DISCUSSION CLASS FOR FINANCIAL MANAGEMENT MNF2023

PRESENTED BY

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UNISA | college of economic and management sciences

OVERVIEW

OUTLINE OF PRESENTATION

Part 1 focuses on important generic information.

Part 2 focuses on the subject matter.

Part 3 focuses on assessment matters.

PART 1

IMPORTANT GENERIC INFORMATION

ACADEMIC SUPPORT

LECTURERS

Mr A. B. Sibindi (Head of Module)

Ms P.L.R. Makoni (Lecturer)

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MODULE EMAIL

Channel all your electronic enquiries via the email address: Fin2601-12-S1@unisa.ac.za

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IMPORTANT TOOLS (ACTIVE)

1. **Discussion forum** (general to focused subject matter related discussions with your fellow students and lecturers : you are strongly encouraged to use this for **assignments and exam revision** purposes)
2. **Announcements** (Your lecturers communicate important information using this tool)
3. **Additional resources** (Any additional information that your lecturers might deem necessary to supplement your resources, including **practice questions**)
4. **Schedule**: calendar showing all important dates related to the module

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IMPORTANT TOOLS (ACTIVE) cont'd

5. **Myfinancelab** (You are able to access registration information to enrol for MyFinancelab [website for additional reading and self assessments])
6. **HB10bII Tutorial** (A visual tutorial on how to perform basic time value of money operations, to help you get started)
7. **Blog** (General communication amongst yourselves and your lecturers e.g. Online study groups share your experiences here, post your questions)
8. **Podcasts** (Several podcasts on TvM have been uploaded)
9. **Course Contact:** Direct all your communication with your lecturers using this tool.

\# **You are strongly encouraged to make use of all of the above online resources**.

Tutorial Classes

We are not directly involved in the running of tutorial classes. Liaise with your regional centres on the same.

PART 2

SUBJECT MATTER

chapter 1

the role and environment of managerial finance

Learning Outcomes

- Define finance
- Describe the primary activities of the financial manager
- Explain the goal of the firm
- Explain the agency issue and how it can be mitigated
- Identify key financial markets and securities

What is Finance?

- **Finance** is the science and art of managing money.
- **Personal finance** is concerned with individuals' decisions about how much of their earnings they spend, how much they save, and how they invest their savings.
- In a **business context**, finance involves the same types of decisions: how firms raise money from investors, how firms invest money in an attempt to earn a profit, and how they decide whether to reinvest profits in the business or distribute them back to investors.

Finance

- Finance is thus concerned with the process, institutions, markets, and instruments involved in the transfer of money among individuals, businesses, and governments.
- **Managerial finance** is concerned with the duties of the financial manager in the business firm.
- The **financial manager** actively manages the financial affairs of any type of business, whether private or public, large or small, profit-seeking or not-for-profit.

Role of Financial Manager

- ***Financial analysis and planning***: using accounting data to project future needs
- ***Making investment decisions***: determining best mix of assets and efficiency levels
- ***Making financial decisions***: determining and maintaining proper mix of assets to liabilities

