

Cost of capital, capital budgeting and financial planning

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Instructions: HW Assignments will be uploaded to Kean Blackboard and must be accessed from there. You must work in groups that were assigned (or independently if not assigned to groups) on homework assignments. Points are noted against each question. You are required to submit Home Work assignments electronically on Kean Blackboard using MS-Office or other text editors. You are required to complete your assignments as per the due date indicated by the Professor.

Total Points in Assignment: 100 (Points scored will be scaled down to a maximum of 15 towards the final grade)

Assignment:

Part I: Cost of Capital

During the last few years, Harry Davis Industries has been too constrained by the high cost of capital to make many capital investments. Recently, though, capital costs have been declining, and the company has decided to look seriously at a major expansion program that has been proposed by the marketing department. Assume that you are an assistant to Leigh Jones, the financial vice-president. Your first task is to estimate Harry Davis's cost of capital.

Jones has provided you with the following data, which she believes may be relevant to your task:

- a) The firm's tax rate is 40%.
- b) The current price of Harry Davis's 12% coupon, semiannual payment, noncallable bonds with 15 years remaining to maturity is \$1,153.72. Harry

Davis does not use short-term interest-bearing debt on a permanent basis. New bonds would be privately placed with no flotation cost.

c) The current price of the firm's 10%, \$100 par value, quarterly dividend, perpetual preferred stock is \$116.95. Harry Davis would incur flotation costs equal to 5% of the proceeds on a new issue.

d) Harry Davis's common stock is currently selling at \$50 per share. Its last dividend (D_0) was \$3.12, and dividends are expected to grow at a constant rate of 5.8% in the foreseeable future. Harry Davis's beta is 1.2; the yield on T-bonds is 5.6%; and the market risk premium is estimated to be 6%. For the over-own-bond-yield-plus-judgmental-risk-premium approach, the firm uses a 3.2% judgmental risk premium.

e) Harry Davis's target capital structure is 30% long-term debt, 10% preferred stock, and 60% common equity. To help you structure the task, Leigh Jones has asked you to answer the following questions.

1. What sources of capital should be included when you estimate Harry Davis's weighted average cost of capital (WACC)? Should the component costs be figured on a before-tax or an after-tax basis? Should the costs be historical (embedded) costs or new (marginal) costs? (5 points)

Sources of capital to be included to estimate WACC are

* Long term debt - to be considered after-tax

* Preferred stock - to be considered before tax (preferred stock is not tax-deductible)

* Common equity - to be considered before tax When it comes to corporate financing, most firms incorporate tax effects in the cost of capital.

For this reason, component costs should be calculated on an after-tax basis. In financial management, the WACC is used primarily to make investment decisions and these decisions hinge on projects expected future returns versus the cost of new or marginal capital that will be used to finance these projects. Thus the relevant cost is its marginal cost of new debt to be raised during the planning period

2. What is the market interest rate on Harry Davis's debt, and what is the component cost of this debt for WACC purposes? (3 points)

Pre -Tax cost of Debt is the YTM in the case of a Bond.

The current price of Harry Davis's 12% coupon, semiannual payment, noncallable bonds with 15 years remaining to maturity is \$1,153.72.

We used the RATE function in Excel to calculate the YTM:

30	-1153.72	60	1000	
n	PV	pmt	FV	Rate (i)
				5%

= RATE(30, 60,-1153.72, 1000) = 5%

Since this is a semiannual rate, we multiplied by 2 to find the annual rate, which is the pre-tax cost of debt. $5\% \times 2 = 10\% = r_d$

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After tax component cost of debt = Interest Rate - Tax Savings = $r_d - r_d T$

We calculated that the r_d is 10%, and it is stated above that the tax rate is 40%. $r_d(1 - T) = 10. \%(1 - 0. 40) = 10. 0\%(0. 60) = 6. 0 = 6\%$ component cost of debt, which is the after-tax cost of debt.

