codes, Meds, Oceans, Peacs, Pears, Phones, Pies, or Tides). Issues designated as LYONs, CoCos and Exotics represent distinct security types that may have stock or cash settlement features. Convertible bonds in the year 2007 are only collected until the end of September.

			Years							
	Description	Total	2000	2001	2002	2003	2004	2005	2006	2007
	Panel A. Full sample by year									
(1)	Total issues (SDC)	1326	154	208	117	256	181	113	143	154
(2)	No prospectus found	197	47	43	21	17	9	8	15	37
(3)	Net issues (SDC), (1)-(2)	1129	107	165	96	239	172	105	128	117
(4)	Equity Units	17	0	1	8	1	1	6	0	0
(5)	Purchase Contracts	13	0	2	7	2	2	0	0	0
(6)	Preferred stock	90	13	5	7	12	16	17	12	8
(7)	Convertible debt	1009	94	157	74	224	153	82	116	109
(8)	Net issues (SDC), (4)+(5)+(6)+(7)	1129	107	165	96	239	172	105	128	117
(9)	Data filters (CRSP, etc.)	310	25	41	38	51	49	38	37	31
(10)	Final sample, (8)-(9)	819	82	124	58	188	123	67	91	86
(11)	Potentially cash settled	473	5	9	15	89	88	69	104	94
(12)	Stock settled	536	89	148	59	135	65	13	12	15
(13)	Convertible debt, (11)+(12)=(7)	1009	94	157	74	224	153	82	116	109
(14)	LYON	31	4	20	5	2	0	0	0	0
(15)	CoCo	194	0	15	13	67	63	12	22	2
(16)	Exotic	31	5	12	3	2	5	3	1	0
	Panel B. Specific cash settlement features by year									
(17)	100% cash settlement	2	2	0	0	0	0	0	0	0
(18)	At option of firm in either cash or stock	25	1	5	3	10	6	0	0	0
(19)	Principal in cash, remainder in cash, stock, or combination of cash and stock (at option of firm)	231	0	0	0	6	29	38	86	72
(20)	At option of firm in cash, stock, or a combination of cash and stock	215	2	4	12	73	53	31	18	22
(21)	Potentially cash settled, (17)+(18)+(19)+(20) = (11)	473	5	9	15	89	88	69	104	94

Table 3: Summary statistics for convertible securities differentiated by choice of fixed income claim.

Excess returns are computed over a [-1,0] event window using the market model. Issue proceeds are the gross proceeds of the issue reported in SDC. Firm characteristics are one year lagged. Assets are determined by Compustat Item 6. Sales is Item 12. The market value of equity is calculated by multiplying Item 24 and Item 25. Tangibility is Item 8. Book leverage is computed by dividing the sum of Item 9 and Item 34 by Item 6, and market leverage is (Item 9 + Item 34) / (Item 34 + Item 9 + Item 24 * Item 25). The market-to-book ratio is calculated as (Item 24 * Item 25 - Item 60 + Item 6) / Item 6. EBIT is Item 18 + Item 15 + Item 16. Tax payments are determined by Item 16. Tax loss carryforwards is a dummy that equals one if Item 52 is larger than zero, and equals zero otherwise. Interest coverage is Item 13 divided by Item 15. Depreciation corresponds to Item 14, and investments are Item 128. Dividend yield is calculated by dividing Item 21 by the market value. Slack is Item 1. Free cash flow is calculated as Item 13 - Item 128. Volatility is calculated as the annualized standard deviation over the period 1987 through 2007 using CRSP monthly data. The stock price run-up is the firm-specific raw return over a period of 75 trading days ending two days before the announcement date. Delta is the convertible's sensitivity for small stock price changes. Decrease EPS is the change in diluted earnings per share that would occur upon issuing the convertible when the "if-converted" accounting method applies. Tangibility, EBIT, tax payments, depreciation, investments, slack, and free cash flows are scaled by total assets. Dollar amounts are in millions of dollars.