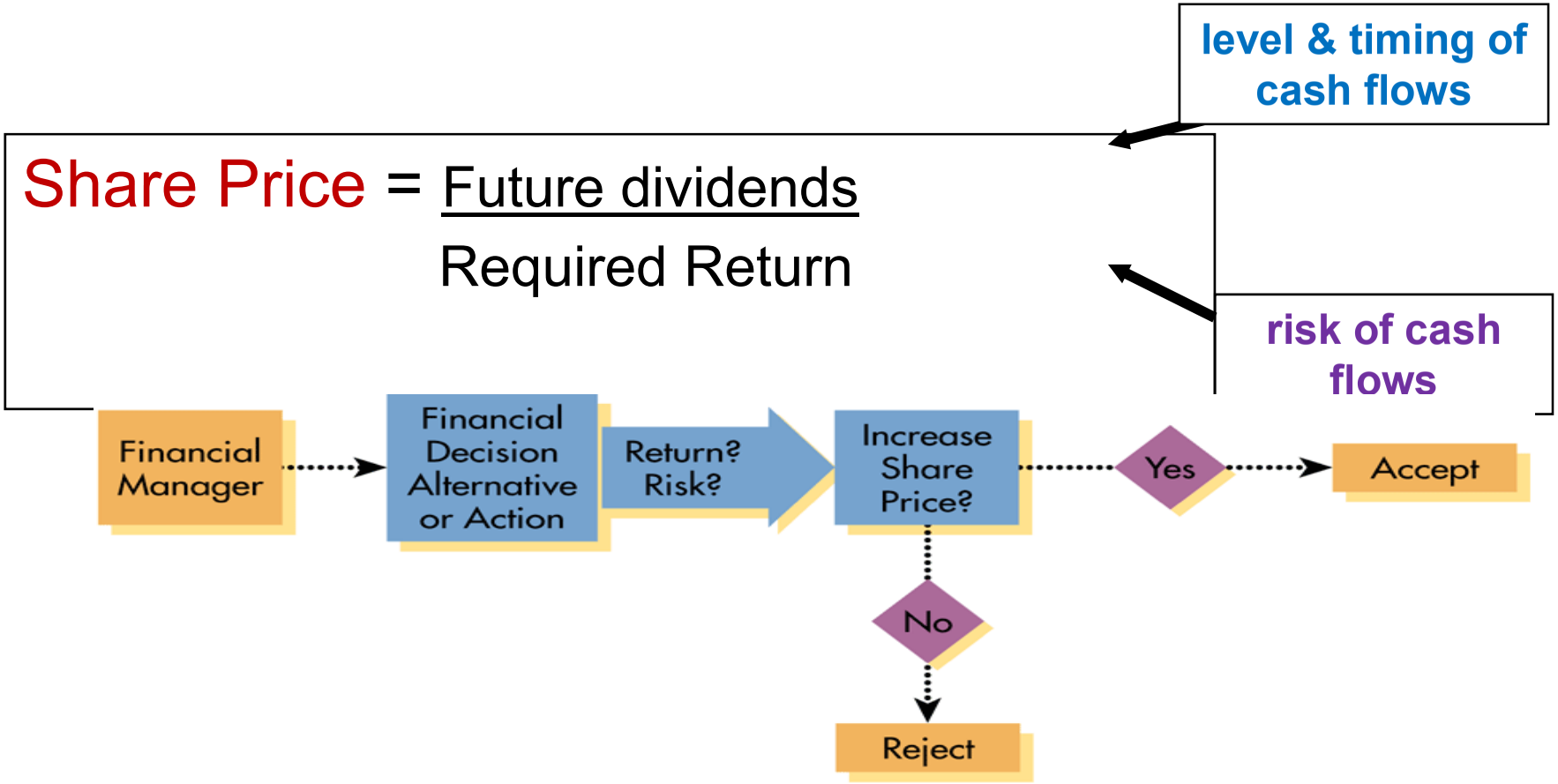
Goal of the Firm

Profit maximisation vs. Wealth maximisation

- **Profit maximisation** fails to account for differences in the level of cash flows (as opposed to profits), the timing of these cash flows, and the risk of these cash flows.
- **Maximising shareholder wealth** properly considers cash flows, the timing of these cash flows, and the risk of these cash flows.
- This can be illustrated using the following simple stock valuation equation:

Goal of the firm…

Wealth Maximisation objective:



Decision rule for managers: only take actions that are expected to increase the share price.

The role of business ethics

- **Business ethics** are the standards of conduct or moral judgment that apply to persons engaged in commerce.
- Violations of these standards in finance involve:
  - "creative accounting," earnings management, misleading financial forecasts, insider trading, fraud, excessive executive compensation, options backdating, bribery, and kickbacks.
- Negative publicity often leads to negative impacts on a firm, esp the value

Ethics and Share Price

- Ethics programmes seek to:
  - reduce litigation and judgment costs
  - maintain a positive corporate image
  - build shareholder confidence
  - gain the loyalty and respect of all stakeholders

- The expected result of such programmes is to positively affect the firm's ***share price***.