3. What is the firm's cost of preferred stock? (3 points)

The current price of the firm's 10%, \$100 par value, quarterly dividend, perpetual preferred stock is \$116. 95. Harry Davis would incur flotation costs equal to 5% of the proceeds on a new issue. The cost of preferred stock is simply the preferred dividend divided by the price the company will receive if it issues new preferred stock. No tax adjustment is necessary, as preferred dividends are not tax-deductible.

Dps is the Preferred dividend = $0. 10(\$100) = \10

Pps is the preferred stock price = \$116. 95

F is the flotation cost as a percentage of proceeds = 5% $r_{ps} = Dps / Pps(1-F)$
 $= \$10 / 111. 10 = 0. 09 = 9\%$ cost of preferred stock

4. Would you expect Harry Davis's preferred stock to be riskier or less risky to investors than its debt? Compare the preferred stock yield to the yield to maturity on the debt and explain the risk/return trade-off between preferred stock and debt from an investor's point of view. (3 points)

Preferred stocks are riskier to investors than debt. Corporations own the most preferred stock because 70% of preferred dividends are non-taxable to corporations. Therefore, the preferred stock often has a lower before-tax yield than the before-tax yield on debt. But, the after-tax costs to the issuer

are higher on preferred stock than debt. This is consistent with the higher risks of preferred stock.

5. Harry Davis doesn't plan to issue new shares of common stock. Using the CAPM approach, what is Harry Davis's estimated cost of equity? (2 points)

Harry Davis's beta is 1.2; the yield on T-bonds is 5.6%, and the market risk premium is estimated to be 6%.

Risk-free rate: 5.6%

Market risk premium: 6%

Beta: 1.2
 $r_s = \text{Risk-free rate} + (\text{Market risk premium}) (\text{Beta})$
 $r_s = r_{RF} + (\text{RPM}) \beta$
 $r_s = .056 + (.06)(1.2) = 0.128 = 12.8\%$ estimated cost of equity using CAPM approach

6. What is the estimated cost of equity using the discounted cash flow (DCF) approach? (2 points)

Harry Davis's common stock is currently selling at \$50 per share. Its last dividend (D_0) was \$3.12, and dividends are expected to grow at a constant rate of 5.8% in the foreseeable future. $P_0 = \$50$ $D_0 = \$3.12$ $g = 5.8\%$
 $D_1 = \$3.30$
 $r_s = D_1/P_0 + g$
 $D_1 = D_0(1+g) = \$3.12(1+.058) = \3.30
 $r_s = (\$3.30/\$50) + 5.8\% = 6.6\% + 5.8\% = 12.4\%$ estimated cost of equity using DCF approach

7. Suppose the firm has historically earned 15% on equity (ROE) and retained 62% of earnings, and investors expect this situation to continue in the future. How could you use this information to estimate the future

dividend growth rate, and what growth rate would you get? Is this consistent with the 5.8% growth rate provided by Jones? (2 points)

Payout rate = 100% - 62% = 38% ROE = 15% Growth from earnings retention model:

$$g = (\text{Retention rate})(\text{ROE}) \quad g = (1 - \text{Payout rate})(\text{ROE}) \quad g = (1 - 0.38)(15\%) = 9.3\%$$

Using the Earnings Retention Model, the estimated future dividend growth rate is 9.3%, which is almost twice the growth rate provided by Jones, and hence inconsistent. Note that the earnings retention model assumes the retention and payout rate will remain constant, as will the ROE on new investments. Under these assumptions, the earnings growth and dividend growth rate will also be constant.

