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Indexing a bond's call price: an analysis of make-whole call provisions

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Abstract

We analyze a new form of call provision known as a "make-whole" call, which utilizes a floating call price based on the level of current interest rates. As rates drop (rise), the call price increases (decreases.) Usually, a floor at par sets a minimum call price. This provision effectively eliminates the reinvestment rate risk associated with bonds with fixed-price call provisions. Survey results indicate a majority of Chief Financial Officers (CFOs) believe make-whole call provisions are "costless." Analysis of 318 recent, make-whole call bonds indicates that this provision is indeed priced. On average, the at-issue yield-to-maturity of a make-whole call bond is 11.2 basis points higher than the yield of a comparable straight bond.

JEL classification: G12
Keywords: Callable bond; Make-whole call

1. Introduction

On October 18, 1995, Quaker State issued US$100 million of 10-year public debt. This debt issue included a call feature known as a make-whole call provision. While make-whole call provisions had been used for several years in privately issued debt, this was the first known public occurrence. Since that date, make-whole call provisions have

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become commonplace.[1] In contrast to a standard call feature with a fixed-price schedule, a make-whole call price is calculated as the present value of the bond's remaining cash flows with a floor price equal to par value. The discount rate used to determine the present value is the yield of comparable maturity Treasury securities plus a contractually specified "make-whole premium." Accordingly, the call price paid to bondholders floats and is a function of the level of interest rates. As interest rates drop, the make-whole call price goes up. Conversely, as interest rates rise, the make-whole call price drops. This arrangement substantially reduces the reinvestment rate risk that investors face in bonds with fixed-price call provisions.

We analyze 318 bonds with make-whole call provisions, issued between October 1995 and September 1999, and we address five primary questions: (1) What are the characteristics of make-whole call bonds? (2) Is the make-whole call provision priced? (3) What factors influence the magnitude of the price? (4) What factors influence the make-whole premium choice? (5) Why do issuers include make-whole call provisions? To our knowledge, this paper represents the first study of bonds with make-whole call provisions.

Our empirical results suggest that there is an upfront price associated with this call provision. For the average bond in our sample, its at-issue yield-to-maturity is 11.17 basis points greater than the at-issue yield-to-maturity of a comparable straight bond. Holding all else equal, a large (small) make-whole premium will result in a low (high) call price if the bond is actually called. Lower ex post call prices should result in lower ex ante bond prices and higher at-issue yields-to-maturity. Regression results are consistent with this intuition and confirm that the 11 basis point differential truly reflects the price of the average make-whole call provision.

The upfront price of 11 basis points is consistent with the predictions of option pricing theory but is inconsistent with prevailing perceptions among practitioners. Our survey of issuing firm Chief Financial Officers (CFOs) indicates that the majority believe a make-whole call provision is costless to the issuing firm. This perception is typically justified by stating that a make-whole call will be paid for with a "fair" call price when exercised; therefore, no upfront premium should be required. The supposedly fair call price reflects the fact that make-whole premiums are generally set well below prevailing credit spreads at the issue date. Thus, if economic conditions do not change, exercise of the make-whole call provision will entail a call price that is above the market price of the bond.

Since the only ex ante choice variable of a make-whole call provision is the size of the make-whole premium, analyzing the characteristics of these bonds is straightforward. We find that poorly rated bonds (where credit spreads are large) have large make-whole premiums. Conversely, highly rated bonds have small make-whole premiums. Make-whole premiums also increase with market-wide credit spreads and with the duration of the bond. Each result is consistent with fundamental bond pricing relationships.

Irrespective of risk, some firms may be willing to pay more upfront in exchange for the ability to call at a lower ex post price. We find that make-whole premiums increase with the

[1] As an indication of how prevalent make-whole call provisions have become, 25 bonds (maturity greater than 5 years) issued by nonfinancial firms during calendar year 2000 were randomly selected from the Mergent Bond Record. Of those 25, 21 had make-whole call provisions, 2 were straight bonds, 1 had a standard fixed-price call provision and 1 was convertible.

relative size of the bond issue and the leverage of the issuer. These characteristics may identify firms having a greater need and willingness to pay for increased financial flexibility.

The remaining sections of this paper are as follows: Section 2 describes the mechanics of the make-whole call provision. Section 3 discusses the advantages of make-whole call provisions. In Section 4, the data are described. An analysis of the bonds with make-whole call provisions is provided in Section 5. Section 6 presents the results of a survey of the Chief Financial Officers of the firms that have issued make-whole call bonds. Section 7 concludes.

2. How does a make-whole call provision work?

With a typical make-whole call bond, the issuing firm retains the right to call the bond anytime during the bond's life. As stated in the prospectus for the Quaker State bond, for example, "These bonds are redeemable at any time in whole or in part at the issuer's option." The prospectus goes on to state that "The redemption price will be the greater of (1) 100% of the principal amount plus accrued interest or (2) the make-whole redemption amount plus accrued interest. The make-whole redemption amount is equal to the sum of the present value of the remaining coupon and principal payments discounted at an Adjusted Treasury Rate plus 15 basis points."[2] The 15 basis points in this example is the previously mentioned make-whole premium.

The Adjusted Treasury Rate is calculated in one of two ways. The first method is to select a US Treasury security having a maturity comparable to the remaining maturity of the bond being redeemed. This selection is made by a primary US Treasury dealer designated in the bond's indenture. An average price for the selected Treasury security is calculated using the quotations of multiple primary dealers. The average price is then used to calculate a bond equivalent yield. This is the Adjusted Treasury Rate to which the contractually specified make-whole premium is then added.

The second alternative is to employ a Constant Maturity Treasury (CMT) yield plus the make-whole premium. CMT yields are published by the Federal Reserve in its weekly statistical H.15 release. When calculating the discount rate, the issuer selects the CMT yield published for the maturity (rounded to the nearest month) corresponding to the remaining life of the bond. If no CMT maturity exactly corresponds to the bond's remaining maturity, a linear interpolation is made using the yields of the closest CMT maturities.

