Refunding Considerations under Rate-Base Regulation

Andrew J. Kalotay

Mr. Kalotay is Vice President of Salomon Brothers in New York City and an Associate Editor of Financial Management.

I. Introduction

The total amount of revenues collected by a regulated utility, such as a telephone or power company, is determined by the so-called "revenue requirements" formula. An important component of this formula is the "cost of capital," which is the weighted average of the embedded cost of debt and of preferred equity and the current cost of common equity. This cost of capital when applied to the rate base determines the amount of operating income (revenue requirements for capital) the company should be allowed to earn.

Any restructuring of the liabilities, such as the retirement of an outstanding issue or the addition of a new issue, affects the cost of capital which, in turn, changes the revenue requirements. In practice, there is a "regulatory lag" before the revenue requirements are formally changed, but in this note we shall assume that the change occurs instantaneously.

In this paper we explore an indigenous problem associated with the determination of the revenue requirements. The source of the problem, in essence, is that the restructuring of the liabilities does not affect the rate base, which normally consists of working plant. Consequently, there is no assurance that the adjusted revenue requirements will leave either the equity or the debt investor whole.

We shall consider the refunding of premium debt or preferred stock.[1] This is an important practical problem: interest rates have declined dramatically from their 1981 peaks, and unless rates substantially rise within the next few years, an enormous volume of public utility debt will be candidate for refunding. The analysis is equally applicable to the refunding of discounted debt, provided that discount and premium refundings are treated symmetrically. (In practice, however, in many jurisdictions the gain arising from market prepurchase of sinking fund obligations is treated asymmetrically. Similar considerations apply to more complicated restructurings, such as exchanges.)

In the next section we show that under traditional regulation the refunding of debt or preferred stock at a premium results in a shortfall to the equity investor. The size of the shortfall is the product of the unamortized premium and the cost of capital. This has already been pointed out in the regulatory literature,[2] but the

[1] Except for tax considerations, these instruments are treated identically

[2] Bond Redemption under Rate Base Regulation, A J Kalotay, Public Utilities Fortnightly, March 1, 1979

methodology is of independent interest to financial analysts. Next we consider various ways of making up the shortfall in a manner consistent with regulatory practice. This can be achieved in a natural way by subtracting the call premium from the amount of outstanding debt. Finally, we investigate the effect of this treatment upon the resulting interest coverage.

The Problem

In this section we establish that under traditional regulation refunding of debt at a premium over par results in a shortfall to the equity investor. The amount of the shortfall is the product of the premium and the cost of capital.[3]

The proof is straightforward. For the sake of simplicity, we assume that the entire outstanding debt consists of a single issue, that the allowed return on equity is unaffected by the redemption, that there is no other component, such as preferred equity, in the capital structure, and that the rate base, which is normalized to be one, is equal to the sum of the outstanding equity and debt. The result can be shown to be independent of these assumptions.

We denote this firm's debt ratio prior to the redemption by d, the cost of the redeemed issue by i_o and the cost of equity by e. Thus the allowed rate of return, say k_o, is given by

$$k_o = (1-d)e + di_o .$$

Assume that the cost of redeeming an outstanding bond is 1 + p per unit, and the premium p is financed by equity and debt in a 1 − h to h ratio. The cost of new debt will be denoted by i_N. Then the new debt ratio d_N is given by

$$d_N = \frac{d(1+hp)}{1+dp}$$

and the new allowed rate of return is

$$k_N = \frac{1}{1+dp}\left\{ [1-d+dp(1-h)]e + d(1+hp)i_N \right\}. \quad (1)$$

Thus, the change in allowed rate of return is

$$k_o - k_N = \frac{d}{1+dp}\left\{ pe(h-d) + (i_o - i_N) + p(di_o - hi_N) \right\}. \quad (2)$$

Multiplying this quantity with the rate base, which is assumed to be one, yields the change in allowed return.

On the other hand, the actual cost of liabilities changes by

$$(1-d)e + di_o - \{[1-d+dp(1-h)]e + d(1+hp)i_N\}$$

or

$$d\{(i_o - i_N) - p[(1-h)e + hi_N]\}. \quad (3)$$

Equation (3) has a nice interpretation: d is the amount of refunded debt, $i_o - i_N$ is the change in coupon rate, while the last term is the allowed return on the premium — which depends upon the mix in which the premium is funded

Subtracting the change in the cost of liabilities (3) from the change in allowed return (2) results in

$$dp\left\{ \frac{1-d+dp(1-h)}{1+dp} e + \frac{d(1+hp)}{1+dp} i_N \right\}$$

or

$$dp \; \{ (1-d_N)e + d_N i_N \} \quad (4)$$

which we recognize as

(cost of premium) times (cost of capital).

This completes the proof.

Example

Consider a utility which refunds, via a tender offer, a \$100 million bond issue at a cost of \$120 million. Suppose that the cost of capital is 13%. According to (4), under traditional regulation the annual shortfall would amount to 13% of the \$20 million premium, or \$2.6 million.

Next, we investigate the effect upon interest coverage. As we shall see, whether the coverage improves or worsens depends upon the size of the premium and how it is funded. For illustrative purposes we shall consider the case in which the debt ratio is unaffected by the refunding (h = d).

Denote the interest coverage and the operating earnings prior to the refunding by r_o and E_o, respectively.

