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Common Equity Flotation Costs and Rate Making

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The proper treatment of common stock flotation costs is an issue in almost every utility rate case, and becomes increasingly important – for reasons shown in this article – as new stock offerings decline. The article provides clarification of the issue and offers a reasonable solution.

Incorrect statements have been made about the proper treatment of common equity flotation costs in the financial literature, and this has contributed to incorrect rate case testimony and to several improper decisions. The problem seems to have arisen for two reasons: (1) During the 1970s, when most utilities were raising large amounts of equity, the case for an equity cost adjustment was generally based on the need to sell common stock at prices greater than book value so as to avoid dilution when new stock was sold, but the proper rationale for the adjustment, and the argument that should have been made, is that an adjustment is necessary to recover actual incurred costs. (2) A number of academic writers [1, 2, 3, 6, 7, 8, 11][1] have attempted to deal with the problem algebraically, and while a mathematical approach has merit, the different authors based their models on different and somewhat obscure assumptions, with the result that the academic research has actually done more to confuse than to clarify the issue.

As we see it, there are two questions which need answers:

1) Is an adjustment needed even if a company has no plans to sell new common stock in the foreseeable future?
2) If an adjustment is required, should it be applied to common stock only or to total common equity (common stock plus retained earnings)?

The answers are "yes" to the first question and "total common equity" to the second. Specifically, the market-determined cost of equity should be adjusted (increased) to reflect issuance costs associated with past issues regardless of whether a company plans to issue stock in the future or not, and the adjustment should be applied to the total common equity, including retained earnings. The reasons for these conclusions are set forth in the balance of this article.

[1]Numbers in brackets correspond to numbers in the list of references at the end of the article.

Background and Approach

The flotation cost adjustment – whether for bonds, preferred stocks, or common equity – is designed to convert a market rate of return into a fair rate of return on accounting book values. Prior to the 1970s, most utilities were regulated on the basis of the comparable earnings approach. With that method no market return was involved, and hence there was no need for a common equity flotation adjustment. However, as use of market-oriented equity cost approaches, especially the discounted cash flow (DCF) method, became prevalent during the 1970s, a specific flotation adjustment became necessary. The first use of DCF, to the authors' knowledge, was by Professor Myron J. Gordon as a staff witness in an American Telephone and Telegraph Company rate case before the Federal Communications Commission in the mid-1960s. Professors Alexander A. Robichek and Ezra Solomon of Stanford University, testifying for AT&T, proved that if a commission correctly identifies and then allows a *company* to earn its DCF cost of equity, k, on book equity, then *investors* will never be able to earn k on their investment, because the capital that investors have put up will exceed the company's book equity as a result of issuance (or flotation) costs. Thus, in the very first

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case where DCF methodology was used, Robichek and Solomon proved, and Gordon accepted, the idea that the allowed return on equity should exceed the DCF cost. Unfortunately, only the need for an adjustment, not the proper adjustment mechanism itself, was identified in that rate case.

The DCF method's great increase in popularity occurred during the 1970s, just when the companies were raising unprecedented amounts of new equity capital. Witnesses who used the DCF method recognized the need for an adjustment, and they had to provide a rationale to commissioners. Most witnesses gave this explanation:

1) If a company were allowed to earn only its DCF cost of equity, then its stock would normally sell at book value.
2) When new stock was issued, flotation expenses plus market pressure would drive the price of the stock below book value.
3) The issuance of stock at below book value would dilute the book value of the existing shares, and since future earnings and dividends are dependent upon book value, the market value of existing stock would also be diluted.
4) This dilution would obviously harm current stockholders; indeed, it would amount to economic confiscation.
5) Therefore, fair regulation requires commissioners to set authorized returns high enough to cause utility stocks to sell at prices that exceed book value by an amount sufficient to prevent below-book sales.

This argument was correct, although incomplete, and it was generally accepted during the 1970s, when most utilities were selling new stock every year or two. There were, of course, arguments about the level of flotation costs and the extent of market pressure, and hence about the proper market-to-book ratio, but the logic of some type of adjustment was rarely questioned.

However, as many utilities' construction programs neared completion in the early 1980s, and, accordingly, as new stock offerings slowed, the issue of the need for a flotation adjustment resurfaced. Patterson [6, 7] applied standard corporate finance techniques and concluded that a flotation adjustment is needed irrespective of current equity sales. Richter [11] supported Patterson's position. Arzac and Marcus [1, 2] also concluded that a flotation adjustment is always needed, but their formula produces an almost trivial adjustment factor unless the company is selling very large amounts of stock every year. Patterson and Arzac-Marcus debated in the finance journals, but they reached no reconciliation. Finally, in the latest article, Professors Bierman and Hass [3] derived yet another formula, one which produces an adjustment factor between those recommended by Patterson and Arzac-Marcus.