	Straight debt (N = 768)		Preferred stock (N = 46)		Diff. in means	
Variable definition	Mean	Median	Mean	Median	*t*-stat	*p*-value
Excess returns [-1; 0] (%)	-4.24	-3.82	-4.17	-3.30	-0.086	0.931
Issue proceeds	350.2	200.0	321.9	162.5	0.411	0.681
Total assets	5,081.9	1,069.6	5,635.1	2,789.9	-0.356	0.722
Total sales	3,433.9	735.1	3,750.2	1,461.9	-0.288	0.773
Market value of equity	4,691.2	1,289.4	3,691.8	1,510.6	0.892	0.372
Tangibility	0.239	0.163	0.464	0.395	-5.266	0.000
Book leverage	0.273	0.254	0.385	0.376	-3.296	0.001
Market leverage	0.209	0.154	0.360	0.373	-4.711	0.000
Market-to-book ratio	2.792	1.825	1.798	1.324	4.887	0.000
EBIT	-0.002	0.049	-0.017	0.016	0.541	0.589
Tax payments	0.018	0.009	0.002	0.000	2.140	0.032
Tax loss carryforwards	0.457	0.000	0.522	1.000	-0.845	0.402
Interest coverage	6.301	5.362	4.257	3.667	3.389	0.001
Depreciation	0.046	0.037	0.059	0.042	-1.559	0.119
Investments	0.056	0.036	0.127	0.046	-3.068	0.002
Dividend Yield	0.004	0.000	0.007	0.000	-1.419	0.156
Slack	0.245	0.160	0.108	0.058	6.035	0.000
Free cash flow	0.002	0.050	-0.061	-0.006	1.881	0.060
Volatility	0.325	0.314	0.306	0.316	1.249	0.212
Stock price run-up	0.231	0.163	0.136	0.097	1.758	0.079
Delta	0.826	0.849	0.828	0.900	-0.066	0.947
Decrease diluted earnings per share	0.057	0.041	0.039	0.000	2.256	0.024

Table 4: Summary statistics for convertible security design characteristics and industry representation by choice of fixed income claim.

LYONs are liquid yield option notes. A call spread overlay is a strategy that increases the effective strike price implicit in the conversion option. Additional share repurchase indicates that the issuer repurchases shares subsequent to issue. Put rights provide the investor with downside protection in the event the firm does not perform well. A convertible security is callable if the firm has the right to force conversion prior to the maturity date. Securities that are sold to private investors rather than through a public offering are considered private placements. Industry classification is based on twelve Fama-French industry groupings.

	Straight debt (N = 768)	Preferred stock (N = 46)
Panel A. Percentage of issues that contain a specific design and offer placement characteristics (%)		
Potentially cash settled	43.10	8.70
Contingent convertible	18.23	6.52
LYON	2.86	0.00
Mandatory conversion	0.00	26.09
Call spread overlay	9.77	0.00
Additional stock repurchase	10.29	6.52
Put rights	42.97	0.00
Callable	72.14	69.57
Private placement	84.64	43.48
Issuer has investment grade rating	17.71	13.04
Panel B. Proportion of issues across industry groupings (%)		
Consumer nondurables	2.08	4.35
Consumer durables	1.69	0.00
Manufacturing	7.29	6.52
Energy	4.30	23.91
Chemicals	1.17	6.52
Business equipment	32.42	15.22
Telephone	5.34	13.04
Utility	0.00	0.00
Wholesale	8.85	4.35
Healthcare	23.44	2.17
Other	13.41	23.91

Table 5: Summary statistics for convertible debt securities differentiated by settlement choice.