3. The benefits of a make-whole call provision

Make-whole call provisions have tangible benefits when compared to leaving the bond noncallable or including a fixed-price call provision. Relative to a noncallable bond, the make-whole call provision improves the firm's financial flexibility. In certain situations, a

[2] These sections from the Quaker State prospectus are standard boilerplate portions of the bond contract and are similar in all of the prospectuses that we analyzed. The only difference is the make-whole premium.

firm may want to retire a bond issue, whether to defease a restrictive covenant (Narayanan and Lim, 1989), make use of surplus cash or as part of a broader corporate restructuring like a merger or takeover. If the bond is not callable, and defeasance covenants have not been included in the bond indenture, then the only option available to the firm is a tender offer.[3] With a make-whole call provision, however, the firm can make use of the call option if the price necessary to execute a tender offer is excessively high. The make-whole call provision also guarantees that 100% of the bond issue can be retired, a result that is often unobtainable with a tender offer.[4]

A fixed-price call provision provides similar financial flexibility, but with substantial complications.[5] The primary complication is the reinvestment rate risk imposed on investors. If borrowing costs for the issuing firm drop significantly, either due to an economy-wide decline in interest rates or an improvement in the firm's credit rating, then the firm may profitably call bonds with a fixed-price call provision and refinance at a lower rate. Investors are well aware of this risk and therefore pay substantially less for the fixed-price call bond than for an otherwise identical straight bond.[6] In order to reduce the upfront cost of fixed-price call provisions, some form of call protection is typical for the first half of the bond's life. This substantially reduces the financial flexibility of the firm. Simple logic suggests that, even after accounting for call protection, the upfront cost of a make-whole call provision should be lower than for a fixed-price call provision due to the floating nature of the make-whole's call price.

4. The data

We identify our sample of bonds with make-whole call provisions by searching all of the monthly *Mergent Bond Record's* (formerly *Moody's Bond Record*) from October 1995 to September 1999 for bonds with "100 to *date*" listed in the call provision column.[7] Bonds issued by Real Estate Investment Trusts (REITs) are excluded. This results in an

[3] Various defeasance covenants can be included in the bond indenture, which enables the firm to eliminate certain covenants. Typically, defeasance requires depositing money or Treasury securities with a trustee to cover the required payments of the affected bond issue.

[4] Emery et al. (1987) envisaged and promoted the indexing of call prices well before the practice became common. The benefits that we note (and more) of indexed calls are discussed in detail in their paper.

[5] With a fixed-price call provision, a schedule of dates and prices is written into the bond indenture. Call prices typically start at par plus 1 year's worth of coupon payments then decline to par at the maturity date.

[6] Kish and Livingston (1993) estimate that the yield-to-maturity at issue of the average bond with a fixed-price call provision is 60 basis points greater than a comparable noncallable bond.

[7] For a bond with a fixed-price call provision, a sample entry in the call provision column might read "105 from December 2004." This indicates that the bond can be called for 105% of par after December 2004. Most bonds with make-whole call provisions have "100 to date" in the call provision column where date is the maturity date of the bond. Unfortunately, Mergent does not systematically code all make-whole call bonds. Indeed, one monthly issue of Mergent's Bond Record may have the "100 to date" in the call column for a particular bond, while another monthly issue will show nothing for the same bond. Only in situations where Mergent lists "NC" (which stands for not callable) or gives a call price greater than 100 can one be sure about the call features of the bond.

initial sample of 335 bonds. Next, we search the SEC's EDGAR database for the associated bond prospectus. Since publicly issued make-whole bonds are a recent innovation, most prospectuses are available (329 of 335). Most of the bond-specific data used in the study comes from the prospectus. These data include coupon rate, amount outstanding, issue date, maturity date, issue price, underwriter fee and the make-whole premium. In addition, the "Description of the Securities" section is carefully read to ensure that the call provision is the only significant covenant that impacts the issue price.

Bonds are eliminated from the sample if they include sinking fund provisions (four bonds), put provisions (two bonds), make-whole call provisions with event contingent make-whole premiums (three bonds) or are mortgage bonds collateralized by specific assets of the firm (seven bonds.)

For the remaining 319 bonds, we return to *Mergent Bond Record* to find the first available rating for the bond. In general, there is a 1- to 2-month lag between the time when the bond is issued and when it first shows up in *Mergent Bond Record*. One bond issued by Whitman in April 1999 is dropped from the sample at this stage because of uncertainty regarding the appropriate rating for Whitman's bonds.[8]

Accounting data for the issuing firms comes from Compustat. There are 183 separate firms in our study that account for the 318 bond issues. Several bond issuers are fully owned subsidiaries. Since the parent guarantees these bonds with its full faith and credit, we consider the parent to be the actual bond issuer and therefore use the parent's Compustat data. Two firms (Calenergy and Arizona Public Service) lack Compustat data; nevertheless, we still include their bonds in our analysis when possible.

Comparison samples of straight bonds and bonds with fixed-price call provisions are selected by searching for all straight and callable bonds issued after January 1, 1995 and listed in the Securities Data New Issues Database. To eliminate the large number of floating-rate notes, medium-term notes, putable reset securities and other somewhat exotic bonds, we limit the comparison sample to bonds with the following characteristics: (1) coupon rate > 0, (2) type listed as either Notes, Senior Notes, Subordinated Notes, Senior Subordinated Notes, Guaranteed Senior Subordinated Notes, Bonds, Debentures, Senior Subordinated Debentures, Guaranteed Debentures, Bank Notes or First Mortgage Bonds, (3) Moody's bond rating included, (4) traded on either the NYSE, AMEX or NASDAQ and (5) the issuing firm is not one of our sample firms.

Cusips for issuing firms of potential comparison bonds are then matched to the Compustat database to find the firm's SIC code and then to assign an industry group code. Bonds are given an industry group code of one if $\text{SIC} < 4000$ or $\text{SIC} \geq 6000$ (manufacturing and service firms), two if $4000 \leq \text{SIC} < 5000$ (regulated utilities and transportation firms) and three if $6000 \leq \text{SIC} < 7000$ (financial firms). We then select straight and callable comparison bonds that have the same industry code and the most similar issue date to the make-whole call bond that we are attempting to match. We control for the industry of the issuing firm since industry group two and three firms have had

[8] Whitman was close to consummating a merger with the bottling subsidiary of PepsiCo, which would result in "New" Whitman. The merger would alter Whitman's bond rating. While considered a done deal for all practical purposes, the merger was not legally complete at the time of the bond issue, thus, Moody's was obligated to continue with the bond rating of "Old" Whitman.

historically different capital structures and debt policies than industry group one firms. To ensure that we do not pick up any additional make-whole call bonds, we check the prospectus for every bond in our two comparison samples.

5. Analysis

5.1. Basic characteristics of the bonds

Figs. 1–3 present an overview of the primary characteristics of our sample. Fig. 1 displays the distribution by issue year. As noted earlier, the first publicly traded bond with a make-whole call provision was issued on October 18, 1995. Our sample includes a total of four make-whole bonds issued in 1995. Numbers for 1996, 1997 and 1998 are 5, 92, and 136, respectively. As of July 1999, at least 81 make-whole bonds had been issued for the year.