The issue is important, so it is necessary that we resolve the conflict. Further, since utility executives and regulators, not financial economists, must make decisions in this area, the resolution must be understandable to these decision makers. After studying the

problem, we concluded that the best way to approach a clear resolution is to set up some hypothetical, but reasonable, situations and then to test the alternative theories, asking the following question: What results do the several methods produce, and are those results fair to both consumers and investors?

Bonds and Preferred Stocks

Because the proper treatment of flotation costs on bonds and preferred stocks is well known and not controversial, it helps to begin by examining that treatment as a lead-in to the analysis of common stock. First, note that debt flotation costs can be recovered in either of two ways: (1) They can be expensed and recovered from customers during the year the securities are sold, or (2) They can be capitalized and recovered over the life of the securities. The second method, which is consistent with the theory that those customers who benefit from a cost should pay for it, is generally used. Under this theory, bond flotation expenses are reflected in the embedded cost of the bond and are recovered over the life of the bond. For example, if flotation costs of 5 per cent were incurred on a $100 million, ten-year, 15 per cent coupon bond issue, they would be handled in the following manner by most federal and state regulators:

$$\frac{\text{Cost to}}{\text{company}} = \frac{\text{Interest expense + Amortization of flotation costs}}{\text{Principal value } - \text{ Unamortized flotation costs}} \quad (1)$$

$$= \frac{\$15,000,000 + (\$5,000,000/10)}{\$100,000,000 - \$5,000,000}$$

$$= \frac{\$15,500,000}{\$95,000,000} = 16.3158\% \text{ for the first year}$$

Return requirements would be calculated as follows:

$$\frac{\text{Return}}{\text{require-}}{\text{ments}} = \text{Cost rate(Principal value } - \text{ Unamortized flotation costs)} \quad (2)$$

$$= 0.163158(\$100,000,000 - \$5,000,000)$$

$$= \$15,500,000.$$

In this example, the company received $95 million of cash, which it used to purchase $95 million of operating assets. To meet its interest expense and flotation amortization requirements, the company must have $15.5 million in return dollars. This return will only be generated if the company earns 16.3158 per cent on its $95 million of operating assets. Under this procedure, the percentage cost as calculated in Equation 1 declines each year, but the return dollar amount remains constant.[2]

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[2] An alternative procedure that produces exactly the same result is to divide interest charges plus flotation amortization by the principal value of the issue, and then to multiply this cost rate by the principal value of the issue:

$$\text{Embedded cost rate} = \frac{\$15,500,000}{\$100,000,000} = 0.155 = 15.5\%.$$

Return requirements = 0.155($100,000,000) = $15,500,000.

This procedure in effect includes both flotation costs and operating assets in the rate base.

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Preferred stocks are handled similarly. Actually, utilities issue two types of preferred stocks, those with sinking funds and those that are perpetual. The adjustment formula for sinking fund preferred is exactly like that for bonds, but a difference arises in the case of perpetual preferreds. Perpetual preferred stock represents permanent capital; hence its flotation costs are not amortized.[3] Assuming again a $100 million issue and a 5 per cent flotation cost, this formula applies:

$$\frac{\text{Cost to}}{\text{company}} = \frac{\text{Dividend requirements}}{\text{Net proceeds}} = \frac{\$15,000,000}{\$95,000,000} \quad (3)$$

$$= 15.7895\%$$

Alternatively, we could write the formula as follows:

$$\frac{\text{Cost to}}{\text{company}} = \frac{\text{Dividend rate}}{1.0 - \text{Flotation}} = \frac{15\%}{0.95} = 15.7895\% \quad (3a)$$

The return dollars can then be calculated as follows:[4]

$$\text{Dollars of return} = 0.157895(\$95,000,000)$$
$$= \$15,000,000.$$

In this example, the preferred stockholders expect and require a return of 15 per cent on *their investment* ($100 million), but the company must earn 15.7895 per cent on *its operating assets* ($95 million) to provide this required return.[5] If the company earned only 15 per cent on the $95 million, then the company would have after-tax revenues of only $14,250,000 to meet investors' preferred dividend requirements of $15 million. Obviously, then, the 15 per cent market value cost of preferred must be adjusted upward to a 15.7895 per cent return on the company's operating assets if investors are to receive the reasonable rate of return they contracted for.

