FM 2555A
Chapter 4 *Practice Exercises*

Problems below, unless indicated otherwise, were taken from Brealey, R. (2017), Principles of Corporate Finance, 12th edition, McGraw-Hill Education, New York.
N.B.: ***You will learn and benefit more if you attempt solving them first before looking at their solutions.***

NOTE: Problem number format: [x/y], where x is the number of the problem and y is the page number in the 12th ed of the Brealey et al. textbook.

Problem [5/99]
Dividend discount model. Company Z's earnings and dividends per share are expected to grow indefinitely by 5% a year. If the next year's dividend is $10 and the market capitalisation rate is 8%, what is the current stock price?

Problem [6/100]
Company Z-prime is like Z in all respects save one: Its growth will stop after 4 years. In year 5 and afterward, it will pay out all earnings as dividends. What is Z-prime's stock price? Assume next year's EPS is $15.

Problem [7/100]
If company Z (see Problem 5) were to distribute all its earnings, it could maintain a level dividend stream of $15 a share. How much is the market actually paying per share for growth opportunities?

Problem [8/100]
Dividend discount model. Consider three investors:

a. Mr Single invests for one year.
b. Ms Double invests for two years.
c. Mrs Triple invest for three years.

Assume each invests in company Z (see Problem 5). Show that each expects to earn a rate of return of 8% per year.

Problem [9/100]

True or False: Explain.

a. The value of a share equals the discounted stream of future earnings per share.
b. The value of a share equals the PV of earnings per share assuming the firm does not grow plus the NPV of future growth opportunities.

Problem [10/100]

Free cash flow: Under what conditions does *r*, a stock's market capitalization rate, equal its earnings-price ratio EPS/P_0?

Problem [13/100]

Horizon value: Suppose the horizon date is set at a time when the firm will run out of positive-NPV investment opportunities. How would you calculate the horizon value? (*Hint*: What is the *P*/*EPS* ratio when PVGO = 0?)

Problem [18/102]

Dividend discount model: Conside the following three stocks:

a. Stock A is expected to provide a dividend of $10 a share forever.
b. Stock B is expected to pay dividend of $5 next year. Thereafter, dividend growth is expected to be 4% a year forever.
c. Stock C is expected to pay a dividend of $5 next year. Thereafter, dividend growth is expected to be 20% a year for five years (i.e., years 2 through 6) and zero thereafter.

If the market capitalisation rate for each stock is 10%, which stock is the most valuable? What if the capitalisation rate is 7%?

Problem [20/101]

Two-stage DCF model: Company Q's current return on equity (ROE) is 14%. It pays out one-half of earnings as cash dividends (payout ratio = 0.5). Current book value per share is $50. Book value per share will grow as Q reinvests earnings.

Assume that the ROE and payout ratio stay constant for the next four years. After that, competition forces ROE down to 11.5% and the payout ratio increases to 0.8. The cost of capital is 11.5%

a. What are Q's EPS and dividends next year? How will EPS and dividends grow in years 2, 3, 4, 5, and subsequent years?
b. What is Q's stock worth per share? How does that value depend on the payout ratio and growth rate after year 4?

Problem [23/101]

DCF model and PVGO: Financial forecasts for Growth-Tech are given below:

Year	1	2	3	4
Book equity	10.00	12.00	14.40	15.55
Earnings per share (EPS)	2.50	3.00	2.30	2.48
Return on Equity (ROE)	0.25	0.25	0.16	0.16
Payout ratio	0.20	0.20	0.50	0.50
Dividends per share (DIV)	0.50	0.60	1.15	1.24
Growth rate of dividends (%)	---	20	92	8

a. Calculate the value of Growth-Tech stock.
b. What part of that value reflects the discounted value of P_3, the price forecasted for year 3?
c. What part of P_3 reflects the present value of growth opportunities (PVGO) after year 3?
d. Suppose that competition will catch up with Growth-Tech by year 4, so that it can earn only its cost of capital on any investments made in year 4 or subsequently. What is Growth-Tech stock worth now under this assumption? (Make additional assumptions if necessary.)

Problem [27/102]

Valuing free cash flow: Mexican Motors' market cap is 200 billion pesos. Next year's free cash flow is 8.5 billion pesos. Security analysts are forecasting that free cash flow will grow by 7.5% per year for the next five years.

a. Assume that the 7.5% growth rate is expected to continue forever. What rate of return are investors expecting?
b. Mexican Motors has generally earned about 12% on book equity (ROE=12%) and reinvested 50% of earnings. The remaining 50% of earnings has gone to free cash flow. Suppose the company maintains the same ROE and investment rate for the long run. What is the implication for the growth rate of earnings and free cash flow? For the cost of equity?

Problem [28/102]

Valuing free cash flow: Phoenix Corp. faltered in the recent recession but is recovering. Free cash flow has grown rapidly. Forecasts made in 2016 are as follows.

$ (millions)	2017	2018	2019	2020	2021
Net income	1.0	2.0	3.2	3.7	4.0
Investment	1.0	1.0	1.2	1.4	1.4
Free cash flow	0.0	1.0	2.0	2.3	2.6

Phoenix's recovery will be complete by 2021, and there will be no further growth in free cash flow.

a. Calculate the PV of free cash flow, assuming a cost of equity of 9%.
b. Assume that Phoenix has 12 million shares outstanding. What is the price per share?

c. If the 2016 net income is $1 million, what is Phoenix's P/E ratio? How do you expect that P/E ratio to change from 2017 to 2021?
d. Confirm that the expected rate of return on Phoenix stock is exactly 9% in each of the years 2017 to 2021.