Fig. 2 presents the distribution of initial Moody's bond ratings. Most of the make-whole call bonds have low Investment Grade ratings. As seen in the figure, approximately 1% are rated Aaa, 6% are rated Aa, 30% are rated A, 54% are rated Baa and 9% are rated Ba. One outlier is rated Caa. Fig. 2 also displays ratings for the comparison samples of straight bonds and fixed-price callable bonds. On average, straight bonds have the best ratings, followed by the make-whole call bonds and then the fixed-price callable bonds. While only one make-whole call bond is rated B1 or below, 53% of the fixed-price callable bonds

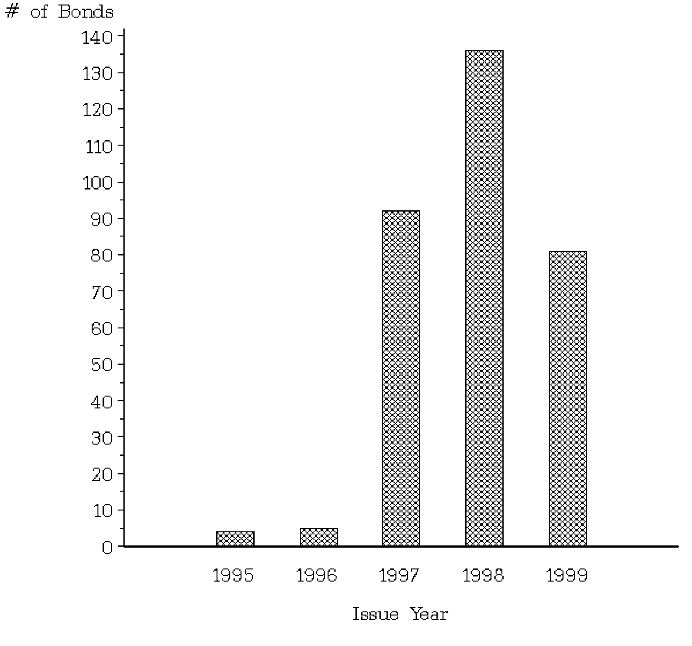

Fig. 1. Distribution of sample make-whole call bonds by issue year.

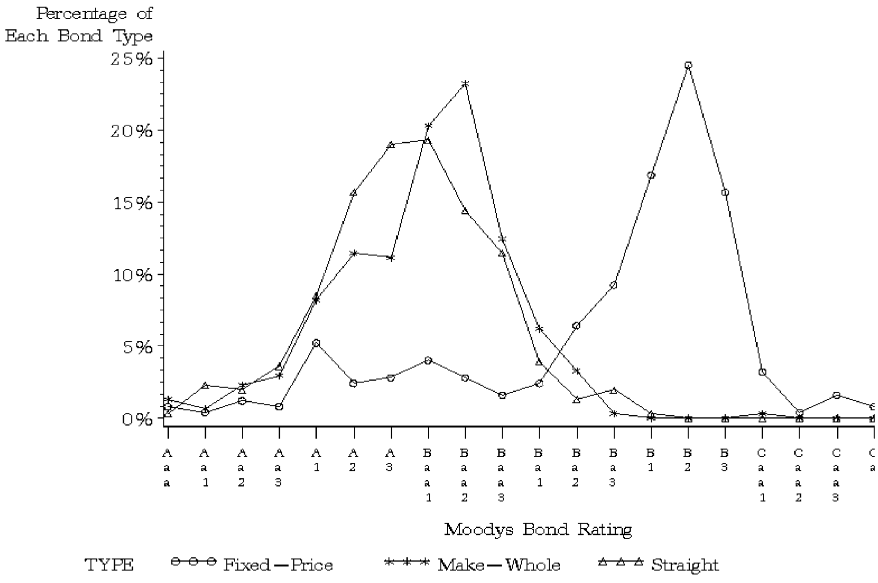

Fig. 2. Percentage distribution of sample fixed-price call bonds, make-whole call bonds and straight bonds by Moody's bond rating at issue.

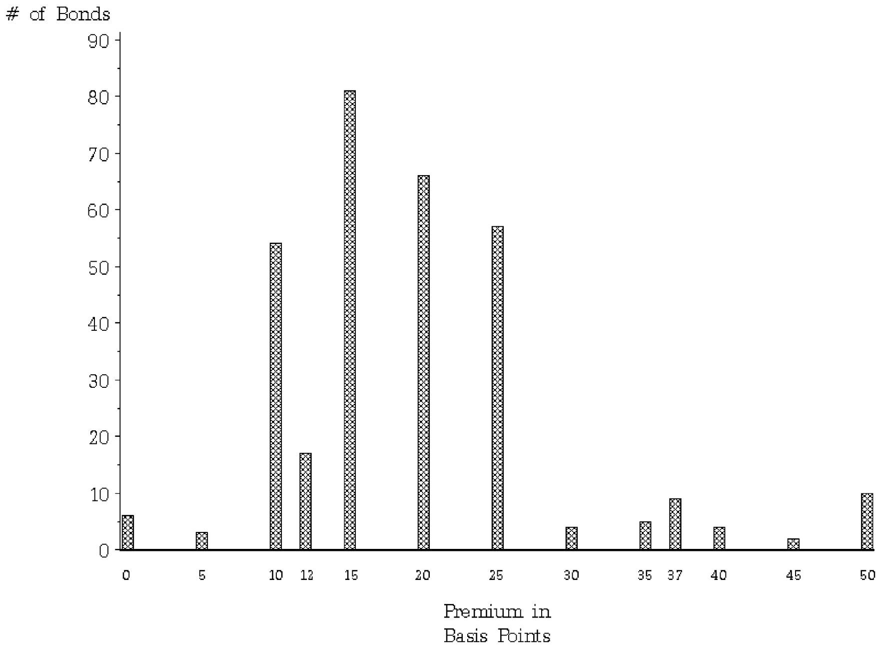

Fig. 3. Distribution of make-whole premiums in basis points.

have ratings in the B range. After ordinalizing bond rating (Aaa = 1, Aa1 = 2, Aa2 = 3, ...) Wilcoxon rank-sum tests (not reported) indicate that the three ratings distributions are all significantly different at the 1% level.

Fig. 3 displays the distribution of the make-whole premium. As noted earlier, the make-whole premium is the number of basis points that are added to the Adjusted Treasury Rate when calculating the make-whole call price. A lower (higher) make-whole premium will result in a higher (lower) call price if the bond is called. The make-whole premiums range between 0 and 50 basis points with a mean (median) value of 19.2 basis points (15 basis points).