Common Stock

From a conceptual standpoint, it has long been recognized that the situation with common stock is similar to that for bonds and preferred stocks: Issuance costs are incurred; they should not be and are not expensed at the time the stock is sold; and therefore recovery must occur in subsequent years. Further, just as with bonds and preferred stock, the authorized rate of return on rate base equity must be above the rate of return to the investor; that is, the cost to the utility is above the return to the investor. The standard text-

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[3]In effect, the flotation costs of the preferred are amortized over an infinite period, which is to say the amortization per year is zero. Investors have made a *permanent* investment, so the original investors or those who purchase the stock in the secondary market must receive a return on that investment in perpetuity.

[4]Of course, preferred stock dividends are not deductible, so the total revenues required to produce the return dollars is higher for preferred stock than for debt.

[5]Note that the return dollars for the bond exceed those for the perpetual preferred stock – $15.5 million versus $15 million. However, these are first-year costs only. The bond's cost rate declines over time due to the amortization of its flotation costs, whereas the cost rate associated with the preferred stock remains constant, and the rates of return to the bondholders and the preferred stockholders are identical.

book formula, which Patterson [6] used, is as follows:[6]

$$r = \frac{\text{Expected dividend yield}}{1.0 - F} + g \quad (5)$$

Here:

r = authorized rate of return on book equity, if stockholders are to earn their required rate of return, k,

F = percentage flotation cost associated with common stock offerings, and

g = the expected growth rate in earnings and dividends.

The percentage flotation factor, F, consists of two elements: (1) underwriting costs and (2) "market pressure," which is the decline in the stock price that results when the supply of shares is suddenly increased. Historically, utility underwriting expenses have averaged from 3 to 4 per cent of gross proceeds [9]. Market pressure varies over time, depending on the size of the issue, the condition of the market, and the degree to which investors were surprised by the announcement of the stock sale. Moreover, stock prices change for reasons other than new offerings, so it is difficult to obtain an exact measure of market pressure. However, several careful studies have been reported, and they indicate that market pressure is in the range of one to 3 per cent [10]. Thus, for most utilities, flotation expenses plus pressure have totaled about 5.5 per cent.

To illustrate the flotation cost adjustment process, and following Bierman and Hass for consistency, we assume that a new, start-up utility has the following characteristics:

1) Our hypothetical company can sell stock in the market at $10 per share, and investors expect it to pay a dividend of one dollar and to grow at a rate of 5 per cent. Thus, its DCF cost of equity is k = D/P + g = 10% + 5% = 15%, investors' required rate of return.
2) To raise initial capital, the company plans to sell an issue of stock, incurring flotation costs of F = 5 per cent.
3) Applying Equation 5, we obtain a flotation-adjusted cost of equity (r) of 15.5263 per cent:

$$r = \frac{\text{Expected dividend yield}}{1 - F} + g$$

$$= \frac{10.0\%}{0.95} + 5\%$$

$$= 10.5263\% + 5\% = 15.5263\%$$

Thus, the illustrative utility's fair rate of return on book equity according to Equation 5 is approximately 53 basis points above its 15 per cent unadjusted "bare bones DCF cost of equity."

4) The company will sell one share of stock and obtain net proceeds of $9.50. This $9.50 is also the initial book value, B, and rate base. (Obvi-

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[6]This formula is developed in reference citation 5, Chapter 7, as well as in most other corporate finance textbooks.

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ously, this amount, which we use for simplicity, could be scaled up without altering the conclusions.)

5) After its inception and initial stock offering, all of the company's equity is expected to come from retained earnings. In a later case, we will examine the situation when more stock is sold.

6) The company operates in a reasonable and prudent manner, such that by any fairness criteria, investors should be allowed to earn their 15 per cent cost of capital return, no more and no less. For simplicity, we also assume that regulation operates properly, without lags.

7) Initially, we assume that the market cost of capital remains constant at 15 per cent, and that the company maintains a constant payout ratio so as to keep the dividend yield and growth components at 10 per cent and 5 per cent, respectively. These assumptions are consistent with the DCF model, but later in the article we expand the analysis by relaxing both of them.

Now these questions may be asked:

Should the flotation adjustment be applied to all common equity or, once retained earnings appear on the balance sheet, only to common stock?
For how many years should an adjustment be applied: One, two, ten, twenty, or forever?

