

Birla Institute of Technology & Science, Pilani
FIN F 315 / ECON F 315 Financial Management

Comprehensive Exam - Make-up (Open Book) - 24 Jul 2018 Weight-age 45% (135 marks)
Time 180 Min.

Note: Make your own (reasonable) assumptions, if required, to solve any question.

1. Beginning from one-person (Robinson Crusoe) economy, apply concepts of production opportunity set (ppf), indifference curves, marginal rate of substitution, marginal rate of transformation, and interest rates to demonstrate that individual or firm is better off when many individuals exist and perfect capital markets exist. Use the graph to suggest whether, in absence of capital markets, the firm's dividend policy is affected by this conflict and that in presence of perfect capital markets individual time preferences will not dominate managerial actions.

Hint - Attempt in stages – first decide between two alternatives facing an individual, i.e. Consumption versus Investment, on X-Y plane with no production opportunities, then, introduce production opportunities and demonstrate the change in graph, then, introduce one more individual and graph his/her time preference with regards to consumption versus investment in productive opportunities. As a manager do you spot a conflict? Now reconcile this conflict by introducing lending and borrowing opportunities (i.e. capital markets).

Explain what challenges do managers face in real life while making such decisions and suggest what actions in real life managers can take to satisfy investors. **(15+5)**

2. A firm is considering undertaking new project related to its core business, which will result in annual saving of Rs 50,000,000 in the first year. These savings will grow at rate of 7% per year forever. The firm's debt equity ratio is 0.5, cost of equity is 26%, and cost of debt is 10%. Firm is in 40% tax bracket. How much should the firm spend on this project so that it remains acceptable? **(10)**

3. Manager of the manufacturing unit comes up with pro-forma figures about sales, costs and other investment requirements for Project P. The relevant information about the project cost and cash flows appear in the table below.

Market share of the firm = 40%; Market Size = 10 mn units; Market size will grow @ 10% per year	Average annual fixed cost in first year = Rs 4.5. Fixed cost includes depreciation on machinery, rent and insurance and amortization of R&D.
WACC on new projects = 30%	Variable cost excluding operating cost = 75% of sale price
Annual rent expense = Rs 2,000,000	Annual insurance premium = Rs 3,000,000
Depreciation on fixed cost investment – straight-line method (3 years). R&D expenditure made by the firm at the beginning of project life is Rs 30,000,000 and to be completely amortized equally by end of project life.	Operating expenses excluding fixed expenses – Rs 75,000,000
Investment in accounts receivable – Rs 750,000	Investment in inventories – Rs 1,000,000
Annual sales = Rs 400,000,000	Annual interest expense on financing raised for the project – Rs 100,000 (@10% p.a.)
Corporate Income Tax Rate – 40%	
Treat investment in current asset as one time investment made at the time of undertaking the project and recoverable totally at the end of the project life.	
Market value of the machinery at the end of the project – Rs 100,000	To undertake the project the firm scrapped existing machinery worth with a book value of Rs 1,000,000 for Rs 750,000

Answer the following questions:

- a. What minimum number of units must the firm sell in order to break-even?
- b. Decide whether the firm must undertake the project using NPV rule.
- c. What is the maximum acceptable cost of capital that the firm can tolerate?
- d. What is the present value of tax shield provided by the loan?

(20)

4. What challenges does management face while choosing mutually exclusive projects? Graphically demonstrate why IRR is not suitable criteria for selecting mutually exclusive projects. Why this problem does not arise while dealing with independent projects? (7)

5. Weston Clothing Company is considering manufacturing a new style of shirt, whose data are shown below. The equipment to be used would be depreciated by the straight-line method over its 3-year life and would have a zero salvage value, and no new working capital would be required. Revenues and other operating costs are expected to be constant over the project's 3-year life. However, this project would compete with other Weston's products and would reduce their pre-tax annual cash flows. What is the project's NPV? (Hint: Cash flows are constant in Years 1-3.) (10)

WACC	10.0%
Pre-tax cash flow reduction for other products (cannibalization)	\$5,000
Investment cost (depreciable basis)	\$80,000
Straight-line deprec. rate	33.333%
Sales revenues, each year for 3 years	\$67,500
Annual operating costs (excl. deprec.)	\$25,000
Tax rate	35.0%

6. The following information has been presented to you about the Gibson Corporation.

Total assets	\$3,000 million	Tax rate	40%
Operating income (EBIT)	\$800 million	Debt ratio	0%
Interest expense	\$0 million	WACC	10%
Net income	\$480 million		
Share price	\$32.00	EPS	\$3.20

The company has no growth opportunities ($g = 0$), so the company pays out all of its earnings as dividends ($EPS = DPS$). The consultant believes that if the company moves to a capital structure financed with 20% debt and 80% equity (based on market values) that the cost of equity will increase to 11% and that the pre-tax cost of debt will be 10%. If the company makes this change, what would be the total market value (in millions) of the firm? (7)