8. What is the cost of equity-based on the bond-yield-plus-judgmental-risk-premium method? (2 points)

For the over-own-bond-yield-plus-judgmental-risk-premium approach, the firm uses a 3.2% judgmental risk premium. We calculated earlier that the company's bond yield is 10%. $r_s = r_d + \text{Judgmental risk premium}$ $r_s = 10.0\% + 3.2\% = 13.2\%$ cost of equity-based on bond-yield-plus-judgmental-risk-premium method

9. What is your final estimate for the cost of equity, r_s ? (2 points)

CAPM $r_s = 12.8\%$ DCF $r_s = 12.4\%$ Bond-yield-plus-judgmental-risk-premium risk $r_s = 13.2\%$ Average $r_s = 12.8\%$ Final estimate for the cost of equity, $r_s = 12.8\%$

10. What is Harry Davis's weighted average cost of capital (WACC)? (2 points)

The firm's tax rate is 40%.

Harry Davis's target capital structure is 30% long-term debt, 10% preferred stock, and 60% common equity. We calculated earlier that the pre-tax cost of debt, r_d is 10%, the cost of preferred stock, r_{ps} is 9% and the cost of equity, r_s is 12.8%. $W_d = 30%$ $r_d = 10%$ $T = 40%$ $W_{ps} = 10%$ $r_{ps} = 9%$ $W_s = 60%$ $r_s = 12.8%$ $WACC = w_d r_d (1 - T) + w_{ps} r_{ps} + w_s r_s$ $WACC = 0.30(.10)(1 - 0.40) + 0.10(.09) + 0.60(.128) = .1038 = 10.38%$ weighted average cost of capital

11. What four common mistakes in estimating the WACC should Harry Davis avoid? (2 points)

Four common mistakes that are to be avoided are

1. Using current cost of debt (instead of the historical cost of debt)
2. Mixing current and historical measures to calculate MRP
3. Using book weights to estimate the weight for capital structure (instead of market weights)
4. Misidentifying the capital component sources

Part II: Capital Budgeting

You have just graduated from the MBA program at a large university, and one of your favorite courses was "Today's Entrepreneurs." In fact, you enjoyed it so much you have decided you want to "be your own boss."

While you were in the master's program, your grandfather died and left you \$1 million to do with as you please.

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You are not an inventor and you do not have a trade skill that you can market; however, you have decided that you would like to purchase at least one established franchise in the fast-foods area, maybe two (if profitable). The problem is that you have never been one to stay with any project for too long, so you figure that your time frame is three years. After three years you will sell off your investment and go on to something else. You have narrowed your selection down to two choices; (1) Franchise L, Lisa's Soups, Salads; Stuff and (2) Franchise S, Sam's Fabulous Fried Chicken.

The net cash flows shown below include the price you would receive for selling the franchise in Year 3 and the forecast of how each franchise will do over the three-year period. Franchise L's cash flows will start off slowly but will increase rather quickly as people become more health-conscious, while Franchise S's cash flows will start off high but will trail off as other chicken competitors enter the marketplace and as people become more health-conscious and avoid fried foods. Franchise L serves breakfast and lunch, while Franchise S serves only dinner, so it is possible for you to invest in both franchises.

You see these franchises as perfect complements to one another: You could attract both the lunch and dinner crowds and the health-conscious and not so health-conscious crowds without the franchises directly competing against one another. Here are the net cash flows (in thousands of dollars): Depreciation, salvage values, net working capital requirements, and tax effects are all included in these cash flows. You also have made subjective risk assessments of each franchise and concluded that both franchises have

risk characteristics that require a return of 10%. You must now determine whether one or both of the franchises should be accepted.

1. What is the difference between independent and mutually exclusive projects? (2 points) Independent projects are those projects whose cash flows are not affected by other projects. If Costco is considering opening a new store in Los Angeles and another one in New York, they would be independent. Mutually exclusive projects are two different methods of attaining the same result. If one is accepted the other would be rejected. If Costco were considering relocating its corporate headquarters to Los Angeles or New York, only one of the 2 locations will be selected thus rejecting the alternate location.

When projects are mutually exclusive, it means they do the same job or have the same purpose.