When we applied Equation 5, the textbook formula which Patterson recommended, we found that it produces results that satisfy the fairness criterion; namely, it permits investors to earn exactly their 15 per cent cost of capital, no more and no less. This result for our initial case is demonstrated in Table 1, which was produced by a simple computer model, and it is analyzed below:

Table 1

Case 1: Company Earns Flotation-adjusted Cost of
Equity (r) on All Common Equity

Beginning of Year

Year	Common Stock (1)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	Market-Book Ratio (5)	EPS (6)	DPS (7)	Payout (8)
1	$9.50	$0.0000	$ 9.5000	$10.0000	1.0526x	$1.4750	$1.0000	67.7966%
2	9.50	0.4750	9.9750	10.5000	1.0526	1.5488	1.0500	67.7966
3	9.50	0.9738	10.4738	11.0250	1.0526	1.6262	1.1025	67.7966
4	9.50	1.4974	10.9974	11.5763	1.0526	1.7075	1.1576	67.7966
5	9.50	2.0473	11.5473	12.1551	1.0526	1.7929	1.2155	67.7966
6	9.50	2.6247	12.1247	12.7628	1.0526	1.8825	1.2763	67.7966
7	9.50	3.2309	12.7309	13.4010	1.0526	1.9766	1.3401	67.7966
8	9.50	3.8675	13.3675	14.0710	1.0526	2.0755	1.4071	67.7966
9	9.50	4.5358	14.0358	14.7746	1.0526	2.1792	1.4775	67.7966
10	9.50	5.2376	14.7376	15.5133	1.0526	2.2882	1.5513	67.7966

NOTES:
1) Assumptions made in this case are as follows:
   a) Issue price = $10
   b) Flotation cost = 5%
   c) k = D/P + g = 10% + 5% = 15%
   d) r = 15.5263%
2) The data in this case, and also the more complex cases, were developed with a Lotus 1-2-3 computer program.

1) The company's balance sheet item common stock is shown in Column 1.

2) Retained earnings are shown in Column 2. Initially, they are zero, but they build up over time.

3) Total equity as shown in Column 3 is the sum of common stock and retained earnings. Total equity grows as retained earnings build up.

4) Column 4 shows the stock price as determined by the basic DCF formula. It starts at $10 and grows at a rate of 5 per cent per year, which is necessary to produce the 5 per cent capital gains yield that investors expect and should receive.[7]

[7] The DCF valuation equation is

$$P_0 = \frac{D_1}{k - g}$$

This equation, solved for k, produces the standard DCF cost of capital equation, $k = D_1/P_0 + g$. See reference citation 5, Chapter 5, for a derivation and discussion.

5) Column 5 shows the market-to-book (M/B) ratio. Notice that the M/B always exceeds one. The only way the M/B ratio could go to one would be for the stock price to fall below the value shown in Column 4, but if that were to happen, then investors would not receive the capital gains to which they are entitled. Thus, the M/B will exceed one if investors are being treated fairly.

6) Earnings per share (EPS) as shown in Column 6 is the product of total equity times 0.155263, the fair rate of return as determined by Equation 5.

7) Dividends per share (DPS) as shown in Column 7 begin at one dollar and grow at a rate of 5 per cent per year. This growth rate is a requirement if investors are to earn their DCF cost of capital.

8) The payout ratio is shown in Column 8. Under

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the assumptions of the standard DCF constant growth model, the payout must be constant, and it is if r as determined by Equation 5 is used as the allowed return on equity.

9) Note also that book value per share as shown in Column 3 is growing at a constant rate, 5 per cent. The retention growth rate, g = br, where r is the return on book equity and b is the fraction of earnings, is

$$g = br = (1.0 - 0.677966)(15.5263) = 0.322(15.5263) = 5.0\%, \text{ just as it should be.}$$

Case 1 proves that Equation 5 produces the desired results: namely, returns that exactly cover the cost of equity, no more and no less. Any return on book equity different from that established by Equation 5 would produce inconsistent results. For example, suppose the authorized rate of return were cut from 15.5263 to the DCF return, 15 per cent, in Year 2. This would cause the stock price to drop from $10.50 to the $9.9750 book value. Thus, stockholders would suffer a loss, and they would not obtain the capital gains yield to which they are entitled. Any other type of experimentation will show exactly the same thing: If the company is not allowed to earn the cost of equity as determined by Equation 5 on total common equity, stockholders will not receive a 15 per cent return on their invested capital.

Sale of Additional Equity

While the only-one-equity-sale conditions used to develop Case 1 are consistent with Bierman and Hass's example, and also with some actual companies such as Comsat and the Yankee Atomic Power companies, most utilities sell additional common stock from time

to time. Therefore, we modified the computer model to analyze stock sales subsequent to the initial offering, and we report the results in Table 2 as Case 2, in which the company raises an additional share of new common equity for $12.1247 at the beginning of Year 6. (Note that the $12.1247 is calculated as the price of the stock at the beginning of Year 6 less flotation costs.) Earnings, dividends, and common equity all increase in Year 6 as a result of the sale, but investors continue to earn exactly 15 per cent on their investment so long as the company is allowed to earn 15.5263 per cent on its total book equity.