Excess returns are computed over a [-1,0] event window using the market model. Issue proceeds are the gross proceeds of the issue reported in SDC. Firm characteristics are one year lagged. Assets are determined by Compustat Item 6. Sales is Item 12. The market value of equity is calculated by multiplying Item 24 and Item 25. Tangibility is Item 8. Book leverage is computed by dividing the sum of Item 9 and Item 34 by Item 6, and market leverage is (Item 9 + Item 34) / (Item 34 + Item 9 + Item 24 * Item 25). The market-to-book ratio is calculated as (Item 24 * Item 25 - Item 60 + Item 6) / Item 6. EBIT is Item 18 + Item 15 + Item 16. Tax payments are determined by Item 16. Tax loss carryforwards is a dummy that equals one if Item 52 is larger than zero, and equals zero otherwise. Interest coverage is Item 13 divided by Item 15. Depreciation corresponds to Item 14, and investments are Item 128. Dividend yield is calculated by dividing Item 21 by the market value. Slack is Item 1. Free cash flow is calculated as Item 13 - Item 128. Volatility is calculated as the annualized standard deviation over the period 1987 through 2007 using CRSP monthly data. The stock price run-up is the firm-specific raw return over a period of 75 trading days ending two days before the announcement date. Delta is the convertible's sensitivity for small stock price changes. Decrease EPS is the change in diluted earnings per share that would occur upon issuing the convertible when the "if-converted" accounting method applies. The probability of conversion is calculated over the life of the convertible security using a Monte Carlo simulation. Tangibility, EBIT, tax payments, depreciation, investments, slack, and free cash flows are scaled by total assets. Dollar amounts are in millions of dollars.

	Stock (N = 437)		Potential cash (N = 331)		Diff. in means	
Variable definition	Mean	Median	Mean	Median	t-stat	p-value
Excess returns [-1; 0] (%)	-5.36	-5.06	-2.76	-2.41	-5.417	0.000
Issue proceeds	292.1	190.0	426.8	200.0	-3.195	0.001
Total assets	3,199.9	752.8	7,566.5	1,356.9	-2.164	0.030
Total sales	2,238.0	510.9	5,012.6	1,023.5	-2.412	0.016
Market value of equity	4,176.6	1,419.1	5,370.7	1,147.4	-1.296	0.195
Tangibility	0.232	0.160	0.247	0.165	-0.920	0.358
Book leverage	0.264	0.240	0.284	0.273	-1.241	0.215
Market leverage	0.190	0.128	0.235	0.183	-2.920	0.004
Market-to-book ratio	3.284	1.975	2.143	1.630	6.411	0.000
EBIT	-0.039	0.020	0.048	0.069	-6.371	0.000
Tax payments	0.020	0.006	0.017	0.014	0.957	0.339
Tax loss carryforwards	0.428	0.000	0.495	0.000	-1.860	0.063
Interest coverage	5.936	4.720	6.784	6.116	-2.410	0.016
Depreciation	0.048	0.038	0.044	0.036	0.939	0.348
Investments	0.057	0.039	0.054	0.031	0.742	0.458
Dividend Yield	0.003	0.000	0.004	0.000	-2.214	0.027
Slack	0.288	0.206	0.187	0.125	6.031	0.000
Free cash flow	-0.035	0.027	0.050	0.066	-7.084	0.000
Volatility	0.348	0.343	0.295	0.278	6.398	0.000
Stock price run-up	0.294	0.214	0.147	0.122	6.055	0.000
Delta	0.827	0.832	0.825	0.863	0.221	0.825
Decrease diluted earnings per share	0.045	0.000	0.074	0.073	-6.259	0.000
Probability of conversion	0.693	0.717	0.784	0.830	-6.742	0.000

Table 6: Summary statistics for convertible debt security design characteristics and industry representation by settlement choice.

LYONs are liquid yield option notes. A call spread overlay is a strategy that increases the effective strike price implicit in the conversion option. Additional share repurchase indicates that the issuer repurchases shares subsequent to issue. Put rights provide the investor with downside protection in the event the firm does not perform well. A convertible security is callable if the firm has the right to force conversion prior to the maturity date. Securities that are sold to private investors rather than through a public offering are considered private placements. Industry classification is based on twelve Fama-French industry groupings.

