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The Appealing Economics of Zero Coupon and Mini-Coupon Bonds

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Abstract

THE APPEALING ECONOMICS OF
ZERO COUPON AND MINI-COUPON BONDS

Because of the numerous zero coupon and mini-coupon bond issues already sold and forthcoming, it is important to understand the accounting for these issues and the advantages and disadvantages of those issues for investors and issuers. This paper sets forth an example of the accepted accounting treatment and contains a detailed discussion of the specific advantages and disadvantages to several investor groups and different issuers (corporations and the government).

THE APPEALING ECONOMICS OF ZERO COUPON AND MINI-COUPON BONDS*

Frank K. Reilly**
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INTRODUCTION

The typical corporate long-term bond has a coupon and maturity, and the value of the bond is the present value of the stream of cash flows (interest and principal) discounted at the required yield to maturity (YTM). Homer and Leibowitz [7] have pointed out that all such bonds are a mixture of (1) coupon bonds with no maturities (i.e., perpetuals or consuls), and (2) zero coupon discount bonds with a definite maturity. Homer and Leibowitz also show that these two "eccentric" types of bonds have distinctly different price volatility characteristics. Fisher and Weil [4] contend that long-term zero coupon discount bonds should have special appeal to many institutional investor groups.

Recently several Corporations have issued zero coupon or mini coupon bonds. Exhibit 1 contains a listing of some of the recent offerings. Conversations with several investment bankers, and recent articles [2,5,6,9,15] indicate that many more such issues will be sold in the future. Given the likely importance of this financial instrument, this paper has the following purposes:

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1. Describe and give an example of a zero coupon bond.
2. Discuss and give an example of the accounting for a zero coupon bond.
3. Discuss the advantages and disadvantages to investors and issuers of zero coupon and mini coupon bonds.

DESCRIPTION AND EXAMPLE OF ZERO COUPON DISCOUNT BONDS

Description of Discount Bonds

A zero coupon discount bond promises to pay a stipulated amount at a future maturity date, but does not promise to make any interim interest payments. Therefore, the investor pays the present value of the principal payment at the maturity date and the return on the bond is the difference between what is paid at the time of issuance and the principal payment at maturity. An example of such a bond would be a $10,000 par value bond, due to mature in 20 years with a zero coupon (i.e., no interim interest payments). The price of the bond at the time of issuance would be the present value of the $10,000 par value to be paid in 20 years at the current market discount rate. The crucial variable in the valuation would be the required market rate of return on the bond. As an example, assume that when the bond is issued the required rate of return on bonds of equal maturity and quality is 8 percent. Assuming semi-annual discounting, the initial selling price of a 20 year bond would be $2,082.89, since the present value factor at 8 percent compounded semi-annually for 20 years is .208289. The point is, $2,082,89 compounded semi-annually at 8 percent for 20 years would grow to $10,000. Notably, during the period from the time of purchase to the point of maturity, <u>the investor would not receive any cash flow from the firm</u>.

<u>Example of Discount Bond Issue</u>

As an example, assume that a corporation (or the government) needs $30 million for a project that has a life of approximately 20 years and the firm decides to issue a 20 year, zero coupon discount bond to meet this capital need. If the prevailing market yield for current coupon bonds with a 20 year life and comparable quality (i.e., agency rating) is 8 percent the bond would be priced at .208289 of par. This means that prior to commissions the firm would have to issue approximately $144 million face value of bonds to derive the required $30 million of capital ($30 million / .208289).

Technically, given a <u>pure</u> zero coupon discount bond, the firm would have <u>no cash flow requirements</u> until the bond matures in 20 years at which time the firm would be required to pay off the $144 million principal. Although there are no interim payments, corporations could establish a sinking fund prior to maturity to prepare for this large requirement. Similarly, investors could require such a stipulation except in extreme cases (e.g., a U.S. government bond). The sinking fund contributions would be used to either acquire outstanding bonds and retire them, or the firm would invest these funds in other securities that would be used to pay off the bonds at maturity.