In Case 3, reported in Table 3, we present the results for a company that issues new equity at a flotation cost different from the cost of its original stock issue. Case 3 is similar to Case 2. Just as in Case 2, the company issues new equity at the beginning of Year 6. However, in Case 3, the equity sold at the beginning of Year 6 has a different flotation cost (3 per cent) from that of the original issue (5 per cent). With lower flotation costs, the company nets more common equity in Case 3 than in Case 2. (The dollar amount of new equity raised is calculated as the price of the share of stock at the beginning of Year 6 less the 3 per cent flotation costs incurred.)

In this example, because the new equity is sold at a different flotation cost than the old equity, a new value of r must be calculated and used to determine net income. The new r is a weighted average of r as determined by Equation 5 for each equity issue, with the weights being the fraction of total equity attributable to the new and old stock at the time the new stock is issued. Because of the lower flotation costs on the new equity, there is a corresponding drop in the market-to-book ratio in Year 6. Note, however, that after the transitional Year 6, earnings and dividends continue to grow at the required 5 per cent rate, which is neces-

Table 2

Case 2: Company Sells Additional Stock at the Beginning of Year 6

Beginning of Year

Year	Common Stock (1)	New Issue (1a)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	Market-Book Ratio (5)	EPS (6)	DPS (7)	Payout Ratio (8)
1	$ 9.50		$0.0000	$ 9.5000	$10.0000	1.0526x	$1.4750	$1.0000	67.7966%
2	9.50		0.4750	9.9750	10.5000	1.0526	1.5488	1.0500	67.7966
3	9.50		0.9738	10.4738	11.0250	1.0526	1.6262	1.1025	67.7966
4	9.50		1.4974	10.9974	11.5763	1.0526	1.7075	1.1576	67.7966
5	9.50		2.0473	11.5473	12.1551	1.0526	1.7929	1.2155	67.7966
6	9.50	$12.1247	2.6247	24.2493	12.7628	1.0526	1.8825	1.2763	67.7966
7	21.6247		3.8371	25.4618	13.4010	1.0526	1.9766	1.3401	67.7966
8	21.6247		5.1102	26.7349	14.0710	1.0526	2.0755	1.4071	67.7966
9	21.6247		6.4470	28.0717	14.7746	1.0526	2.1792	1.4775	67.7966
10	21.6247		7.8506	29.4752	15.5133	1.0526	2.2882	1.5513	67.7966

NOTES:
Assumptions made in this case are as follows:
a) Original issue price = $10
b) Flotation cost = 5%
c) k = D/P + g = 10% + 5% = 15%
d) r = 15.5263%
e) Year 6 issue price = $12.7628
f) Year 6 new common stock = $12.7628(1 − F)
= $12.7628(0.95)
= $12.1247

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Table 3

Case 3: Company Sells Additional Stock at the Beginning of
Year 6 Incurring Different Flotation Costs

Beginning of Year

Year	Common Stock (1)	New Issue (1a)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	Market-Book Ratio (5)	EPS (6)	DPS (7)	Payout Ratio (8)
1	$ 9.5000		$0.0000	$ 9.5000	$10.0000	1.0526x	$1.4750	$1.0000	67.7966%
2	9.5000		0.4750	9.9750	10.5000	1.0526	1.5488	1.0500	67.7966
3	9.5000		0.9738	10.4738	11.0250	1.0526	1.6262	1.1025	67.7966
4	9.5000		1.4974	10.9974	11.5763	1.0526	1.7075	1.1576	67.7966
5	9.5000		2.0473	11.5473	12.1551	1.0526	1.7929	1.2155	67.7966
6	9.5000	$12.3799	2.6247	24.5046	12.7628	1.0526	1.8889	1.2763	67.7566
7	21.8799		3.8499	25.7298	13.4010	1.0526	1.9833	1.3401	67.5676
8	21.8799		5.1364	27.0163	14.0710	1.0526	2.0825	1.4071	67.5676
9	21.8799		6.4872	28.3671	14.7746	1.0526	2.1866	1.4775	67.5676
10	21.8799		7.9056	29.7855	15.5133	1.0526	2.2960	1.5513	67.5676

NOTES:
Assumptions made in this case are as follows:
a) Original issue price = $10
b) Year 1 Flotation cost = 5%
c) $k = D/P + g = 10\% + 5\% = 15\%$
d) $r_1 = 15.5263\%$
e) Year 6 issue price = $12.7628
f) Year 6 flotation cost = 3%
g) Year 6 new common stock = $12.7628(1 − F)
$\qquad\qquad\qquad\qquad\quad = \$12.7628(0.97)$
$\qquad\qquad\qquad\qquad\quad = \$12.3799$
h) Additional issue r = 15.3093%

sary if investors are to receive the 15 per cent DCF return on their investment. The stock price grows at 5 per cent throughout the ten-year period.