The Agency Issue: The Agency Problem

- A **principal-agent relationship** is an arrangement in which an agent acts on the behalf of a principal, e.g. shareholders of a company (principals) elect management (agents) to act on their behalf.
- Whenever a manager owns less than 100% of the firm's equity, a potential **agency problem** exists.
- In theory, managers would agree with shareholder wealth maximization; however, managers are also concerned with their personal wealth, job security, fringe benefits, and lifestyle.
- This causes managers to act in ways that do not always benefit the firms' shareholders

The Agency Issue: Resolving the Problem

- **Agency Costs** are those borne by shareholders to maintain a corporate governance structure that minimizes agency problems and contributes to wealth maximisation.
- Examples would include bonding or monitoring management behaviour, and structuring management compensation to make shareholders interests their own by introducing stock options and performance plans

Financial markets and securities

- Key financial **mkts**:
  - Money mkt: used for raising short term funds
  - Capital mkt: used to raise long-term capital (bond and stock mkts)
  - *must know major stock exchanges globally
- Main financial **securities**:
  - Money mkt: treasury bills, bankers acceptance, commercial paper, NCDs, REPOs (can read up on them in Chapter 14)
  - Capital mkt: shares, bonds

chapter 2

financial statements and analysis

Learning Outcomes

- Understand who uses financial ratios, why and how.
- Use ratios to analyse a firm's liquidity, debt, activity, profitability and market value.
- Discuss the relationship between debt and financial leverage.
- Use a summary of financial ratios and the DuPont system of analysis to perform a complete ratio analysis.
- Interpret the obtained ratios and be able to recommend a course of action
- * formula not provided in the exam

The Four Key Financial Statements:

- **Income statement** provides a financial summary of a company's operating results during a specified period.
- **Balance sheet** presents a summary of a firm's financial position at a given point in time.
- **Statement of retained earnings** reconciles the net income earned and dividends paid during the year, with the change in retained earnings.
- **Statement of cash flows** provides a summary of the cash flows over the period of concern.

Using Financial Ratios:

- Ratio analysis involves methods of calculating and interpreting financial ratios to assess a firm's financial condition and performance.
- It is of interest to shareholders, creditors, and the firm's own management.

Types of ratio analyses:

- Trend or time-series analysis: Used to evaluate a firm's performance over time
- Cross-sectional analysis: Used to compare different firms in the same industry at the same point in time

Using Financial Ratios: **Cautions** for Doing Ratio Analysis

1. Ratios must be considered together; a single ratio by itself means relatively little.
2. Financial statements that are being compared should be dated at the same point in time.
3. Use audited financial statements when possible.
4. Compare like with like, e.g. cannot compare 1time Airlines with MTN group

Types of ratios

Liquidity: measure firm's ability to meet short-term obligations

Activity: measure the speed at which various accounts are converted into sales or cash

Debt: measure the firm's degree of indebtedness

Profitability: in totality, measure a firm's profits vis-a-vis sales, assets or owners' investments

Market: relate the firm's market value using current share price to accounting values

Ratio Analysis: Example

- We will illustrate the use of financial ratios for analysing financial statements using the Bartlett Company Income Statement and Balance Sheet presented in Tables 2.1 and 2.2.

Bartlett Income Statement ($000)

	For the years ended December 31	
	2009	2008
Sales revenue	$3,074	$2,567
Less: Cost of goods sold	2,088	1,711
Gross profits	$ 986	$ 856
Less: Operating expenses		
Selling expense	$ 100	$ 108
General and administrative expenses	194	187
Lease expense[a]	35	35
Depreciation expense	239	223
Total operating expense	$ 568	$ 553
Operating profits	$ 418	$ 303
Less: Interest expense	93	91
Net profits before taxes	$ 325	$ 212
Less: Taxes (rate = 29%)[b]	94	64
Net profits after taxes	$ 231	$ 148
Less: Preferred stock dividends	10	10
Earnings available for common stockholders	$ 221	$ 138
Earnings per share (EPS)[c]	$2.90	$1.81
Dividend per share (DPS)[d]	$1.29	$0.75

[a]Lease expense is shown here as a separate item rather than being included as part of interest expense, as specified by the FASB for financial reporting purposes. The approach used here is consistent with tax reporting rather than financial reporting procedures.