<u>Accounting for a Pure Discount Bond</u>

The alternative accounting treatments allowable for firms that issue discount bonds are set forth in APB 21 [1]. As one might expect, the accounting for the pure discount bond is consistent with the accounting for a coupon bond issued at a discount or premium except that it is an extreme case. In fact it is stated,

> Moreover, if a long-term noninterest bearing note or bond is issued, and its net proceeds are less than face amount, an effective interest rate is based on its market value upon issuance. ... The difference between the face amount and the proceeds upon issuance is shown as either discount or premium, which is amortized over the life of the note [1].

In the proposed example where the total cost of the bond is reflected in the discount of $114 million, it is important to determine how this discount is amortized and the effect of this amortization on the firm's balance sheet and income statement. Regarding the appropriate amortization technique it is stated,

> With respect to a note which by the provisions of this section requires the imputation of interest, the difference between the present value and the face amount should be treated as discount or premium and amortized as interest expense or income over the life of the note in such a way as to result in a constant rate of interest when applied to the amount outstanding at the beginning of any given period. This is the "interest" method described in and supported by section 5361. However, other methods of amortization may be used if the results obtained are not materially different from those which would result from the "interest" method [1].

A possible alternative would be a straight line amortization of the discount. As will be shown there would be a major difference in the interest using the "interest" method compared to the straight line method.

Interest Expense. As stated, with the interest method the discount is amortized such that it is a constant rate of interest to the amount outstanding. In our example the discount rate used was 8 percent. Specifically, the amortization of the discount (which is also the interest expense for the bond) should always be 8 percent of the value of the bond at the beginning of the period. In the example, the amortization for the first year would be 8 percent of $30 million or $2.4 million. The specific amortization schedule (using annual compounding) for the interest method and also for the straight line method would be as follows.

	Interest Method		Straight-Line Method	
Year	Beginning Value	Discount Amortization	Beginning Value	Discount Amortization
1	$30,000,000	$2,400,000	30,000,000	5,700,000
2	32,400,000	2,592,000	35,700,000	5,700,000
3	34,992,000	2,799,360	41,400,000	5,700,000
.	.	.	.	.
.	.	.	.	.
12	71,098,000	5,801,000	92,700,000	5,700,000
13	76,899,000	6,275,000	98,400,000	5,700,000
.	.	.	.	.
.	.	.	.	.
18	113,800,000	9,300,000	126,900,000	5,700,000
19	123,100,000	10,100,000	132,600,000	5,700,000
20	133,200,000	10,800,000	138,300,000	5,700,000

Notably, the amortization of the discount with the interest method increases over time because the beginning value increases. As a result, the amortization of discount (i.e., the annual interest expense) in the last year is four times as large as the amortization (interest expense) during the first year. This is important since <u>the amortization of the discount is the total interest expense for the bond</u>. If the firm did not use the interest method to amortize the discount but did it straight line, the annual interest would be $5,700,000 ($114 ÷ 20). Therefore, during the first 12 years the straight-line interest write-off would be larger than the interest method write-off and lower thereafter. Obviously the straight-line write-off provides a higher present value tax shield, but lower reported earnings in the first 12 years. It is not surprising, therefore, that all of the firms issuing zero coupon or mini coupon bonds intend to write-off the discount on a straight-line basis for tax purposes but intend using the interest method for reporting purposes.

Balance Sheet Presentation. The balance sheet presentation recommended specifies that the bond discount should be reported in the balance sheet as a direct deduction from the face amount of the bond (which is $144 million in the example). Also the description of the bond should indicate the effective interest rate. Therefore, the balance sheet should appear as follows:

	At Issue	One Year After Issue	Two Years After Issue
Principal amount of Noninterest bearing debenture due December 31, 19__ (20 years after issue) Discount is based on imputed interest rate of 8 percent	$144,000,000	$144,000,000	$144,000,000
Less unamortized discount	114,000,000	111,552,000	108,904,244
Long-term debt less unamortized discount	$ 30,000,000	$ 32,448,000	$ 35,095,756

As shown, the unamortized discount on the bond declines each year by the amount of the interest paid and therefore the obligation increases every year until the final year (one year before it matures) when it would appear as:

Principal amount	$144,000,000
Less unamortized discount	10,800,000
Long-term debt less unamortized discount	$133,200,000

ADVANTAGES AND DISADVANTAGES TO INVESTORS

Advantages to Investors

Reinvestment Rate Risk. An obvious advantage of a zero coupon discount bond is that it is devoid of reinvestment rate risk. Homer and Leibowitz [7] constantly point out that a major uncertainty for investors in bonds is the interest-on-interest. It is demonstrated that the widely used yield to maturity (YTM) computation implicitly assumes that all the coupon cash flows from a bond are reinvested at the computed yield to maturity rate--e.g., it is assumed that all coupon cash flows from a bond with an 8 percent YTM are reinvested at 8 percent. Alternatively if the actual reinvestment rate is below the YTM, then the true realized compound yield will be less than 8 percent and vice versa. This uncertainty regarding the rate at which these interim cash flows will be invested is referred to as reinvestment risk. Therefore, one of the major advantages of a low coupon discount bond is that the portion of the return derived from capital appreciation is not subject to the reinvestment risk. This is because the yield to maturity computation assumes that this principal value increases at the YTM rate from the point of purchase to the maturity--e.g., the discount on a bond with a YTM of 8 percent will grow toward par at the rate of 8 percent a year. Therefore, a zero coupon discount bond would not be subject to any reinvestment risk.

Ability to Immunize Bond Portfolios. Another advantage for investors is that zero coupon bonds will have long duration relative to current coupon bonds. More important, the portfolio will have no interest rate risk if the maturity of a zero coupon bond is matched with the investment horizon of the portfolio. Specifically, recently there has been a "rediscovery" of the concept of bond duration as a measure of the time flow of cash from a bond. The concept of duration was originally derived by Macauley in 1938 [12] and rediscovered by numerous authors in the early 1970's [8,16]. Basically, the computed duration of a bond is the weighted average maturity of the bond (that considers all cash flows from the bond) stated in present value terms. Besides being considered a superior measure of the time flow of bond returns, bond duration is useful in two respects. First, it has been shown that there is almost a direct relationship between the duration of a bond and the price volatility of the bond for a specified change in the level of market yields--e.g., given a change in market interest rates of 1 percent (100 basis points), a bond with a duration of 10 years will experience a change in price of approximately 10 percent [8]. Therefore, duration is a useful measure of the potential price volatility of an individual bond or a bond portfolio.

Second, Fisher and Weil [4] showed that it is possible to immunize a bond portfolio from interest rate risk if the investment horizon for the bond portfolio is equal to the duration of the portfolio. To immunize basically means that the portfolio's expected rate of return will be equal to its actual rate of return irrespective of the changes in market yields in the interim. The ability to immunize a portfolio is important to bond portfolio managers with a fixed investment horizon and specific future capital requirements. Examples of portfolios with these requirements would be pension plans and life insurance companies.

Because these institutions have long investment horizons they would prefer to acquire securities with long durations-e.g., 20 to 30 years at least. Unfortunately the duration for a security is typically much shorter than its term to maturity, and the duration declines with the size of the coupon [13,14]. As an example, a 10 year, 8 percent bond selling at par has a duration of about 7 years. Similarly, a 20 year bond under these conditions would have a duration of less than 14 years. Because of this relationship between maturity and duration, it is difficult for bond portfolio managers to find long duration bonds in order to immunize their long investment horizon portfolios. Zero coupon bonds provide a solution to this problem. The duration of a zero coupon discount bond is equal to its maturity. Therefore a long-term zero coupon bond would be a long duration bond that could be used by institutional bond portfolio managers to immunize their long-term bond portfolios [4,13].

Call Protection. A discount bond has almost complete call protection since the typical call feature for these bonds has been at par. Therefore, a discount bond has substantial call protection because the firm would probably not pay the large premium to call a bond selling substantially below par. In the case of a zero coupon or a mini-coupon bond, the price will always be a deep discount, so the bond should not be called. If it is called, the investor would experience a substantial capital gain.