The fact that the company must continue to earn the flotation-adjusted cost of equity, even as retained earnings build up to a larger and larger proportion of total common equity, is counterintuitive, and so it deserves further discussion. Here are two comments:

1) *Demonstration that a weighted average cost rate is inappropriate.* It has been suggested that the authorized return on equity should be a weighted average of the flotation-adjusted cost rate, r = 15.5263 per cent, and the DCF cost rate, k = 15 per cent, with the weights being based on common equity and accumulated retained earnings. respectively. When we programmed our model to reflect these conditions, we obtained the results shown in Table 4. A problem obviously exists – if dividends are to grow at the 5 per cent rate that investors expect, and if earnings are based on a weighted average of k and r, then a higher and higher percentage of earnings will have to paid out. Thus, the payout ratio will rise. In Year 34 the payout ratio will exceed 100 per cent, so retained earnings will start to decline. Retained earnings actually go negative in Year 45, and Total Common Equity goes negative in Year 46, which means the company is officially bankrupt. This example demonstrates, in yet another way, that the flotation-adjusted cost of equity must be earned on all common equity if investors are to receive the DCF return to which they are entitled under prudent management. The example also demonstrates that, if investors were informed that the regulatory treatment implied in Table 4 were going to be

employed, they would not invest in the company in the first place.

2) *Logical explanation.* To understand *why* the Equation 5 value must be applied to all common equity, retained earnings as well as equity raised by selling stock, one must trace through the valuation process. Notice that, in Year 1, investors require a return of 15 per cent on their $10 investment, or $1.50. However, the company earns only $1.4750, of which it pays out one dollar as a dividend and retains 47.5 cents. To give the investor the fifty-cent increase in market value (or capital gain) needed to add to the one dollar dividend to produce the $1.50, or 15 per cent, total DCF return, the 47.5 cents must earn more than 15 per cent. Specifically, it must earn the flotation adjusted cost of equity, r = 15.5263 per cent. This same thought process can be continued in other years, ad infinitum, and the ultimate conclusion is that both the original common equity and all retained earnings must earn r = 15.5263 per cent.

If the preceding paragraph is not clear, we can put it another way. The investor expects and is entitled to earn, under prudent management, a return of 15 per cent on his or her investment. Thus, dividends plus capital gains must total 15 per cent, or $1.50 in the first year. Ten per cent, or one dollar, will come from dividends, so 5 per cent, or 50 cents, must come from capital gains. To obtain a capital gain yield of 50 cents from 47.5 cents of retained earnings, the retained earnings must earn a return greater than k = 15 per cent; specifically, the retained earnings must be allowed to earn r = 15.5263 per cent. (If the 47.5 cents earned 15 per cent, then it would be worth exactly 47.5 cents, not 50 cents.) In Year 2, retained earnings will rise by

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5 per cent from 47.5 cents to 49.875 cents; the capital gains then must rise from 50 cents to $.50(1.05) = 52.5$ cents; the only way this can happen is for the second-year retained earnings to be allowed to earn r = 15.5263 per cent; and so on.

The Effect of the Payout Ratio on the Flotation Cost Adjustment

Even though fair regulation requires that retained earnings be allowed to earn the flotation adjusted cost of equity, the level of retained earnings as affected by the payout ratio does have a material effect on the size of the adjustment.

To illustrate this point, assume (1) that two utilities both have a 15 per cent market cost of equity, that is, k = 15 per cent; (2) that both companies sell at a price of $20; but (3) that one company has a policy of paying out 25 per cent of its earnings and retaining 75 per cent, while the other has the reverse dividend policy. Assume further that both companies earn 15 per cent on their $20 market value, so earnings per share are $.15(\$20) = \$3$. The high payout company has a dividend of $.75(\$3) = \$2.25$, while the low payout company has a dividend of $.25(\$3) = 75$ cents. At the same time, the low payout company, which plows most of its earnings back into the business, will have a growth rate of $g = .75(15$ per cent$) = 11.25$ per cent, while the high payout company will have $g = .25(15$ per cent$) = 3.75$ per cent.