Table 1 displays summary data for make-whole premiums by credit rating as well as comparison data on credit spreads at the time of issue and fixed spreads paid on successful tender offers during the sample period.[9] Credit spreads for the corresponding maturity are calculated by subtracting Treasury yields from Bloomberg's Fair Market Yield Curve.[10] Successful fixed-spread tender offers are identified by searching Lexis-Nexis. Our search identifies tender offers by 39 firms on 69 bonds between 1995 and 1999 where bond information is available in *Mergent Bond Record*.

As seen in the table, make-whole premiums increase monotonically as bond ratings decline. For each ratings class, mean (median) make-whole premiums are uniformly less than mean (median) credit spreads prevailing at the time of issue. For example, for bonds rated between Baa1 and Baa3, the mean (median) make-whole premium is 19.39 (20) basis points while the prevailing credit spread is 109.9 (96) basis points. For all observations in the sample, the make-whole premium is set less than the prevailing credit spread. The minimum difference between the make-whole premium and credit spread is 15 basis points.

The fact that make-whole premiums are set below prevailing credit spreads is not surprising. This ensures that the implicit make-whole call price at issue is above the bond's market price, making the call option out-of-the-money. What is notable, however, is the degree to which these options are out-of-the-money. For example, the maximum make-whole call premium for Baa1 firms in our sample is 30 basis points. Since 1995, the minimum credit spread for 10-year industrial Baa1 bonds has been 63 basis points, while

[9] Many tender offers are now using a fixed spread rather than a fixed price. In a fixed-spread tender offer, the tender price is equal to the present value of the bond's remaining payments, discounted at the end of tender offer window Treasury yield plus the prespecified fixed spread. The fixed-spread method reduces interest rate risk during the tender offer window. For example, on March 30, 1998, Sonoco Products announced a fixed-spread tender offer for any and all of its 9.20% debentures due August 1, 2021. The purchase price was calculated using a discount rate equal to the yield-to-maturity for the 6 1/8% US Treasury bond due November 15, 2027 (the on-the-run T-bond), plus a fixed spread of 59 basis points. Since Sonoco Products' bond was noncallable, the purchase price was calculated using all of the bond's remaining cash flows. If the bond in question has a standard call provision (but is currently call protected), the remaining payments may terminate at the first call date.

[10] These curves are constructed daily using prices from new issue calendars, trading/portfolio systems, dealers, brokers and evaluation services. The rating categories used by Bloomberg are a weighted average of Moody's (60%) and Standard and Poor's (40%) ratings. Option-adjusted spread analysis is employed to construct option-free yields for various maturities and broad industry classes (e.g., industrial, public utilities, etc.) A best-fit curve is drawn from the option free yields resulting in a fair market yield curve for each bond category. Fair market curves are available on a daily basis for all bond ratings from Aaa to B3.

Table 1
Make-whole premiums, credit spreads and fixed spreads by ratings category

	Make-Whole Premium		Credit Spread		Fixed Spread		Make-whole number of observations
	Mean (median)	10th percentile (90th percentile)	Mean (median)	10th percentile (90th percentile)	Mean (median)	10th percentile (90th percentile)	
AAA – Aa3	11.93 (10)	10 (20)	60.68 (63)	40 (81)	18.5 (19)	16 (20)	22
A1 – A3	16.01 (15)	10 (25)	85.88 (83.5)	53.00 (135)	49.92 (52)	30 (75)	94
Baa1 – Baa3	19.39 (20)	10 (35)	109.90 (96)	69.00 (172)	52.43 (45)	15 (95)	171
Ba1 – Caa	33.15 (30)	15 (50)	166.78 (156.5)	91.00 (224.5)	43.38 (50)	15 (75)	31

Results are reported in basis points. The Make-Whole Premium is the number of basis points to be added to the yield on a comparable maturity Treasury security if calculating a call price (present value of remaining payments of the bond.) The Credit Spread is calculated as the difference between the option-free yield reported by Bloomberg and the yield-to-maturity of a comparable maturity Treasury security. For each make-whole bond observation, the corresponding Credit Spread is calculated for bonds of the same rating and maturity on the make-whole bond's issue date. The Fixed Spread comes from a comparison sample of fixed-spread tender offers. Like Make-Whole Premiums, a Fixed Spread is the number of basis points added to the yield on a comparable maturity Treasury security when calculating a tender offer price (present value of remaining payments of the bond).

for 10-year Aaa industrial bonds, the minimum has been 32 basis points. Even if a Baa1 firm improved its credit rating to AAA, the implicit call price would likely still be above the market value of the bond.[11]

These relative numbers indicate that the make-whole call provision, unlike a fixed-price call provision, is not structured as a refunding vehicle. Rather, the make-whole call provision is structured to enable a firm to retire debt should circumstances arise, without relying exclusively on a tender offer.

The mean (median) spread for the tender offers is 47.72 (45) basis points with minimum and maximum values of 5 and 135 basis points, respectively. Like make-whole premiums, fixed spreads generally increase as bond ratings decline. Unreported regressions confirm that, after controlling for rating, time to maturity and credit spreads, make-whole premiums are generally set lower than fixed spreads actually paid in successful tender offers. However, visual inspection of Table 1 indicates that there is room for substantial overlap. Some tendering firms offer low fixed spreads (pay high prices) in order to repurchase their bonds. These firms presumably would have benefited from the cap on tender offer price that a make-whole call provision would have provided.[12]

5.2. Operating characteristics of the issuing firms

The "Costly Contracting Hypothesis" (Smith and Warner, 1979) posits that if financial contracts are structured to ameliorate the inherent conflict between bondholders and stockholders, firm value will increase. Accordingly, firms issuing debt weigh the costs and benefits of including various contract features (e.g., call provisions, covenants, etc.) in order to maximize firm value. The existing literature suggests that there are often important differences between the types of firms that include a particular feature in their debt contracts and those firms that do not. For example, high-growth firms are more likely to issue convertible debt (Kahan and Yermack, 1998) and are less likely to include covenants restricting either dividends or future debt issuance (Nash et al., accepted for publication). In addition, firms with a greater likelihood of financial distress are more likely to include covenants that restrict the following: cash dividends, asset sales, mergers, sale/leaseback arrangements, asset substitution and the ability to pledge assets as collateral (Malitz, 1986; Nash et al., accepted for publication).

[11] Credit spreads increase significantly with time to maturity. For 10-year BBB industrial bonds, the median credit spread during the sample period is 90 basis points. For 30-year BBB industrial bonds, the median credit spread is 136 basis points. Thus, as a bond matures, the make-whole call option will naturally get closer to being in the money.