Ability to Swap Discount Issues. A final advantage that apparently prompted the issuance of an original issue discount bond [9] is that institutional investors can swap an issue that they currently have in inventory for one of these new issues and not recognize the loss on the issue swapped. As an example, assume an institution acquired a 30 year, 7 percent coupon bond ten years ago when long rates were approximately 7 percent. Recently this bond would be selling at a discount which would have to be recognized as a loss if the institution sold it. Alternatively, if the institution can swap this bond for a new 20 year, 7 percent deep discount bond, it will not have to recognize the loss and in the process the portfolio manager can upgrade the quality of the holding.

In summary, there are four major advantages to an investor from acquiring a zero coupon or mini coupon bond rather than a current coupon bond.

1. Because the total return is derived from the implied increase in the principal value at the yield to maturity rate, there is <u>no reinvestment risk</u> if the bond is held to maturity.
2. Because the duration of a zero coupon discount bond is equal to its maturity, it is possible to have bonds with <u>very long durations</u> which is generally not possible, especially with high coupon bonds. These long duration bonds appeal to bond portfolio managers who want to <u>immunize</u> their portfolio against interest rate risk. If the duration of a zero coupon bond is equal to the investment horizon there is no reinvestment risk and no price risk because the bond is redeemed at par.
3. Relative to normal call features, a zero coupon or mini-coupon bond would have <u>almost complete call protection</u>.

4. Portfolio managers can use mini-coupon issues to swap out of issues selling at discounts from cost without recognizing a loss and in the process upgrade the quality of their portfolios.

Disadvantages to Investors

While there are some clear advantages to these bonds, there are also some factors that make them unappealing for some investors and some characteristics that should be considered by everyone.

1. Because of the tax treatment of the implied return, corporate zero coupon bonds are not a viable investment for taxed investors. Specifically, the tax law requires the original purchaser of a pure discount bond to amortize as regular income over the bond's life the difference between the purchase price and the face value to be received at maturity. As a result, the taxed investor would be paying tax each year on the amortized discount, but would not receive any cash flow until maturity (see Livingston [11]). Because of this "negative tax shield" the after tax return would be clearly noncompetitive.
2. Greater default risk. First, there is a higher probability of default because the total requirement comes at maturity. In addition, the typical default provision states that if the default comes before maturity, the company is only liable for the original issue price plus the amortized interest to that point.
3. Greater price volatility than a current coupon bond of the same maturity because these bonds have longer duration and price

volatility is directly related to duration [8,13]. If an investor was expecting a decline in interest rates this would be a desirable characteristic.

4. Lack of current income. By definition, pure discount bonds would not appeal to investors who require current income from their investments.

ADVANTAGES AND DISADVANTAGES TO ISSUERS

Advantages to Issuing Corporation

Lower Borrowing Cost. Zero and mini coupon bonds provide funds to borrowers at a lower cost than current coupon bonds. The reasons for this cost advantage revolve around investor demand for zero coupon or mini coupon bonds and the tax savings realized by issuers.

An obvious advantage to the issuing corporation is the demand for such bonds by institutional investors for the reasons discussed in the prior section. Because of these advantages, it would be expected that the required yield on zero and mini coupon discount bonds would be lower than on a current coupon bond. Recent market evidence supports this hypothesis. For example, in mid-May Archer-Daniels-Midland Co. simultaneously sold a 30 year 7 percent and a 30 year 16 percent debenture. There was a 73 basis point spread in the yields to maturity for these two issues in favor of the mini coupon bonds. The typical yield differential between current coupon and mini-coupon discount bonds has been perhaps 50-100 basis points [9]. Such a differential would represent a significant savings for an issuer.

In addition, zero coupon bonds have a significantly lower cost, especially for the longer maturities, than current coupon bonds because borrowers are permitted for tax purposes to expense the original issue discount (OID) on a straight line basis. Thus, a vital difference between a zero coupon bond and a current coupon bond is that the borrower experiences annual cash inflows via tax savings rather than cash outflows equal to the after tax interest payments.