Under these conditions, the following situation would exist for the two illustrative companies:

Low payout Company:

$$k = \frac{D_1}{P_0} + g = \frac{\$0.75}{\$20} + 11.25\%$$

$$= 3.75\% + 11.25\% = 15\%$$

High payout Company:

$$k = \frac{D_1}{P_0} + g = \frac{\$2.25}{\$20} + 3.75\%$$

$$= 11.25\% + 3.75\% = 15\%$$

Applying the adjustment formula,

$$r = \frac{\text{Expected dividend yield}}{1 - F} + g,$$

we find this situation, assuming that issuance costs are 5 per cent:

High payout Company:

$$r = \frac{11.25\%}{0.95} + 3.75\%$$

$$= 11.842\% + 3.75\% = 15.592\%$$

Low payout Company:

$$r = \frac{3.75\%}{0.95} + 11.25\%$$

$$= 3.947 + 11.25\% = 15.197\%$$
$$\text{Difference} = 0.395\%$$

Thus, we see that the company which retains most of its earnings, and which consequently has more retained

Table 4

Case 4: Company Earns Weighted Average k

Year	Common Stock (1)	Retained Earnings (2)	Total Equity (3)	EPS (4)	DPS (5)	Payout Rate (6)	Weighted k (7)
1	$9.5000	$ 0.0000	$ 9.5000	$1.4750	$1 0000	67.7966%	0.1553
2	9.5000	0.4750	9.9750	1.5463	1.0500	67.9062	0.1550
3	9.5000	0.9713	10.4713	1.6207	1.1025	68.0267	0.1548
4	9.5000	1.4894	10.9894	1.6984	1.1576	68.1591	0.1545
5	9.5000	2.0302	11.5302	1.7795	1.2155	68.3047	0.1543
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
33	9.5000	23.2219	32.7219	4.9583	4.7649	96.1006	0.1515
34	9.5000	23.4152	32.9152	4.9873	5.0032	100.3188	0.1515
35	9.5000	23.3993	32.8993	4.9849	5.2533	105.3852	0.1515
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
45	9.5000	−2.3443	7.1557	1.1234	8.2791	736.9935	0.1570
46	The company goes bankrupt.						

NOTES:
1) Assumptions made in this case are as follows:
   a) Issue price = $10
   b) Flotation cost = 5%
   c) k = D/P + g = 10% + 5% = 15%
   d) r = 15.5263%
2) The dividend in Year 45 cannot grow by the 5 per cent growth rate, because if it did total equity would become negative. Therefore, the Year 45 dividend is calculated as the remaining portion of total equity + earnings in Year 45: $7.1557 + $1.1234 = $8.2791.

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Table 5

Case 5: Company Sells Additional Stock and k Changes

Beginning of Year

Year	Common Stock (1)	New Issue (1a)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	Market-Book Ratio (5)	EPS (6)	DPS (7)	Payout Ratio (8)
1	$ 9.5000		$0.0000	$ 9.5000	$10.0000	1.0526x	$1.4750	$1.0000	67.7966%
2	9.5000		0.4750	9.9750	10.5000	1.0526	1.5488	1.0500	67.7966
3	9.5000		0.9738	10.4738	11.0250	1.0526	1.6262	1.1025	67.7966
4	9.5000		1.4974	10.9974	11.5763	1.0526	1.7075	1.1576	67.7966
5	9.5000		2.0473	11.5473	12.1551	1.0526	1.7929	1.2155	67.7966
6	9.5000	$12.3799	2.6247	24.5046	12.7628	1.0526	1.8889	1.2763	67.5676
7	21.8799		3.8499	25.7298	13.4010	1.0526	1.9833	1.3401	67.5676
8	21.8799		5.1364	27.0163	14.0710	1.0526	1.8123	1.4071	77.6398
9	21.8799		5.9469	27.8268	14.4931	1.0526	1.8667	1.4493	77.6398
10	21.8799		6.7817	28.6616	14.9279	1.0526	1.9227	1.4928	77.6398

NOTES:
Assumptions made in this case are as follows:
a) Original issue price = $10
b) Year 1 flotation cost = 5%
c) Issue 1 r = 15.5263%
d) Year 6 issue price = $12.7628
e) Year 6 flotation cost = 3%
f) Year 6 new common stock = $12.7628(1 − F)
   = $12.7628(0.97)
   = $12.3799
g) Additional issue r = 15.3093%
h) Years 1-7, k = D/P + g = 10% + 5% = 15%
i) Years 8-10, k = D/P + g = 10% + 3% = 13%