	Stock (N = 437)	Potential cash (N = 331)
Panel A. Percentage of issues that contain a specific design and offer placement characteristics (%)		
Contingent convertible	13.27	24.77
LYON	4.35	0.91
Mandatory conversion	0.00	0.00
Call spread overlay	2.06	19.94
Additional stock repurchase	2.97	19.94
Put rights	34.55	54.08
Callable	81.24	60.12
Private placement	84.67	84.59
Issuer has investment grade rating	16.70	19.03
Panel B. Proportion of issues across industry groupings (%)		
Consumer nondurables	1.83	2.42
Consumer durables	1.37	2.11
Manufacturing	4.81	10.57
Energy	3.89	4.83
Chemicals	0.69	1.81
Business equipment	35.70	28.10
Telephone	5.95	4.53
Utility	0.00	0.00
Wholesale	7.09	11.18
Healthcare	26.32	19.64
Other	12.36	14.80

Table 7: Summary statistics for convertible preferred securities differentiated by conversion feature.

Excess returns are computed over a [-1,0] event window using the market model. Issue proceeds are the gross proceeds of the issue reported in SDC. Firm characteristics are one year lagged. Assets are determined by Compustat Item 6. Sales is Item 12. The market value of equity is calculated by multiplying Item 24 and Item 25. Tangibility is Item 8. Book leverage is computed by dividing the sum of Item 9 and Item 34 by Item 6, and market leverage is (Item 9 + Item 34) / (Item 34 + Item 9 + Item 24 * Item 25). The market-to-book ratio is calculated as (Item 24 * Item 25 - Item 60 + Item 6) / Item 6. EBIT is Item 18 + Item 15 + Item 16. Tax payments are determined by Item 16. Tax loss carryforwards is a dummy that equals one if Item 52 is larger than zero, and equals zero otherwise. Interest coverage is Item 13 divided by Item 15. Depreciation corresponds to Item 14, and investments are Item 128. Dividend yield is calculated by dividing Item 21 by the market value. Slack is Item 1. Free cash flow is calculated as Item 13 - Item 128. Volatility is calculated as the annualized standard deviation over the period 1987 through 2007 using CRSP monthly data. The stock price run-up is the firm-specific raw return over a period of 75 trading days ending two days before the announcement date. Delta is the convertible's sensitivity for small stock price changes. Decrease EPS is the change in diluted earnings per share that would occur upon issuing the convertible when the "if-converted" accounting method applies. Tangibility, EBIT, tax payments, depreciation, investments, slack, and free cash flows are scaled by total assets. Dollar amounts are in millions of dollars.

	Mandatory (N = 12)		Optional (N = 34)		Diff. in means	
Variable definition	Mean	Median	Mean	Median	t-stat	p-value
Excess returns [-1; 0] (%)	-3.22	-2.95	-4.51	-3.30	0.862	0.389
Issue proceeds	497.1	275.0	260.0	150.0	1.188	0.235
Total assets	10,215.9	7,797.9	4,018.3	1,621.9	2.357	0.018
Total sales	6,251.3	5,227.9	2,867.4	633.7	1.794	0.073
Market value of equity	5,006.6	3,993.8	3,227.7	1,119.1	1.013	0.311
Tangibility	0.422	0.386	0.479	0.439	-0.636	0.525
Book leverage	0.388	0.380	0.383	0.375	0.069	0.945
Market leverage	0.451	0.446	0.328	0.372	1.848	0.065
Market-to-book ratio	1.330	1.224	1.964	1.393	-2.348	0.019
EBIT	0.051	0.045	-0.041	-0.002	1.366	0.172
Tax payments	0.022	0.005	-0.004	0.000	1.251	0.211
Tax loss carryforwards	0.588	1.000	0.333	0.000	1.536	0.140
Interest coverage	4.800	4.018	4.065	3.053	0.694	0.488
Depreciation	0.042	0.042	0.064	0.045	-1.979	0.048
Investments	0.084	0.036	0.142	0.052	-1.322	0.186
Dividend Yield	0.013	0.003	0.005	0.000	1.154	0.249
Slack	0.066	0.042	0.122	0.061	-1.728	0.084
Free cash flow	0.047	0.038	-0.099	-0.032	2.238	0.025
Volatility	0.241	0.229	0.328	0.336	-3.455	0.001
Stock price run-up	-0.024	0.028	0.192	0.196	-2.049	0.040
Delta	0.598	0.580	0.909	0.928	-14.218	0.000
Decrease diluted earnings per share	0.057	0.041	0.032	0.000	1.192	0.233

Table 8: Summary statistics for convertible preferred security design characteristics and industry representation by conversion feature.