[3]For rate-making purposes the premium is amortized over some time period, such as the remaining life of the issue or the life of the refunding issue Thus the premium is eventually recovered, the question is whether the company actually earns on it For the sake of simplicity we assume no amortization In that case the effect described is permanent In practice, as the premium is recovered, the size of the shortfall gradually declines

Then $E_o = ri_od$. If $h = d$, then the earnings decline by the amount $d(i_o - i_N)$ to $d\{i_o(r_o - 1) + i_N\}$, while the new interest expense is $(1 + dp)i_Nd$. The new interest coverage r_N is given by their ratio:

$$r_N = \frac{i_o(r_o - 1) + i_N}{(1 + dp)\, i_N}.$$

Since $r > 1$ and $i_o > i_N$, it follows that if $p = 0$ then $r_N > r_o$. However, as p increases r_N decreases, and it is obvious that in general there is no assurance that the coverage ratio does not suffer.

Remedy 1: Inclusion of Premium in the Rate Base

Since under traditional regulation the shortfall to the equity investor is the product of the premium and the cost of capital, by including the premium in the rate base the equity investor would be made whole. A conceptual difficulty with this approach is that the rate base is usually defined to consist of physical plant. However, the inclusion of financial assets such as the capital carry charges associated with plant under construction, is not unprecedented. It is important to note nevertheless, that interest during construction is associated with particular physical plant.

As long as the equity investor is made whole, whether by including the premium in the rate base or by some other means, the interest coverage ratio becomes

$$r_N = \frac{i_o(r_o - 1) + i_N + p[(1-h)e + i_N]}{(1 + hp)i_N}. \quad (5)$$

In order to preserve the old coverage, we must have in Equation (5) $r_N = r_o$, or

$$r_o = \frac{i_o(r_o - 1) + i_N + p[(1-h)e + hi_N]}{(1 + hp)i_N}$$

and from this relationship we can determine h, i.e., how the premium should be funded. It is easy to see that

$$h = \frac{(r_o - 1)(i_o - i_N) + pe}{p[e + i_N(r_o - 1)]}.$$

As p approaches zero h increases without bounds, indicating that the firm must leverage further to maintain the coverage ratio. In the case of high-coupon debt refundings ($i_o > i_N$) the maximum value of p is attained when $i_o = (1 + p)i_N$, and in that case $h = 1$. Thus, the coverage ratio of the firm will generally improve when high coupon debt is refunded as long as the revenue requirements are sufficient to maintain the equity investor's return.

Remedy 2: Proper Definition of Cost of Debt

As we discussed earlier, the inclusion of financial assets, such as the call premium, in the rate base is somewhat arbitrary. A method which appears to be more compatible with the spirit of rate base regulation is to leave the rate base unchanged and adjust the cost of capital. In the derivation below we assume that the cost of equity is unchanged, and determine the cost of debt to make the equity investor whole.

Under traditional regulation the shortfall to the equity investor is given by (4). Since the rate base is assumed to be of unit size, the cost of capital must be increased from (1) to (1) + (4), or (1 + hp) times (4), *i.e.*, to

$$[1 - d + dp(1-h)]e + d(1 + hp)i_N. \quad (6)$$

The cost of capital is the weighted average of the cost of equity and the cost of debt, and the cost of equity is assumed to be unchanged. It is evident from Equation (6) that the new debt ratio $\hat{d}$ is determined from the relationship

$$1 - \hat{d} = 1 - d + dp(1-h), \text{ or}$$

$$\hat{d} = d[1 - p(1-h)]. \quad (7)$$

Returning to Equation (6), we observe that the adjusted cost of debt, say $\hat{i}_N$, must be such that

$$\hat{d}\hat{i}_N = d(1 + hp)i_N, \text{ or}$$

$$\hat{i}_N = \frac{1 + hp}{1 - p(1-h)} i_N = \frac{i_N}{1 - p/(1 + hp)}. \quad (8)$$

The face amount of debt after refunding is $d(1 + hp)$, and the interest expense is $i_Nd(1 + hp)$. We wish to reduce the amount of debt by some x so that the resulting debt cost is given by (8). In that case

$$\frac{d(1 + hp)i_N}{d(1 + hp) - x} = \frac{i_N}{1 - p(1 + hp)}$$

which reduces to $x = dp$.

This is a fundamental result. It establishes that in order to make the equity investor whole in computing the cost of debt the premium paid in previous refundings should be subtracted from the face amount. This result is independent of how the premium is funded. Of course, the revenue requirements depend upon the funding of the premium.

Exhibit 1 displays the effect of the proposed treatment. If, for example, the unamortized premium is 3% of the outstanding amount and the conventional embedded cost is 10%, then the proposed treatment would increase the embedded cost to approximately 10.30%. The effect is directly proportional to both the amount of premium and the embedded debt cost.

Conclusion

In this paper we have investigated the effect upon a regulated utility of extinguishing a debt issue at a premium. We have shown that under traditional regulatory treatment revenue requirements decline more than the interest payments. The incremental cost is borne by the equity investor.

The situation can be remedied by an appropriate increase of either the rate base or the cost of capital. In the former case, the premium would be included in the rate base. In the latter case, the amount of outstanding debt would be reduced by the premium. The lower amount of debt would result in a higher debt cost and thus in a higher cost of capital. In either case, the interest coverage is likely to improve.

Since the inclusion of a financial asset in the rate base may be inconsistent with standard regulatory procedures, the reduction of the amount of debt would seem to be the preferable treatment. In fact, such treatment would be particularly appropriate for firms which already use the "net proceeds" method instead of the "face amount" method for rate-making purposes. Under the net proceeds method the amount of debt is increased by the proceeds, rather than the face amount, of an issue, and the premium or discount is amortized over the life of the issue.

The amortization of the premium was not explicitly addressed in this study. Under the proposed treatment it is irrelevant whether or not the premium is amortized. As the premium is amortized, as would be the typical case, the revenue requirements would initially be higher by the amount of amortization. Over time, as the premium is fully amortized, the effect would gradually dissipate.

Exhibit 1. Incremental Effect of Adjusting for the Premium