[12] This characterization of a make-whole call premium as a cap on a successful tender offer price is supported by the fact that a firm can still tender for a bond with a make-whole call provision. Nothing in the bond indenture prohibits a tender offer. For example, in April 1999, RJR Nabisco announced a fixed-spread tender offer for approximately US$4.4 billion in debt, which included 14 different issues. Two of these issues—8.25% notes due 2004 and 8.5% notes due 2007—contained make-whole call provisions with premiums of 15 and 25 basis points, respectively. In the fixed-spread tender offer, Nabisco offered a spread of 95 basis points for the 8.25% notes and 135 basis points for the 8.5% notes.

To address whether there are notable differences in the firms issuing the make-whole call bonds, straight bonds and fixed-price call bonds, Table 2 presents a summary of operating statistics for the various issuing firms. All data are for the fiscal year prior to the first year that the issuing firm appears in any of the three samples. The bond ratings presented in Fig. 2 suggest that make-whole and straight bond issuing firms are relatively similar, while fixed-price call issuing firms are not. The data in Table 2 lend further support to this characterization. Fixed-price call issuing firms are significantly smaller, less profitable, more levered and have lower market-to-book ratios than either make-whole or straight bond issuing firms.[13] However, the fixed-price call issuing firms have significantly greater post-issue sales growth, a finding that is consistent with the notion that callable debt can be a lower cost method of financing than straight debt for "good" firms expecting revelation of positive information in the future (Robbins and Schatzberg, 1986). When comparing make-whole and straight bond issuing firms, we find that they are of similar size, profitability and leverage, and they have similar market-to-book ratios.[14] The only characteristic where there is a discernible difference is that post-issue sales growth that is greater for make-whole issuing firms (an unpaired t-test has a p-value of 0.0324, however, a rank-sum test statistic has a p-value of 0.1061).[15]

5.3. The pricing of make-whole call bonds

We calculate the issuer's cost of including a make-whole call provision as the difference between the at-issue yield-to-maturity of the make-whole call bond and the corresponding Bloomberg Fair Market Yield for the issue day. We refer to this quantity as the yield differential. In addition, we calculate the theoretical price of our make-whole bonds by discounting promised cash flows at the Bloomberg Fair Market Yield. Subtracting the actual price from this theoretical price generates a price differential. To ensure that yield (price) differentials are not simply an IPO-like underpricing premium (Fung and Rudd, 1986), we replicate this process for our matching sample of straight bonds.

Table 3 displays the results of these benchmark comparisons. The mean (median) yield differential for the make-whole bonds is 17.29 (10.31) basis points. In comparison, the mean (median) yield differential is 6.12 (4.16) basis points for the sample of straight bonds and 49.11 (34.92) basis points for the sample of fixed-price call bonds. As a percentage of par, the mean (median) price differential between actual and implied price for the make-

[13] These results are consistent with the findings of Marr and Ogden (1989), Kish and Livingston (1992), Crabbe and Helwege (1994) and Roback and Kish (1998).

[14] Given the better ratings of straight bonds displayed in Fig. 2, it is surprising to find that the interest coverage and leverage ratios for make-whole bond issuing firms are actually slightly better than for straight bond issuing firms. Note, however, that the Z score for straight bond issuing firms is slightly better than the Z score for make-whole bond issuing firms.

[15] Following Nash et al., we estimate multivariate logistic regressions (results not reported in tables) where we compare the likelihood of a firm to issue a straight bond or a bond with a make-whole call provision. In these regressions, we include a measure of investment opportunity (market-to-book or post-issue sales growth) and a measure of financial constraint (leverage, interest coverage or Z score), along with controls for firm size (log of sales), the level of interest rates (log treasury yield) and regulated versus unregulated industries. The only variable that is consistently significant is post-issue sales growth.

Table 2
Issuing firm characteristics

	Make-whole call issuing firms	Straight bond issuing firms	Fixed-price call issuing firms	*t*-Test *p*-value (rank-sum test *p*-value)		
				Make-whole versus straight	Make-whole versus fixed-price	Straight versus fixed-price
Assets	11,103 (4570)	16,114 (4056)	7973 (704)	0.2016 (0.7843)	0.3251 (0.0001)	0.0436 (0.0001)
Sales	6971 (3544)	8301 (3600)	2975 (507)	0.3934 (0.9182)	0.0001 (0.0001)	0.0004 (0.0001)
Post-Issue Sales Growth	0.217 (0.095)	0.124 (0.081)	0.318 (0.131)	0.0324 (0.1061)	0.0692 (0.0426)	0.0001 (0.0002)
ROA	0.150 (0.141)	0.149 (0.143)	0.118 (0.123)	0.9701 (0.9109)	0.0001 (0.0001)	0.0001 (0.0001)
ROS	0.205 (0.190)	0.203 (0.200)	0.158 (0.179)	0.8412 (0.8333)	0.0631 (0.2027)	0.0606 (0.2134)
Market-to-Book	1.806 (1.531)	1.779 (1.482)	1.446 (1.268)	0.7879 (0.1146)	0.0001 (0.0001)	0.0002 (0.0001)
R&D/Sales	0.028 (0.014)	0.032 (0.019)	0.016 (0.005)	0.5398 (0.5255)	0.0459 (0.0026)	0.0065 (0.0005)
Leverage	0.163 (0.156)	0.183 (0.149)	0.287 (0.281)	0.1451 (0.3997)	0.0001 (0.0001)	0.0001 (0.0001)
Interest Coverage	13.51 (7.16)	10.15 (7.00)	6.22 (3.82)	0.0699 (0.3780)	0.0001 (0.0001)	0.0017 (0.0001)
Z score	2.392 (2.350)	2.578 (2.562)	1.982 (1.694)	0.1678 (0.1180)	0.0076 (0.0001)	0.0001 (0.0001)

All data are from the fiscal year prior to the first year in which a firm issued either a make-whole call bond, straight bond or fixed-price callable bond. Assets and Sales are in millions of nominal dollars. Post-Issue Sales Growth is $(\text{Sales}_{t+2} - \text{Sales}_{t+1})/(\text{Sales}_{t+1})$. ROA (Return on Assets) is calculated as Earnings Before Interest, Taxes and Depreciation divided by Total Assets. ROS (Return on Sales) is calculated similarly using Sales as the denominator. Market-to-Book is (Total Assets − Book Value of Common + Market Value of Common)/(Total Assets). Leverage is Book Value of Debt/(Market Value of Common + Book Value of Debt). Interest Coverage Ratio is EBITD/Interest. Z score = 3.3(EBITD/Assets) + 0.999(Sales/Assets) + 0.6(Equity/Liabilities) + 1.2(Current Assets/Assets) + 1.4(Retained Earnings/Assets). *t*-Test and rank-sum test *p*-values comparing the three different samples are reported in the final three columns.