The after tax cost of a zero coupon bond to a corporate issuer is calculated conventionally to be the internal rate of return that will equate the after tax cash inflows and outflows. Imagine a AAA rated bond issued by a corporation subject to a 46 percent tax rate. Assume the firm plans to issue 25 year zero coupon bonds with no sinking fund. Assume further that bond investors demand a 15.0 percent return on AAA 25 year current coupon bonds and that they require the same 15.0 percent yield on similar zero coupon bonds. Given these assumptions and annual discounting, a bond investor would pay \$30.3776 at issue for the right to receive \$1000 in 25 years [$\$30.3776 = \$1000/(1 + .15)^{25}$].

A corporate borrower will obtain the \$30.3776 issue price plus an annual benefit equal to the tax savings associated with the amortization of the original issue discount (OID). The \$969.6224 OID (\$1000 maturity bond value - \$30.3776 issue price) will be amortized on a straight line basis over the 25 year bond maturity. Therefore, the annual charge against pre-tax income would be \$38.7849 (\$969.6224/25 years = \$38.7849/year). The annual tax savings of the issuer will be \$17.8411 (\$38.7847 x .46 tax rate). Thus, the after tax cash flows associated with this zero coupon bond are a \$30.3776 inflow at issue, an annual \$17.8411 inflow from tax savings, and a \$1000 outflow at bond maturity.

The after tax cost is

$$\$30.3776 = \sum_{t=1}^{25} \frac{\$17.8441}{(1+i)^t} - \frac{\$1000}{(1+i)^{25}}$$

$$i = 5.314\%.$$

This 5.314 percent after tax cost compares favorably to the 8.100 percent [(.15)(1 - .46)] after tax cost of the 15.0 percent current coupon bond. The significantly lower after tax cost of the zero coupon bond emerges, of course, because <u>the annual tax savings are comparable to interest free loans from the taxing authority to the borrowing firm</u>. Indeed, the 5.31 percent cost may be viewed as the after tax return that must be earned on the issue proceeds and the annual tax savings in order to generate the \$1000 maturity value by the end of year 25.

The after-tax cost of issuing zero coupon bonds to a corporate borrower with a 46 percent marginal tax rate is shown in Exhibit 2 for alternative time periods and investor yield to maturity combinations. The issuer cost data show why zero coupon bonds which have been proposed for some time [4] have finally emerged as financing vehicles. When investors required only a 5 percent return, the after tax cost to a corporate borrower with a 46 percent tax rate was 2.70 percent for a 25 year current coupon bond, and 2.55 percent for a 25 year, zero coupon bond. When rates increase to the 15 percent level, the current coupon bond after tax cost is 8.10 percent or 279 basis points higher than the zero coupon bond after tax cost of 5.31 percent. Clearly, higher interest rates have increased both the appeal of zero coupon bonds for investors and the incentive for borrowers to supply such bonds.

Exhibit 2 data on the cost of borrowing via zero coupon bonds also show: (1) that for a specific yield to investors, the borrower's cost declines as the bond maturity increases; and (2) that for bond maturities of 30 or more years, the borrower's cost is approximately the same regardless of whether investors are offered yields to maturity of 15 percent or 100 percent. Both of these phenomena are because the value of long maturity zero coupon bonds to a borrower is not in the proceeds realized when the bonds are sold, but rather is in the annual tax savings realized when the OID is expensed. For example, the sale proceeds of a 40 year zero coupon bond offering investors a 15 percent yield is \$3.73 [$\$1000/(1 + .15)^{40}$]. Sale proceeds decline only \$3.73 or to \$.0000000009 [$\$1000/(1 + 1.0)^{40}$] if investors are offered a 100 percent yield. The annual tax savings realized through expensing the OID is hardly effected by the difference in yield because it increases from \$11.46 [((\$1000 - \$3.73)/40 years)(.46 tax rate)] to \$11.50 [((\$1000 - 0)/40 years)(.46 tax rate)] or only four cents per year.