2. Define the term net present value (NPV). What is each franchise's NPV? (4 points) Net Present Value is defined as the present value of the project's cash inflows minus the present value of its costs. It tells us how the project contributes to shareholder wealth. The larger the NPV the more value the project adds and thus the higher the stock price.

$$NPV = CF_0 + CF_1 / (1+r)^1 + CF_2 / (1+r)^2 + CF_3 / (1+r)^3 \dots + CF_N / (1+r)^N \quad r = 10\%$$

$$\text{Franchise L } CF_{0L} = -100 \quad CF_{1L} = 10 \quad CF_{2L} = 60 \quad CF_{3L} = 80$$

$$NPV_L = CF_{0L} + CF_{1L} / (1+r)^1 + CF_{2L} / (1+r)^2 + CF_{3L} / (1+r)^3 = -100 + 10 / (1.10)^1 + 60 / (1.10)^2 + 80 / (1.10)^3 = -100 + 9.09 + 49.59 + 60.11 = \$18.79$$

Franchise S

$$CF_{0S} = -100$$

$$CF_{1S} = 70$$

$$CF_{2S} = 50$$

$$CF_{3S} = 20$$

$$NPV_S = CF_{0S} + CF_{1S}/(1+r)^1 + CF_{2S}/(1+r)^2 + CF_{3S}/(1+r)^3 = -100 + 70/(1+0.10)^1 + 50/(1.10)^2 + 20/(1.10)^3 = -100 + 63.64 + 41.32 + 15.03 = \$19.99$$

3. What is the rationale behind the NPV method? According to NPV, which franchise or franchises should be accepted if they are independent? Mutually exclusive? How would the NPVs change if the cost of capital changed? (4 points)

NPV is generally regarded as the best single screening criterion, primarily because it is directly related to the firm's central goal of maximizing the stock's intrinsic value. NPV tells us how the project contributes to shareholder wealth. The larger the NPV the more value the project adds and thus the higher the stock price. A negative NPV indicates sufficient cash is not being generated from the project to meet the cost associated with the project. Zero NPV indicates that cash generated is only sufficient to cover costs. Positive NPV on the other hand indicates that the inflow of cash is larger than the outflow.

NPV rules dictate that if projects are independent, both projects should be accepted as long as they have a positive NPV. In this case both Franchise S;

L have positive NPV's and should be accepted. If projects are mutually exclusive, then the project with the larger NPV should be selected. In this case, Franchise S has a higher NPV indicating that the returns from investing in Franchise S are larger and thus Franchise S should be selected.

4. Define the term internal rate of return (IRR). What is each franchise's IRR? (4 points)

IRR is the discount rate that forces the PV of the inflow of a project to equal the initial cost.

In other words, it forces the NPV to be zero. IRR is an estimate of the project's rate of return and it is comparable to the YTM on a bond.

$$\text{NPV} = \text{CF}_0 + \text{CF}_1 / (1 + \text{IRR})^1 + \text{CF}_2 / (1 + \text{IRR})^2 + \text{CF}_3 / (1 + \text{IRR})^3 \dots + \text{CF}_N / (1 + \text{IRR})^N = 0$$

Using Excel function IRR

Expected net cash flows	-	-
Year (t)	Franchise L	Franchise S
0	(\$100)	(\$100)
1	10	70
2	60	50

3	80	20
IRR	18.13%	23.56%

IRRL = 18.13%

IRRS = 23.56%

5. What is the logic behind the IRR method? According to IRR, which franchises should be accepted if they are independent? Mutually exclusive? How would the IRRs change if the cost of capital changed? (4 points)

IRR is an estimate of a project's rate of return. If the return exceeds the cost of funds used to finance the project, then the difference is a bonus that goes to the firm's stockholders and causes the stock price to rise. So if the WACC/hurdle rate(r) is less than the estimated return IRR, it indicates the project will be profitable. As in NPV where zero is the threshold above which the project is considered profitable, r is the threshold above which IRR is considered profitable. In the condition where Franchise S and L are independent, both franchises have positive IRR's and thus both franchises should be accepted.

However, when both franchises are mutually exclusive, the franchise with the larger IRR has to be selected, which in this case Franchise S.