Table 3
Bond yields and prices

	Make-whole call bonds	Straight bonds	Fixed-price call bonds	Make-whole call versus straight		Make-whole call versus fixed-price call	
				t-Test (*p*-value)	Rank-sum test (*p*-value)	*t*-Test (*p*-value)	Rank-sum test (*p*-value)
Yield Differential	17.29 (10.31)	6.12 (4.16)	49.11 (34.89)	4.4465 (0.0000)	3.954 (0.0001)	9.5665 (0.0000)	9.164 (0.0000)
Price Differential	− 1.421% (− 0.744%)	− 0.421% (− 0.321%)	− 2.916% (− 2.559%)	4.2084 (0.0000)	3.874 (0.0001)	4.4592 (0.0000)	4.747 (0.0000)
Number of observations	318	318	273				

Yield Differential is the mean (median) difference (in basis points) between sample bond yield-to-maturity and Bloomberg's Fair Market Yield for bonds of comparable rating, maturity and industrial sector. Price Differential is the mean (median) difference (as a percentage of par value) in sample bond issue price of sample bond and imputed price calculated using the Bloomberg Fair Market Yield. *t*-Test gives the test statistic and the associated *p*-value of an unmatched *t*-test for the difference between make-whole call bond and straight bond Yield Differential and Price Differential. Rank-sum test gives the corresponding Wilcoxon rank-sum test statistic and the associated *p*-value.

whole bonds is − 1.42% (− 0.74%) versus − 0.42% (− 0.32%) for the straight bonds and − 2.92% (− 2.56%). Most importantly, the mean (median) difference of 11.17 (6.15) basis points between the make-whole yield differential and the straight bond yield differential is highly significant. As shown in Table 3, the t statistic for an unpaired t-test is 4.45 ($p=0.0000$) while the z statistic for a Wilcoxon rank-sum test is 3.954 ($p=0.0001$).[16] Price differences have similar statistical significance.

In addition to being statistically significant, the differences in price and yield differentials seem economically significant as well. The median bond in our sample has a face value of US$200 million, 10 years to maturity and a coupon rate of 6 7/8%. The median price differential of − 0.74% for make-whole call bonds and − 0.32% for straight bonds indicates that the inclusion of a make-whole call provision reduces proceeds for our "median" firm by 0.42% of par or US$840,000. As a comparison, the median underwriter fee is 0.65% of par or US$1,300,000.

A potential concern with our results is that the greater yield differential for make-whole call bonds reflects unobserved heterogeneity rather than the price of the make-whole call provision (Roberts and Viscone, 1984 discuss the problem of heterogeneity in detail in their analysis of the price of seniority and security covenants). We feel that this is a negligible concern because of the negligible differences between make-whole bond and straight bond issuing firms documented in Table 2, and because of the manner in which Moody's assigns bond ratings. As noted in various reports published by Moody's Investor Services, Moody's accounts for financial characteristics of the firm, industry trends,

[16] Many firms have more than one bond outstanding with a make-whole call provision. In addition, a comparable number of firms account for multiple issues in our matching sample of straight bonds. To adjust for the potential overstatement of significance due to this lack of independence across observations, the *t*-test and rank-sum test are recalculated using each firm's average and median yield and price differentials (not displayed in tables). All tests remain highly significant.

management quality and a vast array of covenants typically included in corporate bonds. Moody's, however, does not account for call provisions. The bond rating and our use of the Bloomberg Fair Market Yield therefore should control for any unobserved heterogeneity.

To be certain, we verify that heterogeneity is not an issue. After controlling for rating, there are differences in the likelihood of certain covenants occurring. Specifically, make-whole call bonds are more likely to include credit enhancements (11.9% vs. 4.7% of sample) and asset sale restrictions (92.1% vs. 83.9% of sample) and are slightly less likely to be secured (3.5% vs. 5.4% of sample). To account for these differences, we estimate a regression of yield differential on type (make-whole call or straight), dichotomous variables for the three covenants just listed and log of the offering amount as a liquidity control. Results (not reported in tables) confirm that covenant heterogeneity does not drive our results. The difference in yield differentials for make-whole call and straight bonds is consistently 11 basis points and highly significant.

5.4. Analysis of make-whole call bond prices

A firm issuing a make-whole call bond retains a long American call option with a floating exercise price. If that call option is truly priced by the marketplace, it is straightforward to predict how the price will change as basic characteristics of the bond and economic conditions vary. First, the upfront price should increase as the difference between the make-whole premium and the prevailing credit spread narrows (becomes less negative), making the call option closer to being in the money. Second, the price of the call option should increase with the maturity of the bond due to the greater potential variation in stochastic (but mean reverting) credit spreads, the increased time during which the firm can substantially improve its credit rating (thereby narrowing the difference between the

Table 4
Bond yield analysis

Constant	Premium	Log Issue Size	BBB Spread	Median Credit Spread	Duration	Rating	Adjusted R^2 (number of observations)
53.542 (2.542)**	1.039 (3.547)***	− 13.423 (4.410)***	0.176 (2.386)***	− 0.240 (3.291)***	–	2.608 (2.552)**	0.2947 (317)
66.211 (2.710)***	1.202 (3.820)***	− 13.510 (4.393)***	0.153 (2.003)**	–	− 2.245 (3.322)***	0.492 (0.437)	0.3020 (317)

The dependent variable is Yield Differential in basis points, calculated as the yield-to-maturity of a bond with a make-whole call provision minus the Bloomberg Fair Market Yield for bonds of comparable maturity, rating and industrial sector. Premium is the make-whole call provision premium in basis points. Log Issue Size is the log of total offering amount. BBB Spread is the end of month option adjusted spread between 10-year BBB1 bonds and 10-year Treasury bonds as reported by Bloomberg. For each observation, Median Credit Spread is the median value between 1/1/95 and 1/1/2001 for Bloomberg's Fair Market Yield for that observation's rating and maturity minus the yield on a comparable maturity Treasury security. Duration is the bond's Macaulay duration. Numbers in parentheses are t statistics calculated using heteroscedasticity-consistent errors that have been clustered by issuing firms in order to account for cross-sectional dependence. All regressions include (0,1) dummy variables identifying financial services and utility companies.

** Significant at the 5% level.

*** Significant at the 1% level.

make-whole premium and prevailing credit spreads) and the increased duration of the bond.[17] Finally, the upfront price of the make-whole call provision should increase as the rating of the firm worsens since poorly rated firms have significant room for improvement, again potentially narrowing the difference between the make-whole premium and prevailing credit spreads.