Table 6

Case 6: Company Sells Additional Stock and k Changes

Beginning of Year

Year	Common Stock (1)	New Issue (1a)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	Market-Book Ratio (5)	EPS (6)	DPS (7)	Payout Ratio (8)
1	$ 9.5000		$0.0000	$ 9.5000	$10.0000	1.0526x	$1.4750	$1.0000	67.7966%
2	9.5000		0.4750	9.9750	10.5000	1.0526	1.5488	1.0500	67.7966
3	9.5000		0.9738	10.4738	11.0250	1.0526	1.6262	1.1025	67.7966
4	9.5000		1.4974	10.9974	11.5763	1.0526	1.7075	1.1576	67.7966
5	9.5000		2.0473	11.5473	12.1551	1.0526	1.7929	1.2155	67.7966
6	9.5000	$12.3799	2.6247	24.5046	12.7628	1.0526	1.8889	1.2763	67.5676
7	21.8799		3.8499	25.7298	13.4010	1.0526	1.9833	1.3401	67.5676
8	21.8799		5.1364	27.0163	14.0710	1.0526	1.8011	1.1257	62.5000
9	21.8799		5.9469	27.3671	14.7746	1.0526	1.8911	1.1820	62.5000
10	21.8799		6.7817	29.7855	15.5133	1.0526	1.9857	1.2411	62.5000

NOTES:
Assumptions made in this case are as follows:
a) Original issue price = $10
b) Year 1 flotation cost = 5%
c) Issue 1 r = 15.5263%
d) Year 6 issue price = $12.7628
e) Year 6 flotation cost = 3%
f) Year 6 new common stock = $12.7628(1 − F)
   = $12.7628(0.97)
   = $12.3799
g) Additional issue r = 15.3093%
h) Years 1-7, k = D/P + g = 10% + 5% = 15%
i) Years 8-10, k = D/P + g = 10% + 3% = 13%

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earnings and a smaller dollar amount of flotation costs, also has the lower flotation-adjusted cost of equity. This demonstrates that the issuance cost adjustment formula is itself adjusted to reflect the extent to which a company finances by retaining earnings rather than by selling new common stock.

Changes in the DCF Cost of Equity

We also analyzed the effects of changes in the DCF cost of equity over time. While a change in the DCF k causes a change in earnings, dividends, and the growth rate, the flotation adjustment *process* is not affected – Equation 5 still produces a fair rate of return on book value. This is demonstrated in Tables 5 and 6. It should be noted that the effects of the adjustment as derived by Equation 5 do vary with the level of the DCF cost and with the split between dividend yield and growth. In Case 5, we analyze the effects of a change in the growth rate with the dividend yield held constant, while in Case 6, reversing them, we analyze the effects of a change in the dividend yield with the growth rate held constant. Both cases use Case 3 as their base case. In each instance, a new value for r, based on Equation 5, can be established, and this return on book value permits investors to earn their new DCF cost of equity.

Capitalizing Flotation Costs

Bierman and Hass, almost as an afterthought toward the end of their article, suggested that utilities should be allowed to record the *gross amount* of equity sales and to earn a DCF return on gross equity capital. This would amount to capitalizing flotation costs. These capitalized costs could then be amortized over some prescribed period or else be kept on the books indefinitely.

To show this, we set up computer models using our various cases but capitalizing flotation costs. One can see that earnings, dividends, and stock prices are all exactly like those shown in our tables. Thus, capitalizing flotation costs produces exactly the same results as Equation 5.

Capitalizing flotation costs has much to recommend it, for it would eliminate the confusion that has existed. However, a fundamental problem exists for any company that has incurred flotation costs in the past, that is, for virtually the entire utility industry: How would the fact that past flotation costs were not capitalized be dealt with? In other words, capitalizing flotation costs would be an excellent procedure for a new, start-up, company, but such a plan would not be feasible for an existing company without somehow adjusting for past costs. Such an adjustment could be made, but a discussion of it goes beyond the scope of this article.

Conclusion

The proper treatment of equity flotation costs has caused much confusion. Had such costs been either capitalized in the past or else expensed on an as-incurred basis, there would be no problem, but since neither of these practices has generally been followed, the DCF return must be adjusted to produce a fair rate of return on book equity.

Further, the adjustment is always required, irrespective of whether or not a company has plans to sell new stock in the future, and the adjusted return must be earned on total equity, including retained earnings. Otherwise, it would be impossible for investors to earn the cost of equity, even under prudent and efficient management.

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