LYONs are liquid yield option notes. A call spread overlay is a strategy that increases the effective strike price implicit in the conversion option. Additional share repurchase indicates that the issuer repurchases shares subsequent to issue. Put rights provide the investor with downside protection in the event the firm does not perform well. A convertible security is callable if the firm has the right to force conversion prior to the maturity date. Securities that are sold to private investors rather than through a public offering are considered private placements. Industry classification is based on twelve Fama-French industry groupings.

	Mandatory (N = 12)	Optional (N = 34)
Panel A. Percentage of issues that contain a specific design characteristics (%)		
Potential cash settlement	0.00	11.76
Contingent convertible	8.33	5.88
LYON	0.00	0.00
Call spread overlay	0.00	0.00
Additional stock repurchase	8.33	5.88
Put rights	0.00	0.00
Callable	25.00	85.29
Private placement	0.00	58.82
Issuer has investment grade rating	25.00	8.82
Panel B. Proportion of issues across industry groupings (%)		
Consumer nondurables	8.33	2.94
Consumer durables	0.00	0.00
Manufacturing	16.67	2.94
Energy	8.33	29.41
Chemicals	8.33	5.88
Business equipment	8.33	17.65
Telephone	8.33	14.71
Utility	0.00	0.00
Wholesale	8.33	2.94
Healthcare	0.00	2.94
Other	33.33	20.59

Table 9: Coefficient estimates from the nested logit model.

The table reports the estimation of a nested logit model. It reports the expected signs of the coefficients, the coefficient estimates, and p-values based on Huber-White standard errors. The dependent variable for the fixed income choice (the top level) is one for convertible bonds, and zero for convertible preferred stock. The dependent variable for the settlement choice (lower level for convertible bonds) is one for stock settlement and zero for cash settlement. The dependent variable for the mandatory conversion choice (lower level for convertible preferred stock) is one for mandatory conversion features and zero for optional conversion features. The inclusive value represents the expected value from a particular choice made at the lower levels.

	Fixed income choice (Straight debt = 1 Preferred stock = 0)			Settlement choice (Stock = 1 Potential cash = 0)			Mandatory conversion (Mandatory = 1 Optional = 0)		
Variable definition	Sign	Coef.	p-value	Sign	Coef.	p-value	Sign	Coef.	p-value
Constant		-0.189	1.878		1.670	0.018		-4.659	0.337
Log(market value)	+	-0.012	0.948	-	0.074	0.420	-	1.975	0.052
Book leverage	-	-0.004	0.996	+	0.027	0.956	+	1.508	0.705
Market-to-book ratio	-	0.135	0.572	+	0.168	0.003	+	-8.207	0.006
EBIT	+	0.630	0.741	?	0.283	0.788	-	10.219	0.064
Free cash flow	+	5.341	0.000	-	-1.988	0.142	-	14.802	0.093
Stock price run-up	+	0.015	0.987	-	0.558	0.038	?	-8.136	0.050
Investment grade	+	0.099	0.876	-	0.299	0.240	-	-0.904	0.519
Interest coverage	+	0.134	0.004	-	0.027	0.282	-	-0.396	0.349
Slack	+	4.925	0.000	-	0.158	0.751			
Tax payments	+	8.212	0.203						
Tax loss carryforwards	-	-0.132	0.679						
Depreciation	-	-4.422	0.066						
Proceeds / market value	?	3.279	0.114						
Investment				+	-0.848	0.637	+	5.906	0.451
Probability of conversion				?	-2.955	0.000			
Decrease diluted earnings per share				-	-2.398	0.158			
Call spread overlay				-	-2.554	0.000			
Additional stock repurchase				-	-1.434	0.000			
Inclusive value		1.406	0.240						
N		814			768			46	
χ^2 (p-value)		0.000			0.000			0.171	
Pseudo R^2		0.233			0.206			0.439	

Table 10: Distribution of convertible issues by method of payment choice across investment banks

The table reports the number of convertible issues that are underwritten by a specific investment bank. The sample consists of convertible straight debt issues. One firm issued an Instrument A specification; we reclassify this issue as an Instrument C specification. Panel A reports the counts based on proportional participation (if two investment banks are identified as lead underwriters in the SDC database, each would be credited with 0.5 issues). Panel B reports the proportion of stock settlements, Instruments B, Instruments C, and Instruments X per investment bank. Panel C reports the proportion of each settlement type compared to the average industry proportion.