[b]The 29% tax rate for 2009 results because the firm has certain special tax write-offs that do not show up directly on its income statement.

[c]Calculated by dividing the earnings available for common stockholders by the number of shares of common stock outstanding—76,262 in 2009 and 76,244 in 2008. Earnings per share in 2009: $221,000 ÷ 76,262 = $2.90; in 2008: $138,000 ÷ 76,244 = $1.81.

[d]Calculated by dividing the dollar amount of dividends paid to common stockholders by the number of shares of common stock outstanding. Dividends per share in 2009: $98,000 ÷ 76,262 = $1.29; in 2008: $57,183 ÷ 76,244 = $0.75.

Bartlett Balance Sheet ($000)

Assets	December 31 2009	2008
Current assets		
Cash	$ 363	$ 288
Marketable securities	68	51
Accounts receivable	503	365
Inventories	289	300
Total current assets	$1,223	$1,004
Gross fixed assets (at cost)[a]		
Land and buildings	$2,072	$1,903
Machinery and equipment	1,866	1,693
Furniture and fixtures	358	316
Vehicles	275	314
Other (includes financial leases)	98	96
Total gross fixed assets (at cost)	$4,669	$4,322
Less: Accumulated depreciation	2,295	2,056
Net fixed assets	$2,374	$2,266
Total assets	$3,597	$3,270

Barlett Statement of Retained Earnings

TABLE 3.3 **Bartlett Company Statement of Retained Earnings ($000) for the Year Ended December 31, 2012**

Retained earnings balance (January 1, 2012)	$1,012
Plus: Net profits after taxes (for 2012)	231
Less: Cash dividends (paid during 2012)	
Preferred stock	10
Common stock	98
Total dividends paid	$ 108
Retained earnings balance (December 31, 2012)	$1,135

Summary of all ratios for Bartlett (2007 – 2009)

Ratio	Formula	Year 2007[a]	Year 2008[b]	Year 2009[b]	Industry average 2009[c]	Evaluation[d] Cross-sectional 2009	Evaluation[d] Time-series 2007–2009	Evaluation[d] Overall
Liquidity								
Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	2.04	2.08	1.97	2.05	OK	OK	OK
Quick (acid-test) ratio	$\frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$	1.32	1.46	1.51	1.43	OK	good	good
Activity								
Inventory turnover	$\frac{\text{Cost of goods sold}}{\text{Inventory}}$	5.1	5.7	7.2	6.6	good	good	good
Average collection period	$\frac{\text{Accounts receivable}}{\text{Average sales per day}}$	43.9 days	51.2 days	59.7 days	44.3 days	poor	poor	poor
Average payment period	$\frac{\text{Accounts payable}}{\text{Average purchases per day}}$	75.8 days	81.2 days	95.4 days	66.5 days	poor	poor	poor
Total asset turnover	$\frac{\text{Sales}}{\text{Total assets}}$	0.94	0.79	0.85	0.75	OK	OK	OK
Debt								
Debt ratio	$\frac{\text{Total liabilities}}{\text{Total assets}}$	36.8%	44.3%	45.7%	40.0%	OK	OK	OK
Times interest earned ratio	$\frac{\text{Earnings before interest and taxes}}{\text{Interest}}$	5.6	3.3	4.5	4.3	good	OK	OK
Fixed-payment coverage ratio	$\frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Int.} + \text{Lease pay.} + \{(\text{Prin.} + \text{Pref. div.}) \times [1/(1 - T)]\}}$	2.4	1.4	1.9	1.5	good	OK	good

Summary of all ratios for Bartlett (2007 – 2009) [continued]