Borrowers that issue zero coupon bonds must have sufficient future income to utilize the tax shelter a zero coupon bond issue creates. Indeed, long term zero coupon bonds may be an attractive financing vehicle for the firm that envisions persistent debt financing needs. Consider such a firm that issues (i.e., gives away for \$.0000000009 or as a "sweetener" in a current financing package) \$100,000,000 of 40 year zero coupon bonds providing investors a 100 percent yield. Assuming a 46 percent tax rate, this firm would realize tax savings of

$1,150,000 annually (i.e., the annual amortization of $2.5 million x .46). This annual tax savings could be viewed as being comparable to a series of 40 balloon note term loans, each with an after tax cost of 3.622 percent (see Exhibit 2) and a maturity of (40-t) years.

The zero coupon bond issues offered in 1981 have had maturities of 10 years or less except for the Pepsico private placement which had a 20 year maturity. Assuming investors would require a 15.50 percent yield on a 10 year current coupon bond and only 15.00 percent on a zero coupon bond, the 7.51 percent after tax cost of the zero coupon bond (see Exhibit 2) is 86 basis points less than the 8.37 percent after tax cost of a current coupon bond for a corporate borrower with a 46 percent marginal tax rate [15.50 x (1-.46)]. This is a significant saving, but not nearly as large as the benefit that could be derived by issuing zero coupon bonds with maturities over 30 years. A major reason long maturities have not been forthcoming is that the firms need funds currently and, as noted above, long maturity zero coupon bonds provide low cost financing in the form of annual loans (tax savings) in the future. Also, some firms may be reluctant to commit to a long term source of funds at a specific cost. In this regard, it is noteworthy that the after tax cost of a 50 year zero coupon bond with a YTM of from 25 to 100 percent is 2.877 percent (Exhibit 2). This is equivalent to a pre-tax cost of 5.33 percent [.02877/(1-.46 tax rate)]. Notably, this cost of 5.33 percent is lower than A rated corporate bond issuers have had to offer since the mid-1960's.

Reduced Cash Flow Requirements. A second advantage for corporate issuers of zero coupon bonds is the absence of cash flow requirements for the period prior to maturity. In theory, the firm could completely ignore all cash requirements until the bonds mature. As noted previously, in practice, some firms may initiate a sinking fund a few years after the initial sale with the cash flow to be used to acquire bonds in the open market or invested in other securities to provide funds at maturity.

Exhibit 2 data on the after tax cost for a corporate issuer of zero coupon bonds are calculated assuming no sinking fund requirements. As of this writing no zero coupon bond issues have a sinking fund provision. However, the introduction of a sinking fund requirement does not alter the cost advantage of zero coupon bonds relative to current coupon bonds if one assumes the sinking fund contributions are invested at am after-tax yield equal to the after-tax cost of a zero coupon bond.

Variable Interest Expense. Finally, both cash flow and reported earnings benefit if an issuer of a zero coupon bond were to calculate interest expense and debt outstanding via the interest method for reporting purposes, and use the straight-line amortization method for tax purposes. As shown previously for the $144 million of 20 year bonds sold for $30 million to yield investors 8 percent, the recorded expense for the bond issue would vary over time. Specifically, the first year expense would be 8 percent of the beginning value ($30 million) or $2,400,000, and increase each year. This cost would not exceed the $5,700,000 [($144 million - 30 million)/20 years] annual interest charge under the straight-line amortization method until the twelfth year. Also, the interest method expense flow that is initially low and increases over time would be more consistent with the typical flows from a capital project that are often low during the start up period and subsequently increase.

Disadvantages to Corporate Issuers

It appears that there might be two concerns for corporations issuing such securities: (1) inability to call the issue if interest rates decline, and (2) the large capital requirement at maturity.

Inability to Call. Earlier we discussed call protection as one of the advantages for investors. In turn this is a problem for an issuer who cannot call an issue (except at a very large premium) if interest rates decline. While it clearly is a consideration, there are two factors to consider. First assuming that not all the firm's financing is done with zero coupon and mini coupon bonds, it is still possible to call some of the firm's bonds. Second, assuming a long-term zero coupon bond, as shown in Exhibit 2, the after tax cost of the zero coupon issue is so low, it would require a major change in current coupon rates to justify the call.