Security Type	Bank of America	Bear Stearns	CSFB	Citibank	Deutsche Bank	Goldman Sachs	JP Morgan	Lehman Bros.	Merrill Lynch	Morgan Stanley	Salomon Smith Barney	Other	Total
Panel A. Number of issues for each settlement type													
Stock settlement	12.33	10.00	55.83	22.25	17.33	58.67	27.25	26.08	64.25	55.83	18.92	68.25	437.00
Instrument B	2.14	0.00	1.67	1.48	3.00	0.14	1.98	0.00	3.64	1.48	1.33	1.14	18.00
Instrument C	24.38	2.98	11.73	8.73	11.71	10.81	20.23	7.77	26.21	9.57	0.00	25.89	160.00
Instrument X	20.42	7.83	14.00	14.46	6.29	17.46	9.29	10.71	23.63	17.88	1.67	9.38	153.00
Total	59.27	20.81	83.23	46.92	38.33	87.08	58.75	44.56	117.73	84.75	21.92	104.65	768.00
Panel B. Proportion of issues for each settlement type by investment bank													
Stock settlement	0.21	0.48	0.67	0.47	0.45	0.67	0.46	0.59	0.55	0.66	0.86	0.65	0.57
Instrument B	0.04	0.00	0.02	0.03	0.08	0.00	0.03	0.00	0.03	0.02	0.06	0.01	0.02
Instrument C	0.41	0.14	0.14	0.19	0.31	0.12	0.34	0.17	0.22	0.11	0.00	0.25	0.21
Instrument X	0.34	0.38	0.17	0.31	0.16	0.20	0.16	0.24	0.20	0.21	0.08	0.09	0.20
Panel C. Proportion of issues for each settlement type relative to industry average													
Stock settlement	0.37	0.84	1.18	0.83	0.79	1.18	0.82	1.03	0.96	1.16	1.52	1.15	
Instrument B	1.54	0.00	0.85	1.34	3.34	0.07	1.44	0.00	1.32	0.74	2.60	0.47	
Instrument C	1.97	0.69	0.68	0.89	1.47	0.60	1.65	0.84	1.07	0.54	0.00	1.19	
Instrument X	1.73	1.89	0.84	1.55	0.82	1.01	0.79	1.21	1.01	1.06	0.38	0.45	

Table 11: Earnings management strategies

The table reports logit regression models that examine the determinants of earnings management policies. Our sample consists of convertible straight debt issues. The first model (Stock Repurchase) considers firms that adopt stock repurchase programs. The second (Call spread overlay) examines the use of call spread overlays. The third model (Combined) examines firms that adopt either a share repurchase program, a call spread overlay, or both strategies simultaneously. The fourth model is based on the Combined specification and adds underwriter dummy variables. For all of the models, we report coefficient estimates and the associated p-values based on Huber-White standard errors. For the final specification, we also provide the marginal effects and the p-value for the economic significance of the marginal effect. Marginal effects are based on a one standard deviation change in the explanatory variable holding all other explanatory variables at their sample means. Dummy variables are set to zero. Their marginal effects are calculated by evaluating the fitted value assuming the dummy variable under consideration equals one.