Table 4 presents regression results illustrating these relationships. Rather than using the dollar value price of the make-whole call provision, we use the yield differential in basis points as the dependent variable. This is because the yield differential has less skewness and kurtosis and because the make-whole premium and credit spreads are also reported in basis points. A positive coefficient indicates that yield differential, hence the price of the embedded call option, goes up as the independent variable gets larger.

The natural logarithm of issue size is included in all regressions as a control for liquidity. Dummy variables identifying financial service and utility firms are also included but are not reported. All t statistics are heteroscedasticity consistent and take account of the possible correlation of error terms due to the multiple bond issues made by some parent companies.

Rather than using the difference at issue between the make-whole premium and the prevailing credit spread as an independent variable, we include the components individually. Additionally, given the mean-reverting nature of credit spreads, we use the median credit spread (for bonds with similar rating and maturity) over the life of the sample rather than the credit spread at the time of issue. Results are as expected. Estimated make-whole premium coefficients are uniformly positive and significant ($p < 0.01$), while the estimated median credit spread coefficient is negative and significant ($p < 0.01$). Rather than being positive, the estimated duration coefficient is negative and significant ($p < 0.01$).[18] This result, however, reflects the use of the yield differential rather than the price differential as the dependent variable.[19] In unreported regressions using the price differential as the dependent variable, the estimated duration coefficient is positive as predicted, although it is insignificant at conventional levels ($p = 0.19$).

Ordinalized bond rating has a positive and significant ($p = 0.018$) estimated coefficient when included in conjunction with median credit spread, however, the estimated coefficient is insignificant when included with duration. Firm-specific characteristics such as leverage, return on assets and book-to-market ratio (not reported in tables) have

[17] In situations where the make-whole premium is greater than the credit spread, compounding ensures that a make-whole call provision will be deeper into the money for a long-duration bond. In situations where the make-whole premium is less than the credit spread, make-whole call provisions for both short-duration and long-duration bonds will be out of the money. How far out of the money is irrelevant, in effect, the delta (relative to credit spreads) for the option on the long-duration bond is greater.

[18] Macaulay duration assumes that a bond's cash flows are unaffected by a change in yields. Accordingly, it is technically inappropriate for use as a measure of price volatility for bonds with embedded options. However, we cannot calculate an "effective duration" measure because it would require a make-whole call bond valuation model. At present, no such model is available.

[19] A basic relationship in bond pricing is that the price of a long-duration bond is more sensitive to changes in yields than is the price of a short-duration bond. Assume that you are comparing two bonds with make-whole call provisions that are equivalent in all respects except that one bond has 30 years to maturity, while the other bond has 5 years to maturity. While the value (cost) of the make-whole call provision might represent a greater percentage of the face value of the 30-year bond, it is entirely possible that the yield differential for the 30-year bond will be less than the yield differential of the 5-year bond. This is simply an artifact of compounding.

estimated coefficients that are significant and reflect the same characteristic as rating, specifically, the price of the make-whole call provision is greater for firms that are in worse financial condition.

We are unsure why, but the credit spread for 10-year industrial BBB bonds, included as an absolute measure of credit spreads, has a positive, rather than a negative, coefficient. The BBB spread variable may be acting as a year dummy variable since credit spreads generally widened from 1995 through 1999. If so, the positive estimated BBB spread coefficients indicate that the cost of make-whole call provisions has increased slightly during the later part of the sample.

The significance of the estimated make-whole premium coefficients provide strong supporting evidence that the make-whole call provision is priced. The size of the make-whole premium coefficients, however, seem inordinately large. A coefficient of 1 means that, on average, a 1 basis point increase in the make-whole premium is associated with a 1 basis point increase in the yield differential. Since the call provision is initially set to be out of the money, one would expect the sensitivity of the yield differential to the make-whole premium to be substantially less than one. This embarrassment of riches, however, is surprisingly robust. Estimated coefficients for the make-whole premium remain in the vicinity of one across many different regression specifications and controls for potential outliers.

5.5. Analysis of the make-whole premium

Nothing restricts the issuing firm when setting the make-whole premium; however, consistent patterns are evident. Table 5 presents multivariate regression results where the make-whole premium is the dependent variable. As in the regressions in Table 3, dichotomous variables identifying financial service and utility firms are included and t statistics are heteroscedasticity consistent.

The most notable relationship is that, the more risky the bond issue, the larger is the chosen make-whole premium. The estimated coefficients for the ordinalized bond rating are positive and highly significant ($p<0.01$).[20] This relationship is not surprising. For a risky bond, a large make-whole premium makes up for the large credit spread relative to Treasuries. Similarly, market-wide increases in credit spreads generate larger make-whole call premiums. Estimated coefficients for the BBB spread variable previously used in Table 4 are positive and highly significant ($p<0.01$).

Several other characteristics of the bond also have explanatory power. The estimated coefficient for duration is positive (as expected) and highly significant ($p<0.01$).[21] The

[20] We have also estimated regressions (not reported) where rating (Aaa–Aa3, A1–A3, Baa1–Baa3, Ba1–Ba3, B1–C) is represented by dichotomous variables. Coefficients for rating increase monotonically as rating worsens. We are unable to reject the hypothesis that the relationship is linear.

[21] As stated earlier, a make-whole call on a long-duration bond will be deeper into the money in all states where the make-whole premium is greater than prevailing credit spreads. Conversely, the call option will be deeper out of the money in all states where the make-whole premium is less than prevailing credit spreads. If the objective of issuers is to set the make-whole premium so that the implicit call price at issue is a set premium above par (say 110% of par), then, the make-whole premium on the long-duration bond will be set greater than the make-whole premium on the short-duration bond.

Table 5
Make-whole call premium regression

Constant	Rating	BBB Spread	Duration	U-writer discount	Leverage	Relative size	Adjusted R^2 (number of observations)
− 17.214	1.931	0.093	0.812	–	13.702	19.240	0.3970
(4.898)***	(5.250)***	(5.786)***	(6.027)***		(2.785)***	(1.935)*	(309)
− 17.291	1.255	0.098	–	0.163	13.018	13.633	0.5396
(5.632)***	(5.393)***	(6.565)***		(6.865)***	(2.753)***	(2.112)**	(298)

The dependent variable is the make-whole premium in basis points. Rating is the Moody's bond rating converted to an ordinal scale where Aaa = 1, Aa1 = 2, Aa2 = 3 and so on. BBB Spread is the end-of-month option-adjusted spread between 10-year BBB1 bonds and 10-year Treasury bonds as reported by Bloomberg. Duration is the Macaulay duration of the bond. U-writer Discount is the underwriter fee as a percentage of par in basis points. Leverage is end of year book value of debt divided by total market value of the firm. Relative Size is the dollar value of the bond issue normalized by end of year total assets. All regressions include (0,1) dummy variables identifying financial services and utility companies. Numbers in parentheses are t statistics calculated using heteroscedasticity-consistent errors that have been clustered by issuing firm in order to account for cross-sectional dependence.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

coefficient for underwriter fee is positive and highly significant ($p < 0.01$). We are unsure, however, why this result holds. Since underwriter fee is positively correlated with duration ($\rho = 0.290$), it may be a proxy for the same effect. Underwriter fee, however, is also positively correlated with the ordinalized bond rating ($\rho = 0.276$) and may be a proxy for the bond's riskiness.