6. Construct NPV profiles for Franchises L and S. At what discount rate do the profiles cross? From the NPV profile which franchise or franchises should be accepted if they are independent? Mutually exclusive? Explain. (6 points)

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NPV Profile for Franchise S; L

Cost of Capital = 10%

Year =	0	1	2	3
Project S	-100.00	70	50	20
Project L	-100.00	10	60	80
-	-	-	-	-
-	-	r	NPVS	NPVL
-	-	0%	\$40.00	\$50.00
-	-	5%	\$29.29	\$33.05
-	-	8.68%	\$22.32	\$22.32
-	-	10%	\$19.98	\$18.78

-	-	15%	\$11.83	\$6.67
-	-	18.126%	\$7.23	\$0.00
-	-	20%	\$4.63	-\$3.70
-	-	23.564%	\$0.00	-\$10.20

On this plot, the X-Axis is the cost of capital and the Y-axis is the NPV. IRR is the discount rate at which the profile line crosses the X-axis. Profiles crossover at an 8.68% cost of capital. Based on the plot, the NPV for both Franchise S and Franchise L have NPV's above the cost of capital indicating cash inflow is larger than the costs and thus both projects should be selected if they are independent of each other.

On the other hand, if the projects are mutually exclusive, the project with the larger x-intercept (higher IRR), which is Franchise S, should be accepted.

7. What is the underlying cause of ranking conflicts between NPV and IRR? (3 points)

Ranking conflicts occur when the cost of capital is higher than the crossover rate which causes NPV and IRR to point in different directions. The two basic conditions that cause these conflicts are * Timing difference: When one

project receives the majority of the cash early while the other receives it later.

This is the reason for conflict between Franchise S; Franchise L * Project size (scale) difference: Significant difference in invested amount can cause a conflict. When either timing or size differences occur, the firm will have different amounts of funds to invest in other projects depending on which of the two mutually exclusive projects it chooses. Given this situation, the rate of return at which differential cash flows can be reinvested is a critical issue. Therefore, whenever conflict exists between mutually exclusive projects, NPV method is better to use.

8. What is the “reinvestment rate assumption,” and how does it affect the NPV versus IRR conflict? (3 points)

NPV calculation is based on the assumption that cash inflows can be reinvested at the project's risk-adjusted WACC, whereas the IRR calculation is based on the assumption that cash inflows can be reinvested at the IRR itself. Since NPV assumes reinvestment at cost of capital which is more realistic and is typically lower than the IRR (cash flows generally cannot be reinvested at their IRR), so NPV is the more reasonable method. NPV should be used to choose between mutually exclusive projects.

9. Define the term modified IRR (MIRR). Find the MIRRs for Franchises L and S. (4 points)

IRR overstates the expected rate of return for accepted projects because cash flows cannot be reinvested at the IRR. The modified IRR (MIRR) rectifies this problem by assuming reinvestment at the WACC or any other

reasonable rate. Using excel function MIRR, we calculated the MIRR for Franchise L and S.

WACC	10%	-	-	-
year	1	1	2	3
Franchise L	(\$100)	10	60	80
Franchise S	(\$100)	70	50	20
-	-	-	-	-
MIRRL	16.50%	-	-	-
MIRRS	16.89%	-	-	-

10. What are the MIRR's advantages and disadvantages vis-a-vis the regular IRR? What are the MIRR's advantages and disadvantages vis-a-vis the NPV? (4 points)

MIRR has two significant advantages over IRR. First, MIRR assumes reinvestments at cost of capital rather than an investment at IRR which is generally not correct. Thus, MIRR is usually a better indicator of profitability.

In addition, the MIRR eliminates the multiple IRR problem because there can never be more than one MIRR, and it can be compared with the cost of capital when deciding on accepting or rejecting projects.

MIRR does not always lead to the same decision as NPV in the case of mutually exclusive projects where the difference in size and timing can give rise to conflicts. In these considerations, NPV is a better indicator as it selects the project that maximizes value. However, MIRR is superior to the regular IRR as an indicator of a project's "true" rate of return.