7. A project with an up-front cost at $t = 0$ of \$1500 is being considered by Nationwide Pharmaceutical Corporation (NPC). (All dollars in this problem are in thousands.) The project's subsequent cash flows are critically dependent on whether a competitor's product is approved by the Food and Drug Administration. If the FDA rejects the competitive product, NPC's product will have high sales and cash flows, but if the competitive product is approved, that will negatively impact NPC. There is a 75% chance that the competitive product will be rejected, in which case NPC's expected cash flows will be \$500 at the end of each of the next seven years ($t = 1$ to 7). There is a 25% chance that the competitor's product will be approved, in which case the expected cash flows will be only \$25 at the end of each of the next seven years ($t = 1$ to 7). NPC will know for sure one year from today whether the competitor's product has been approved.

NPC is considering whether to make the investment today or to wait a year to find out about the FDA's decision. If it waits a year, the project's up-front cost at $t = 1$ will remain at \$1,500, the subsequent cash flows will remain at \$500 per year if the competitor's product is rejected and \$25 per year if the alternative product is approved. However, if NPC decides to wait, the subsequent cash flows will be received only for six years ($t = 2 \dots 7$).

Assuming that all cash flows are discounted at 10%, if NPC chooses to wait a year before proceeding, how much will this increase or decrease the project's expected NPV in today's dollars (i.e., at $t = 0$), relative to the NPV if it proceeds today? (14)

8. Drilling Experts, Inc. (DEI) finds and develops oil properties and then sells the successful ones to major oil refining companies. DEI is now considering a new potential field, and its geologists have developed the following data, in thousands of dollars.

- t = 0. \$400 will be invested for the feasibility study at t = 0. The results of this study would determine if the company should commence drilling operations or make no further investment and abandon the project.
- t = 1. If the feasibility study indicates good potential, the firm would spend \$1,000 at t = 1 to drill exploratory wells. The best estimate is that there is an 80% probability that the exploratory wells would indicate good potential and thus that further work would be done, and a 20% probability that the outlook would look bad and the project would be abandoned.
- t = 2. If the exploratory wells test positive, DEI would go ahead and spend \$10,000 to obtain an accurate estimate of the amount of oil in the field at t = 2. The best estimate now is that there is a 60% probability that the results would be very good and a 40% probability that results would be poor and the field would be abandoned.
- t = 3. If the full drilling program is carried out, there is a 50% probability of finding a lot of oil and receiving a \$25,000 cash inflow at t = 3, and a 50% probability of finding less oil and then only receiving a \$10,000 inflow.

Since the project is considered to be quite risky, a 20% cost of capital is used. What is the project's expected NPV, in thousands of dollars? Draw the decision tree for illustrating your approach. (18)

9. Calculate the Weighted Average Cost of Capital for new firm ABC Ltd. The company is in 30% tax bracket and the target capital structure post fund raising is 60% equity, 30% debt and 10 % preferred stock. The firm will incur 2% flat floatation cost for each of its capital component. (15)

- a. **Equity** - Firm ABC Ltd. maintains a uniform dividend policy of 40% out of its earnings and it is expected to continue for the foreseeable future. The most recent EPS of the firm is Rs 6.5 and five years ago it was Rs 4.42. The stock is currently trading at Rs 36. Since the firm is new the retained earnings is zero.
- b. **Preferred stock** – The firm will raise Rs 1,000,000 by issuing 10,000 at the rate of 12% dividends and the redemption of preferred stock will be at the end of 5 years.
- c. **Debt** – Debt funding will be done through an issue of 8.5% debentures for 5 years. Similar bonds issued by other firms are trading at current YTM higher than the coupon rate of 8.5%, hence, the firm is forced to issue debentures at 10% discount to its face value. The firm is issuing 40,000 units of debentures.

10. Use below details to answer the questions that follow:

Total funds available for investment Rs 1,000,000. Assume 0% idle cash in the portfolio. The portfolio consists of at most 2 assets i.e. asset A and asset B.

Correlation coefficient of Asset A and B is 0.45

Standard deviation Asset A – 15%

Standard deviation Asset B – 17%

Standard deviation of Market – 13%

Expected return on Asset A – 18%

Expected return on Asset B – 22%

Correlation between Asset A and Market – 0.75

Correlation between Asset B and Market – 0.93

Expected return on Market – 13%

A market portfolio is defined as the one containing all the stocks in proportion to their share in total market capitalization.

- a. Create minimum-variance portfolio containing Asset A and Asset B and calculate its expected return and its variance.
- b. As an equity analyst would you advise your client to invest in asset A? Justify mathematically.

(14)