Table 5 also shows results for relative size of the bond issue and for leverage of the issuing firm, both of which have positive and significant coefficient estimates. It may be that the ability to call the bond at an attractive price (i.e., when the make-whole premium is set high) is particularly valuable for large bond issues and in situations where the firm is highly levered. Hence, these firms may be more willing to pay the larger upfront price associated with a larger make-whole premium.

6. Survey of Chief Financial Officers

Agency-theoretic and asymmetric information models prevalent in the academic literature offer numerous predictions about why firms make particular capital structure decisions. However, one cannot forget that real-world decisions are rendered, not by fully rational and informed agents, but by imperfect people under imperfect conditions. Rather than speculate on why firms include make-whole call provisions, we query Chief Financial Officers (CFOs) of our sample firms directly. A short survey was mailed to the CFO (or equivalent executive) of each firm. The survey asked the following questions:

- What are the benefits of including a make-whole call provision with a bond?
- What are the downsides of including a make-whole call provision with a bond?

- When can you foresee calling bonds with a make-whole call provision?
- Why would a firm choose to attach a make-whole call provision to its bonds rather than attaching a fixed-price call provision?

Twenty-six out of 181 surveys were returned, giving a response rate of 14.4%. While this sample is too small for meaningful statistical analysis, the results do provide valuable descriptive information. Our most important finding is that a majority of CFOs regard make-whole call provisions as "costless." Thirteen respondents explicitly state that a primary benefit of make-whole call provisions is that investors do not require a higher yield, despite the fact that investors are now short a call option on the bond.

Respondents indicate that the primary benefit of including a make-whole call provision is the ability to retire 100% of a debt issue (18 surveys.) Six of these surveys further state that including a make-whole call provision precludes the need to pay a tender offer premium to redeem. Finally, 11 surveys cite "financial flexibility" as a rationale for including a make-whole call provision (six surveys cite flexibility in conjunction with ability to retire 100% of an issue).

The importance of financial flexibility mirrors the survey results of Graham and Harvey (2001). They find that maintaining financial flexibility is the primary concern when CFOs are deciding on the overall level of debt for their firm, indicating that managers want to retain the ability to issue additional debt in case a valuable investment opportunity becomes available. Our results show the other side of the same coin. Firms desire the flexibility to retire debt if surplus cash becomes available.

One might expect the value of financial flexibility to depend on characteristics of the issuing firm. Nash et al. (accepted for publication), for example, document that high investment opportunity firms (those with high market-to-book ratios) are significantly less likely to include certain restrictive covenants. This finding suggests that high investment opportunity firms might also be more likely to include make-whole call provisions in their debt rather than leaving the debt noncallable. As noted in Table 2, however, with the exception of post-issue sales growth, we find little difference in the operating performance of firms issuing either straight bonds or bonds with make-whole call provisions.

Perhaps this nonresult is to be expected. In order for there to be the type of separating equilibrium implied by the "Costly Contracting Hypothesis" (Smith and Warner, 1979), the perceived cost/benefit ratio of including a covenant must differ across firms. Our survey results, however, suggest that a significant portion of CFOs feel that a make-whole call provision is of negligible cost. If the provision is perceived to be costless, then the perceived cost/benefit ratio will not differ between high and low investment opportunity firms.

When asked about the downsides of including a make-whole call provision, seven respondents note that the make-whole call provision may require an upfront premium. Six respondents note that the provision might reduce the incentives of investors to participate in a tender offer if the tender offer price is below the implicit make-whole call price. Four respondents note a related downside, stating that if a make-whole bond is called, the call price will probably be at a substantial premium to the current market price of the bond.

The most frequent answer for when respondents could envision executing a make-whole call is if the company needs to restructure or recapitalize (20 surveys). The next most common reason for execution is if the firm wants to eliminate a troublesome covenant (nine surveys). Three respondents noted that a call might occur if the firm is able to refinance on more favorable terms, whether due to improved market conditions (two surveys) or an improvement in the firm's credit rating (one survey).

When asked why firms would use a make-whole call provision rather than a fixed-price call provision, the overwhelming rationale is that the upfront cost of a make-whole call provision is substantially lower (19 surveys).[22]

7. Conclusions

This study represents the first effort to examine a recent innovation in the public debt markets—the make-whole call provision. We address five major questions: (1) What are the characteristics of make-whole call bonds? (2) What is the price of the make-whole call provision? (3) What factors influence the magnitude of the price? (4) What factors influence premium choice? (5) Why do issuers include make-whole call provisions?

Our primary finding is that the make-whole call provision is priced. We find that, relative to a comparable straight bond, on average, investors require an additional 11.17 basis points in yield when a bond has a make-whole call provision. Regression results show that this yield differential increases with the make-whole premium, further confirming that the make-whole call provision is priced.

Our analysis of make-whole premiums shows that the chosen make-whole premium increases as credit ratings decline, as duration increases and as credit spreads increase. If issuers are trying to keep ex post call prices comparable across ratings, maturities and time periods, then these results are expected. In addition, we find that premiums increase when the bond issue is large relative to the size of the issuer and the issuer is highly levered. These characteristics potentially identify firms that need financial flexibility and that are willing to pay more upfront for the ability to call bonds for a lower price in the future.

The pricing results contrast sharply with the opinions of a majority of CFOs responding to our survey who expect the make-whole call provision to be "costless." Why is there a disparity between our results and what seems to be the prevailing perception among practitioners? Perhaps it is because make-whole call provisions have been mischaracterized. We believe that the appropriate way to characterize a make-whole call provision is as a cap on the price of a successful tender offer. When compared to the spreads offered in successful fixed-spread tender offers, we find that make-whole call premiums are systematically lower. However, substantial overlap between make-whole premiums and these fixed spreads indicate that some firms tendering for their bonds during our sample period would have benefited from the cap that a make-whole call provision would have provided. When viewed as a cap on the price of a successful tender offer, it is not surprising that investors require the slight premium that we document for bonds with a make-whole call provision.

[22] Complete survey results are available from the authors by request.

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