Ratio	Formula	Year			Industry average	Evaluation[d]		
		2007[a]	2008[b]	2009[b]	2009[c]	Cross-sectional 2009	Time-series 2007–2009	Overall
Profitability								
Gross profit margin	$\frac{\text{Gross profits}}{\text{Sales}}$	31.4%	33.3%	32.1%	30.0%	OK	OK	OK
Operating profit margin	$\frac{\text{Operating profits}}{\text{Sales}}$	14.6%	11.8%	13.6%	11.0%	good	OK	good
Net profit margin	$\frac{\text{Earnings available for common stockholders}}{\text{Sales}}$	8.2%	5.4%	7.2%	6.2%	good	OK	good
Earnings per share (EPS)	$\frac{\text{Earnings available for common stockholders}}{\text{Number of shares of common stock outstanding}}$	$3.26	$1.81	$2.90	$2.26	good	OK	good
Return on total assets (ROA)	$\frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$	7.8%	4.2%	6.1%	4.6%	good	OK	good
Return on common equity (ROE)	$\frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$	13.7%	8.5%	12.6%	8.5%	good	OK	good
Market								
Price/earnings (P/E) ratio	$\frac{\text{Market price per share of common stock}}{\text{Earnings per share}}$	10.5	10.0[e]	11.1	12.5	OK	OK	OK
Market/book (M/B) ratio	$\frac{\text{Market price per share of common stock}}{\text{Book value per share of common stock}}$	1.25	0.85[e]	1.40	1.30	OK	OK	OK

[a]Calculated from data not included in the chapter.
[b]Calculated by using the financial statements presented in Tables 2.1 and 2.2.
[c]Obtained from sources not included in this chapter.
[d]Subjective assessments based on data provided.
[e]The market price per share at the end of 2008 was $18.06.

DuPont System of Analysis

- **The DuPont system** of analysis is used to dissect the firm's financial statements and to assess its financial condition.

- It merges the income statement and balance sheet into two summary measures of profitability.

DuPont System of Analysis

- DuPont enables the firm to break down its return into profit-on-sales and efficiency-of-asset-use components.

- So, a firm with a low NP margin has a high total asset turnover which results in a fairly good ROA

DuPont…

- The **Modified DuPont** Formula relates the firm's ROA to its ROE using the financial leverage multiplier (FLM), *which is the ratio of total assets to common stock equity*
- ROA and ROE as shown in the series of equations on the following slide and in Figure 2.2 on the slide thereafter.