Large Capital Requirements at Maturity. The thought of receiving $30 million today and being obligated to pay back $144 million 20 years from now clearly may be disconcerting to chief financial officers. It is the ultimate "crisis at maturity". Alternatives to alleviate the concern is a sinking fund for some portion or refinancing with another zero coupon issue. A complete refinancing is probably not very appealing because the size of the issue grows rapidly. As an example, where the initial face amount is $144 million, if one assumes another 20 year bond at 8 percent, it would require a zero coupon bond issue of over $691 million face value to get the necessary $144 million ($144/.208289).

Advantages to the Federal Government

The Federal government can always float such issues because of the unquestioned ability to pay off the issue at maturity or refinance it with another bond issue. Zero coupon bonds appear to offer the federal government the advantages of a longer debt maturity at a lower cost. There would be reduced annual debt service cash outflows plus the possibility of issuing very long duration bonds (30-50 years) that would tend to lengthen debt maturity. Debt cost would also be reduced to the extent that long duration bonds would have significant appeal to investors.

Further, the amortized discount on government bonds is not taxable until the sale or maturity of the bond, whichever is the earlier. This provision, which is limited to Treasury discount bonds, would make such bonds attractive to taxed individuals and institutions [10]. Obviously this tax postponement along with the other advantages should increase the demand for such securities and reduce the interest cost to the government.

Based upon the prior discussion, long duration government bonds should have substantial appeal to many large institutions. This appeal will extend to individual investors as well in the case of U.S. Treasury securities.

Although the government would probably not be allowed to do all their financing by such means, it could issue these bonds for some proportion of the debt for an anxious institutional clientele.

Disadvantages to Government

There is one factor that is not really a drawback, but really the absence of a major advantage--namely, the government does not receive the tax advantage on these bonds that corporations enjoy. Therefore, the whole discussion on the lower after-tax cost to a borrower with longer maturity bonds does not apply. Hence, the main advantage is a lower required return because of the other advantages to the investor.

Another problem with zero coupon bonds relates to the statement above that the government could issue long duration bonds. The point is, long duration zero coupon bonds would not be practical for the government during periods of high interest rates because the government would not receive any money (e.g., the present value factor for 15 percent in 30 years is only .0151; in 50 years it is .0009).

SUMMARY AND CONCLUSION

The purpose of this paper has been to describe the characteristics of zero coupon and mini coupon bonds including the accounting treatment and the specific advantages and disadvantages to investors and alternative issuers. Several articles have posed the question whether these instruments are simply gimmicks or fads that will eventually fade away. Based upon a full understanding of these bonds, it is probably safe to say that they should be a permanent part of corporate finance especially during periods of high interest rates. In contrast, they should have their greatest appeal to the government during periods of low interest rates.

