The answer to the question is highlighted in red. Explanations are highlighted in green.

4. Sam’s Orthodontic Services (SOS) will retain for reinvestment $300,000 of the net income it expects to generate next year. Recently, the CFO determined that the firm’s after-tax cost of debt, r_{aT}, is 5 percent, its cost of internal equity (retained earnings), r_s, is 10 percent, and its cost of external equity (new common stock), r_e, is 13 percent. Next year, SOS expects to finance capital budgeting projects so as to maintain its current capital structure, which consists of 60 percent debt. SOS has no preferred stock. What will SOS’s marginal cost of capital be if its total capital budgeting needs are $700,000 for next year?
   a. 7.0%
   b. 7.6%
   c. 8.2%
   d. 9.0%
   e. The cost of capital for SOS cannot be determined without knowing the tax rate.

The firm’s capital structure consists of 60 percent debt and 40 percent (= 100% - 60%) common equity (SOS has no preferred stock). If retained earnings can be used to satisfy the common equity portion of the funds needed to invest in the capital budgeting projects for next year, then \( WACC = 0.6(5\%) + 0.4(10\%) = 7.0\% \). On the other hand, if new common stock has to be issued, \( WACC = 0.6(5\%) + 0.4(13\%) = 8.2\% \). The firm expects to have $300,000 in retained earnings, so the break point caused by retained earnings is \( BP_{RE} = \frac{300,000}{0.4} = $750,000 \). Therefore, if the firm’s capital budgeting needs next year are $700,000, SOS will have to issue new common equity. The $700,000 capital budget would be financed with $420,000 = $700,000(0.6) of debt and $280,000 = $700,000(0.4) of common equity. Thus, SOS can use retained earnings to satisfy the equity portion of the financing. Because SOS does not have to issue new common stock, the appropriate cost of equity is 10 percent, and \( WACC = 7.0\% \).

RETURN TO THE SAMPLE QUESTIONS