DuPont…

$$\text{ROA} = \text{Net profit margin} \times \text{Total asset turnover}$$

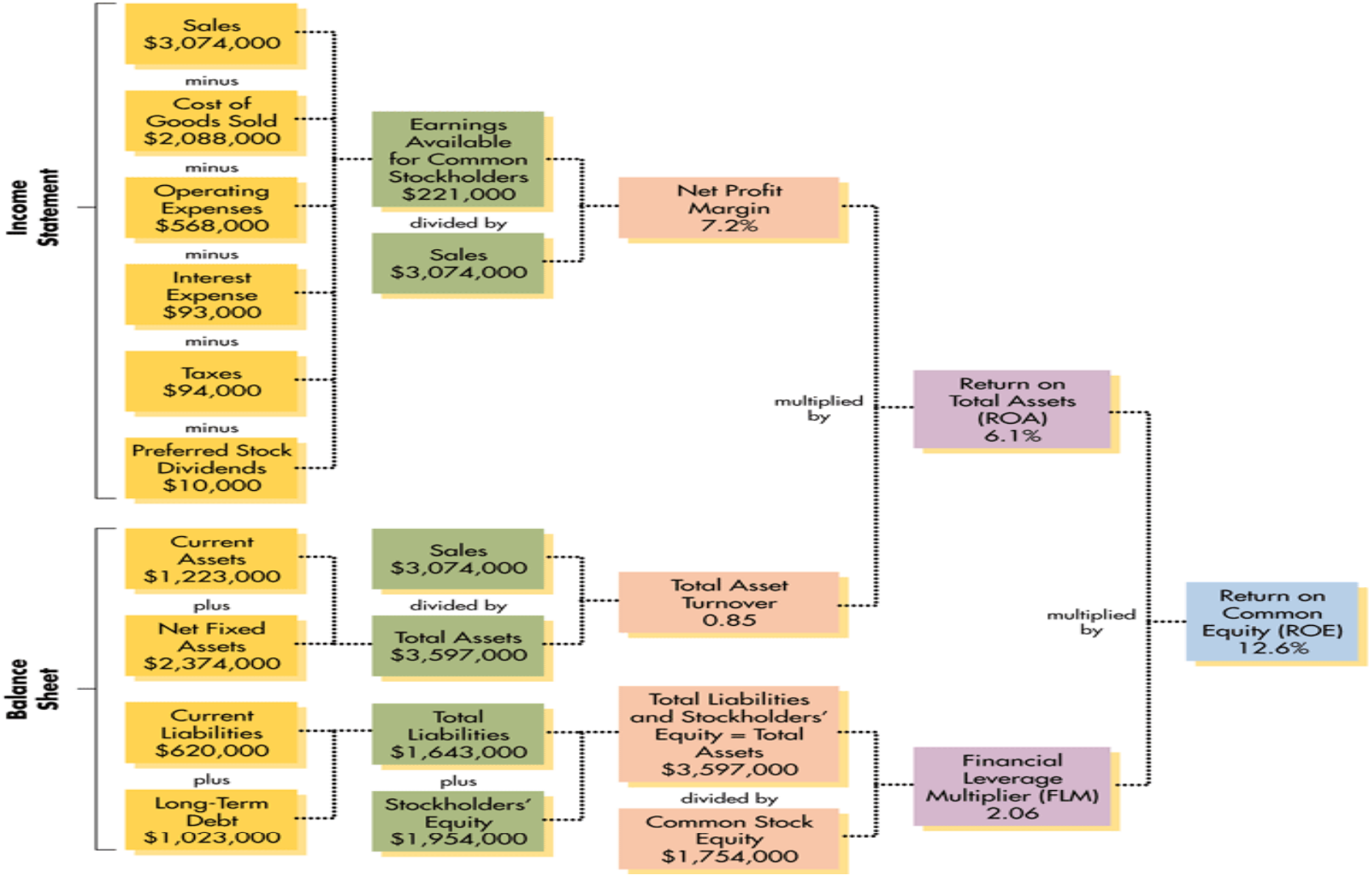
$$\text{ROA} = \frac{\text{Earnings available for common stockholders}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$$

$$\text{ROA} = 7.2\% \times 0.85 = 6.1\%$$

$$\text{ROE} = \text{ROA} \times \text{FLM}$$

$$\text{ROE} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Common stock equity}} = \frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$$

DuPont…


Income Statement
Sales $3,074,000
minus
Cost of Goods Sold $2,088,000
minus
Operating Expenses $568,000
minus
Interest Expense $93,000
minus
Taxes $94,000
minus
Preferred Stock Dividends $10,000
Earnings Available for Common Stockholders $221,000
divided by
Sales $3,074,000
Net Profit Margin 7.2%
multiplied by
Return on Total Assets (ROA) 6.1%
Balance Sheet
Current Assets $1,223,000
plus
Net Fixed Assets $2,374,000
Sales $3,074,000
divided by
Total Assets $3,597,000
Total Asset Turnover 0.85
Current Liabilities $620,000
plus
Long-Term Debt $1,023,000
Total Liabilities $1,643,000
plus
Stockholders' Equity $1,954,000
Total Liabilities and Stockholders' Equity = Total Assets $3,597,000
divided by
Common Stock Equity $1,754,000
Financial Leverage Multiplier (FLM) 2.06
multiplied by
Return on Common Equity (ROE) 12.6%

Modified DuPont...

Use of the FLM to convert ROA into ROE reflects the impact of financial leverage on the owner's return.