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D/29

Exhibit 1

RECENT ZERO COUPON AND MINI-COUPON BOND ISSUES

Date of Issue	S+P Rating	Company	Par Value ($Mil.)	Coupon	Maturity	Offer Price	YTM (%)
3/10	AA-	Martin Marietta Corp.	175.0	7%	2011	58.835	13.25
3/18	A	Northwest Industries	125.0	7%	2011	52.75	13.51
3/19	A+	Transamerica Financial Corp.	200.0	6½%	2011	48.067	13.80
3/21	NA	Pepsico	25.0	0%	2011	27.00	12.79
4/1	AAA	Gen. Motors Acc. Corp.	400.0	6%	2011	44.51	13.80
4/8	A-	Eaton Corp.	200.0	7%	2011	48.80	14.57
4/9	A+	Cities Service Co.	300.0	7%	2011	49.94	14.25
4/16	A+	J. C. Penney, Inc.	200.0	6%	2006	42.064	14.85
4/22	A+	J. C. Penney, Inc.	200.0	0%	1989	33.247	14.76
4/22	A	Aluminum Co. of America	250.0	7%	2011	48.362	14.70
4/29	A	ITT Financial Corp.	200.0	6½%	2011	41.89	15.17
5/12	A	Archer-Daniels-Midland Co.	250.0	7%	2011	46.246	15.35
5/27	A	Borg Warner Accep. Corp.	125.0	6%	2001	42.553	15.25
6/17	A	Associates Corp. of N.A.	150.0	6%	2001	45.125	14.45
6/23	AA	General Foods Corp.	150.0	6%	2001	47.58	13.75
6/23	AA	General Foods Corp.	200.0	7%	2011	51.624	13.70
6/24	AAA	Gen. Motors Acc. Corp.	750.0	0%	1991	25.245	14.76
6/24	AAA	Gen. Motors Acc. Corp.	150.0	6%	2001	47.580	13.75
7/1	AAA	IBM Credit Corp.	150.0	0%	1988	39.164	14.33
7/6	AA-	Dana Corp.	150.0	5 7/8%(Conv.)	2006	50.00	12.40*
7/9	A	Phillip Morris	250.0	6%	2001	42.90	15.14
8/12	B+	Petro Lewis Corp.	125	0%	1989	26.65	17.97
F	AA	Barclay's America Corp.	150	0%	1989	NA	NA
F	A-	ITT Financial	200	0%	1989	NA	NA
F	AA-	Xerox Credit Corp.	100	0%	1991	NA	NA

* Straight bond yield to maturity.
F - forthcoming

Exhibit 2

AFTER TAX (46%) COST TO A CORPORATE BOND ISSUER

YIELD TO MATURITY FOR TAX EXEMPT INVESTOR	CURRENT COUPON BOND*	ZERO COUPON BOND (MATURITY IN YEARS)									
		5	10	15	20	25	30	35	40	45	50
.05	.027	.02694	.02676	.02645	.02603	.02551	.02489	.02410	.02341	.02258	.02171
.10	.054	.05354	.05214	.04991	.04703	.04370	.04019	.03674	.03348	.03052	.02787
.15	.081	.07952	.07510	.06849	.06080	.05314	.04628	.04049	.03572	.03184	.02867
.20	.108	.10463	.09494	.08173	.06837	.05704	.04815	.04137	.03612	.03202	.02876
.25	.135	.12869	.11140	.09037	.07210	.05849	.04871	.04157	.03620	.03204	.02877
.30	.162	.15155	.12456	.09567	.07384	.05902	.04887	.04161	.03622	.03205	.02877
.35	.189	.17312	.13475	.09881	.07465	.05922	.04891	.04162	.03622	.03205	.02877
.40	.216	.19333	.14245	.10063	.07502	.05929	.04893	.04163	.03622	.03205	.02877
.45	.243	.21214	.14816	.10170	.07520	.05932	.04893	.04163	.03622	.03205	.02877
.50	.270	.22955	.15236	.10232	.07529	.05933	.04894	.04163	.03622	.03205	.02877
.55	.297	.24558	.15542	.10269	.07533	.05934	.04894	.04163	.03622	.03205	.02877
.60	.324	.26026	.15764	.10292	.07535	.05934	.04894	.04163	.03622	.03205	.02877
.65	.351	.27365	.15926	.10305	.07536	.05934	.04894	.04163	.03622	.03205	.02877
.70	.378	.28582	.16045	.10313	.07537	.05934	.04894	.04163	.03622	.03205	.02877
.75	.405	.29684	.16132	.10319	.07537	.05934	.04894	.04163	.03622	.03205	.02877
.80	.432	.30679	.16195	.10322	.07537	.05934	.04894	.04163	.03622	.03205	.02877
.85	.459	.31575	.16243	.10324	.07537	.05934	.04894	.04163	.03622	.03205	.02877
.90	.486	.32380	.16279	.10325	.07537	.05934	.04894	.04163	.03622	.03205	.02877
.95	.513	.33103	.16306	.10326	.07537	.05934	.04894	.04163	.03622	.03205	.02877
1.00	.540	.33751	.16326	.10327	.07537	.05934	.04894	.04163	.03622	.03205	.02877

*The after-tax cost of a current coupon bond does not vary with maturity.