	Stock repurchase (1)		Call spread overlay (2)		Combined (3)		Combined with investment bank dummies (4)			
Variable definition	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Marg. effect	p-value
Constant	-4.329	0.000	-5.649	0.000	-3.994	0.000	-3.832	0.000		
Log(market value)	0.554	0.050	1.511	0.000	0.803	0.002	0.735	0.009	0.073	0.007
Book leverage	0.558	0.500	1.026	0.162	1.061	0.080	0.888	0.128	0.088	0.123
Market-to-book ratio	0.002	0.979	-0.106	0.227	-0.041	0.533	-0.022	0.744	-0.002	0.743
EBIT	-1.645	0.171	1.404	0.238	-0.608	0.572	-0.498	0.652	-0.050	0.652
Interest coverage	0.013	0.749	0.085	0.044	0.052	0.114	0.044	0.180	0.004	0.181
Investment	0.186	0.952	-10.716	0.012	-2.876	0.283	-2.075	0.414	-0.207	0.413
Slack	-0.427	0.544	0.590	0.440	0.350	0.561	0.559	0.375	0.056	0.370
Free cash flow	6.157	0.001	-2.709	0.146	1.969	0.277	1.845	0.290	0.184	0.285
Stock price run-up	-1.545	0.000	-2.332	0.000	-1.863	0.000	-1.919	0.000	-0.191	0.000
Decrease diluted earnings per share	0.972	0.654	8.769	0.000	4.863	0.011	4.671	0.025	0.465	0.024
Investment grade	-0.924	0.012	-0.954	0.018	-0.815	0.008	-0.835	0.010	-0.068	0.002
Probability of conversion	0.385	0.596	-2.596	0.000	-0.908	0.134	-1.409	0.032	-0.140	0.026
Bank of America							0.947	0.000	0.123	0.004
Bear Stearns							0.490	0.380	0.058	0.452
CSFB							-0.452	0.262	-0.040	0.201
Citibank							0.554	0.133	0.065	0.196
Deutsche Bank							0.801	0.027	0.103	0.071
Goldman Sachs							-0.212	0.550	-0.020	0.526
JP Morgan							0.622	0.029	0.074	0.058
Lehman Bros.							0.011	0.978	0.001	0.978
Merrill Lynch							0.306	0.302	0.033	0.337
Morgan Stanley							0.309	0.282	0.033	0.320
Salomon, Smith, Barney							-1.578	0.081	-0.092	0.001
N	768		768		768		768			
χ^2 (p-value)	0.000		0.000		0.000		0.000			
Pseudo R^2	0.099		0.184		0.104		0.156			

Table 12: Multinomial logit model based on convertible debt settlement type

The table reports the estimation of a multinomial logit model that examines the determinants of the settlement types (stock settlement, Instrument B, Instrument C, and Instrument X). The sample consists of convertible straight debt issues. One firm issued an Instrument A specification; we reclassify this issue as an Instrument C specification. We report the coefficient estimates and the associated p-values (based on Huber-White standard errors).

	Instrument B (N = 18)		Instrument C (N = 160)		Instrument X (N = 153)	
Variable definition	Coef.	p-value	Coef.	p-value	Coef.	p-value
Constant	-7.461	0.001	-6.179	0.000	-0.276	0.727
Log(market value)	0.537	0.016	0.326	0.006	-0.156	0.156
Book leverage	2.510	0.190	-0.054	0.937	0.246	0.628
Market-to-book ratio	-0.671	0.018	-0.118	0.147	-0.205	0.004
EBIT	3.730	0.186	1.005	0.412	-0.859	0.411
Interest coverage	0.020	0.785	0.036	0.256	-0.044	0.114
Investment	-5.568	0.225	-3.161	0.255	1.933	0.334
Slack	-0.152	0.906	-0.194	0.756	0.156	0.778
Free cash flow	-1.833	0.600	0.822	0.668	2.683	0.043
Stock price run-up	0.821	0.236	-1.777	0.000	-0.723	0.025
Decrease diluted earnings per share	5.552	0.109	8.658	0.000	-0.286	0.887
Investment grade	0.088	0.892	-1.399	0.000	0.086	0.775
Probability of conversion	0.489	0.764	3.784	0.000	1.463	0.016
N	768					
χ^2 (p-value)	0.000					
Pseudo R^2	0.138					

Table 13: Marginal effects associated with the multinomial logit model based on convertible debt settlement type

The table reports the estimation of a multinomial logit model that examines the determinants of the settlement types (stock settlement, Instrument B, Instrument C, and Instrument X). The sample consists of convertible straight debt issues. One firm issued an Instrument A specification; we reclassify this issue as an Instrument C specification. We report the marginal effects and p-values for the economic significance of the marginal effect. Marginal effects are based on a one standard deviation change in the explanatory variable holding all other explanatory variables at their sample means. Dummy variables are set to zero. Their marginal effects are calculated by evaluating the fitted value assuming the dummy variable under consideration equals one.