Substituting the values for Bartlett Company's ROA of 6.1 percent calculated earlier, and Bartlett's FLM of 2.06 (R3,597,000 total assets ÷ R1,754,000 common stock equity) into the Modified DuPont formula yields:

ROE = 6.1% X 2.06 = 12.6%

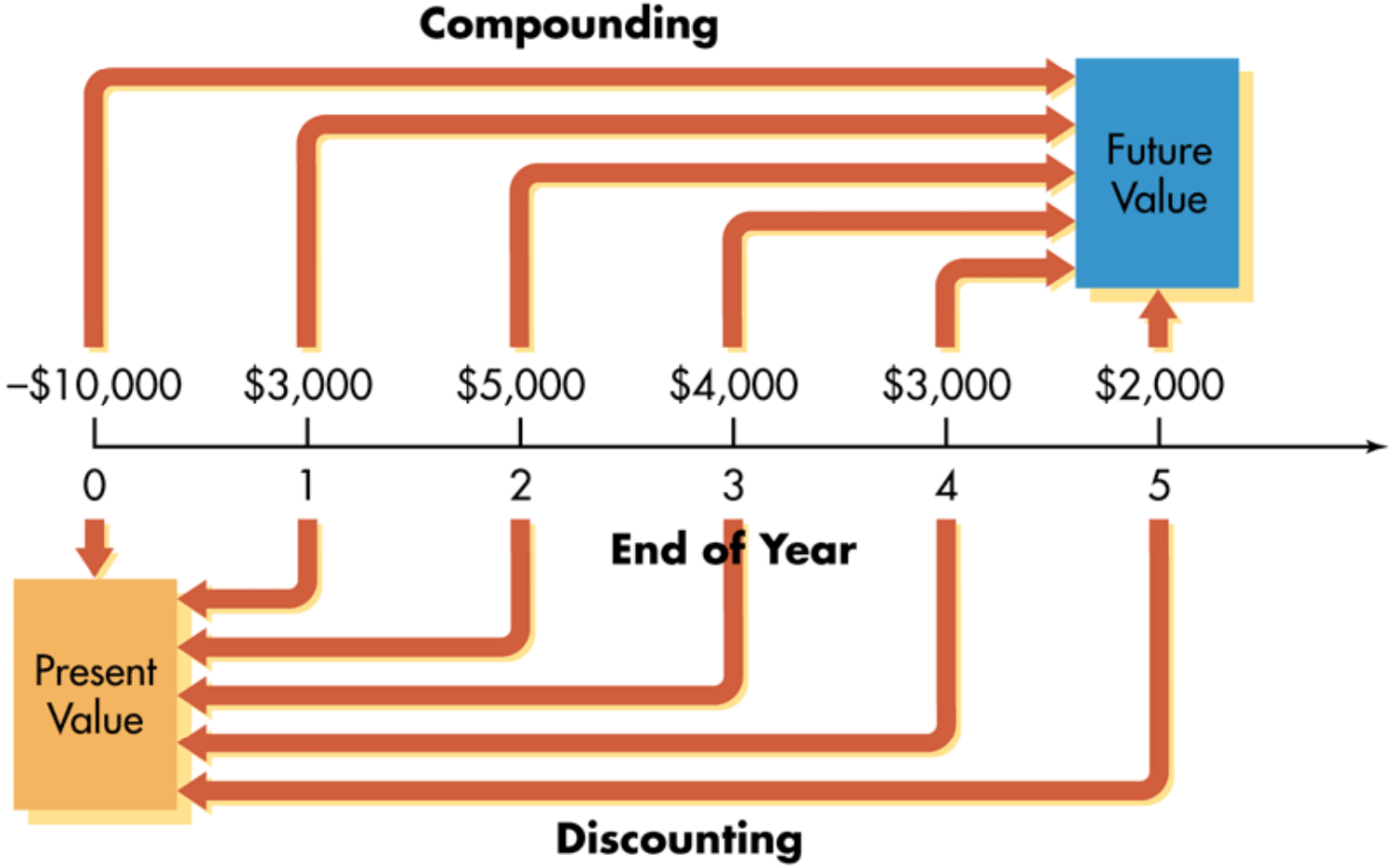
chapter 4

time value of money

Learning outcomes:

