

WACC

The Weighted Average Cost of Capital

Don't Be Afraid of the WACC!

Average

You know how to do this. If you had 10 apples, 7 oranges, and 4 bananas, you'd have 21 pieces of fruit (10 + 7 + 4 = 21), but you'd have an *average* of 7 of each kind (21 / 3 = 7)

Cost of Capital

You've also learned how to figure out the cost of Common Stock, Preferred Stock, and Bonds. This is called the I/Y, required rate of return, discount rate, annual growth, yield to maturity, interest rate, etc.

Average Cost of Capital

If the cost of Common was 9%, cost of Preferred was 6%,

and cost of Bonds was 3%, could you average them and say "My average cost of capital is 6%"? (.09+.06+.03) / 3 = .06 Yes, but *only* if you had the *same* amount of capital in each (like \$10m in Common, \$10m in Preferred, and \$10m in Bonds).

Weighted Average Cost of Capital

The weighting comes in because your firm has *different* amounts of Common Stock, Preferred Stock, and Bonds. Think about it: If you had \$25m in Common, \$3m in Preferred, and \$2m in Bonds, could you still say your average cost was 6%? No, because the vast majority of that capital cost you 9%! WACC factors this in through weighting.

The Formula

$$WACC = \left(\frac{C}{V} \times k_{cs} \right) + \left(\frac{P}{V} \times k_{ps} \right) + \left(\frac{D}{V} \times k_d \times (1 - T) \right)$$

C

How much capital is in Common Stock. The problems will often call it common equity. It's equity because the stockholder has paid money to be a part owner of the company.

P

How much capital is in Preferred Stock. Also called preferred equity.

D

How much capital is in Bonds. The problems will often call it debt (hence the D), because a bond is a \$1,000 loan that the firm is taking out. (The investor lends the firm money, gets interest payments in the form of coupons, and gets the thousand-dollar principle back at the end.)

V

How much total capital there is. This number is found by simply adding up C + V + D.

Kcs

Cost of Common Stock, often called the Required Rate of Return. Depending on the problem, this might be found using the Build-up Method, CAPM (Capital Asset Pricing Model), or the most commonly-used for these problems: the Gordon Growth Rate.

Kps

Cost of Preferred Stock. Easily found by Dividend/Value.

Kd

Cost of Debt. This is just the I/Y of the bond.

T

Marginal Tax Rate. The rate that the firm is taxed with. It's taken out here because the government doesn't tax money paid in interest, so the weighting of the bond part of the formula gets a lot lighter.

A Very Involved Sample Problem

A firm's capital is based on \$26m in common equity, \$35m preferred stock, and \$13m in debt. The debt is a 15-year \$1,000 face-value bond priced at 92% of par, and pay 8% coupons quarterly. Flotation costs are 4%. The firm's preferred stock pays a \$4 dividend, and sells for \$38.61. Flotation cost of this stock is \$3.92. The firm also recently paid a dividend to common stock owners of \$3.75. Dividends are expected to increase 4% per year. The stocks are currently trading at \$37.42. Flotation cost of this stock is \$4.05. If the firm's marginal tax rate is 41%, what is their Weighted Average Cost of Capital?

$$C = \$26m \quad P = \$35m \quad D = \$13m$$

$$V = \$74m$$

For the value of the firm, just add up all the capital: C + P + D.

$$Kd = 9.51\%, \text{ or } .0951$$

It's a bond problem, so just solve for I/Y. Make sure you account for the fact that it's quarterly, and that there is a flotation cost. Flotation is given as a percentage, so make sure you are computing it from the Face Value.

$$N = 15 \times 4 = 60$$

$$PV = 92\% \text{ of par} = \$920 \text{ minus flotation} = \$920 - \$40 = \$880$$

$$PMT = 8\% \text{ of } \$1000 = \$-80 \div 4 = \$-20$$

$$FV = \$-1000$$

$$I/Y = (\text{Solution}) \times 4 = Kd$$

$$Kps = 11.53\%, \text{ or } .1153$$

There is a flotation cost, so don't forget to subtract that from the value.

$$\text{Dividend} \div (V0 - \text{flotation}) = \$4 \div (\$38.61 - \$3.92) = \$4 \div \$34.69$$

$$Kcs = 15.69\%, \text{ or } .1569$$

"Recently paid" means you were given D0, so you'll have to increase it by the growth rate to get D1 (\$3.75 x 1.04). Also, don't forget to pull flotation out of the value (\$37.42 - \$4.05).

$$Kcs = (D1 \div V0) + g = (\$3.90 \div \$33.37) + 4\% = 11.69\% + 4\% = 15.69\%$$

$$T = 41\%, \text{ or } .41$$

$$\left(\frac{C}{V} \times k_{cs} \right) + \left(\frac{P}{V} \times k_{ps} \right) + \left(\frac{D}{V} \times k_d \times (1 - T) \right)$$

$$\left(\frac{\$26m}{\$74m} \times .1569 \right) + \left(\frac{\$35m}{\$74m} \times .1153 \right) + \left(\frac{\$13m}{\$74m} \times .0951 \times (1 - .41) \right)$$

$$\left(.3514 \times .1569 \right) + \left(.473 \times .1153 \right) + \left(.1757 \times .0951 \times .59 \right)$$

$$5.513\% + 5.454\% + .986\%$$

$$WACC = 11.95\%$$