	Stock settlement (N = 437)		Instrument B (N = 18)		Instrument C (N = 160)		Instrument X (N = 153)	
Variable definition	Marg. effect	p-value	Marg. effect	p-value	Marg. effect	p-value	Marg. effect	p-value
Log(market value)	-0.013	0.507	0.006	0.109	0.043	0.001	-0.036	0.038
Book leverage	-0.045	0.652	0.027	0.149	-0.018	0.828	0.036	0.659
Market-to-book ratio	0.042	0.001	-0.007	0.005	-0.007	0.429	-0.028	0.009
EBIT	-0.005	0.979	0.041	0.218	0.141	0.323	-0.177	0.276
Interest coverage	0.002	0.658	0.000	0.741	0.006	0.142	-0.008	0.060
Investment	0.074	0.857	-0.061	0.305	-0.430	0.200	0.418	0.187
Slack	-0.002	0.987	-0.002	0.903	-0.028	0.702	0.031	0.715
Free cash flow	-0.414	0.139	-0.028	0.496	-0.025	0.910	0.416	0.046
Stock price run-up	0.251	0.000	0.013	0.056	-0.196	0.000	-0.068	0.182
Decrease diluted earnings per share	-0.790	0.053	0.048	0.211	1.050	0.000	-0.309	0.310
Investment grade	0.079	0.857	0.002	0.749	-0.126	0.000	0.044	0.388
Probability of conversion	-0.540	0.000	-0.004	0.838	0.416	0.000	0.127	0.182

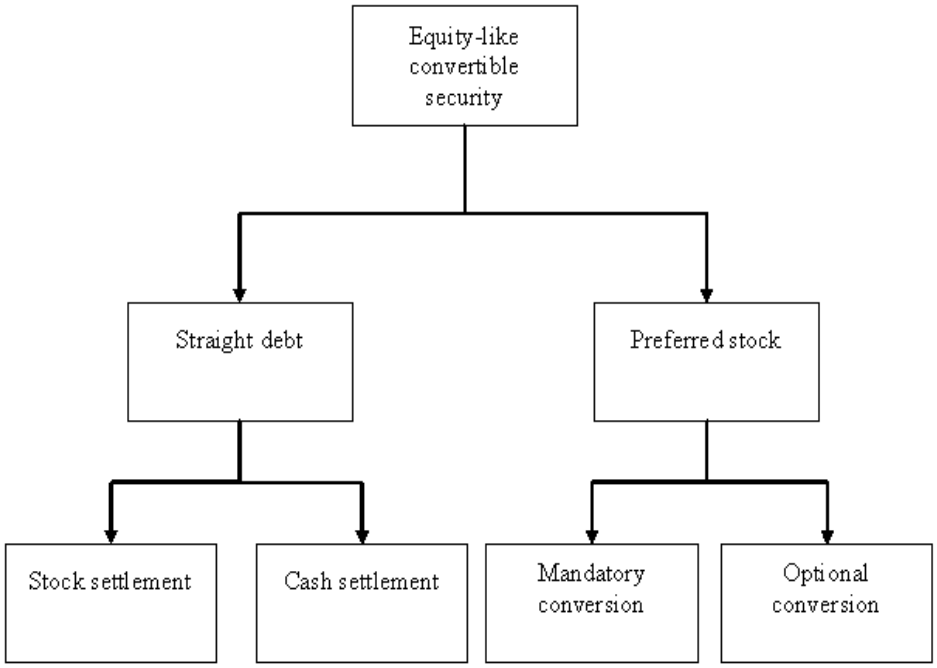

Figure 1: The security design choice structure