Part III: Forecasting Financial Statements

Matthews Industries' most recent financial statements are available in the attached Excel worksheet and also in the partial model file, Ch12 P11 Build a Model. xls from the textbook's web site.

Matthews Industries' financial planners must forecast the company's financial results for the coming year. The forecast will be based on the forecasted financial statements method, and any additional funds needed will be obtained by using notes payable. Complete the partial model and answer the following questions.

1. Assume that the firm's 2010 profit margin, payout ratio, capital intensity ratio, and spontaneous liabilities to sales ratio remain constant. If sales grow by 10% in 2011, what is the required external capital the firm will need in 2011 as calculated by the AFN equation? (10 points)

AFNMatthe	Add'l		Add'n
ws =	Req'd	- Spontaneo	- to RE
	Asset	us	

	s	liabilities	
			S1 ×
	(A0*/		
=	S0)Δ -	(L0*/S0)Δ	M ×
	S	S	(1-
			POR)
			S1 ×
	(A0*/		
=	S0) -	(L0*/S0)	M ×
	(gS0)	(gS0)	(1-
			POR)
=	\$660 -	\$74. 70 -	\$257.
			73

AFNMatthe \$327. millio

ws = 27 n

The required external capital for 2011 as calculated by AFN is 327. 27 Million.

2. If 2010 ratios remain constant, what is Matthews' self-supporting growth rate?

How will the self-supporting growth rate change if each of the following changes occur:

(1) the profit margin declines,

(2) the payout ratio increases, or

(3) the capital intensity ratio declines? (10 points)

Self-supporting $g = (PM(1 - POR)(S_0)) / (A_0^* - L_0^* - PM(1 - POR)S_0) = \$234.30 / \$5,615.70 = 4.17\%$

Mathew's self-supporting growth is calculated to be 4.17%. Effect on Self-Supporting growth when all ratios are kept constant except one ratio is changed as follows 1) When the profit margin declines, the self-supporting growth percentage drops.

Assuming that everything else is constant and M falls to 2.55%, self-supporting growth g would fall to 2.96% 2) When Payout-ratio increases, self-supporting growth percentage drops. Assuming that everything else is constant and POR increases to 55%, self-supporting growth g would fall to 3.39% 3) When capital intensity ratio (A_0^*/S_0) declines, it does not change the self-supporting growth

3. Matthews' management has reviewed its financial statements and arrived at two possible scenarios for 2011.

The first scenario assumes a steady-state while the second scenario, the target scenario, shows some improvement in ratios toward industry-average values. Forecasted values for the scenarios are shown in the partially completed file Ch12 P11 Build a Model. xls. If Matthews assumes that external financing is achieved through notes payable and financing feedbacks are not considered because the new notes payable are added at

the end of the year, what are the firm's forecasted AFN, EPS, DPS, and year-end stock price under each scenario? (14 points)

Using the file Chapter 12P11 Build a Model. Is, forecasted values for scenarios are as follows:

Forecasted Values	Steady State	Target State
AFN	\$324. 40 Million	-332. 50 Million
EPS	\$3. 16	\$5. 66
DPS	\$1. 42	\$2. 41
Year-end Stock Price	\$25. 27	\$70. 79

See excel file submitted separately for detailed calculations on Part III.

Scoring Sheet:

Question #	Max Points	Points scored
Part I	-	-
1	5	-

2	3	-
3	3	-
4	3	-
5	2	-
6	2	-
7	2	-
8	2	-
9	2	-
10	2	-
11	2	-
Part II	-	-
1	2	-
2	4	-

3	4	-
4	4	-
5	4	-
6	6	-
7	3	-
8	3	-
9	4	-
10	4	-
Part III	-	-
1	10	-
2	10	-
3	14	-
TOTAL	100	-
-	-	-

Points towards final grade	15	-
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