- By the end of this session, you should be able to calculate:
  - the future value of a single amount
  - the future value of an annuity
  - the present value of a single amount
  - the present value of a mixed stream of cash flows
  - the present value of an annuity
  - deposits to accumulate a future sum
  - instalments to amortise a loan
  - an interest or growth rate

TVM: compounding and discounting



Future Value: compounding or growth over time

Present Value: discounting to today's value

Patterns of cash flow

- The cash inflows and outflows of a firm can be described by its general pattern.
- The three basic patterns include a single amount, an annuity, or a mixed stream:

	Mixed cash flow stream	
End of year	A	B
1	$ 100	−$ 50
2	800	100
3	1,200	80
4	1,200	− 60
5	1,400	
6	300	

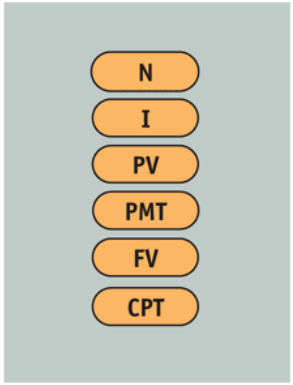
TVM terms

- PV_0 = present value or beginning amount
- i = interest rate
- FV_n = future value at end of “n” periods
- n = number of compounding periods
- A = an annuity (series of equal payments or receipts)

TVM: common calculator keys

FIGURE 5.3

Calculator Keys
Important financial keys on the typical calculator



N — Number of periods
I — Interest rate per period
PV — Present value
PMT — Amount of payment (used only for annuities)
FV — Future value
CPT — Compute key used to initiate financial calculation once all values are input

*NB: you will not find the “CPT” key on your HP10BII calculator

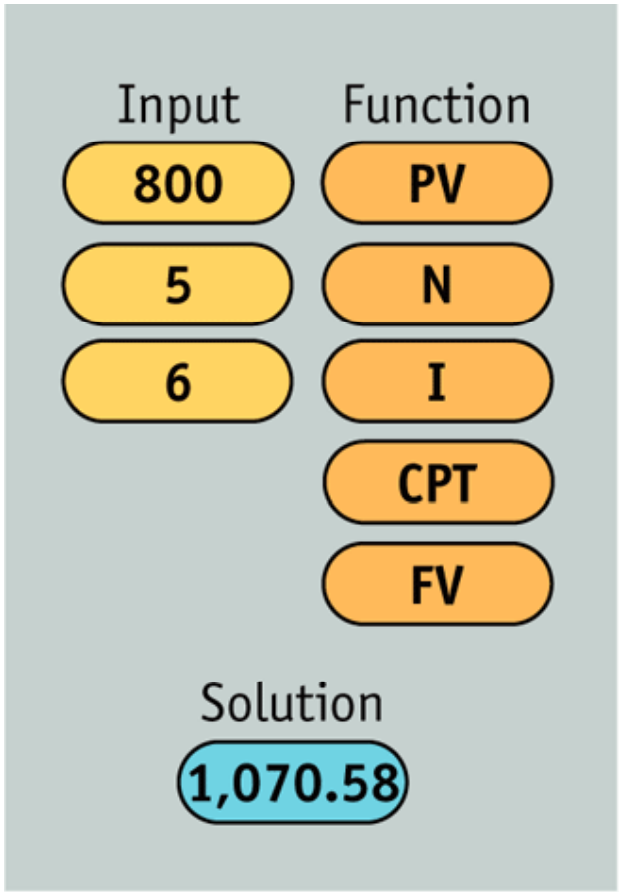
Four basic models of TVM

- $FV_n = PV_0(1+i)^n = PV \times (FVIF_{i,n})$
- $PV_0 = \quad FV_n[1/(1+i)^n] = FV \times (PVIF_{i,n})$
- $FVA_n = A\left[\frac{(1+i)^n - 1}{i}\right] = A \times (FVIFA_{i,n})$
- $PVA_0 = A\left[\frac{1 - [1/(1+i)^n]}{i}\right] = A \times (PVIFA_{i,n})$

Future value of a single amount

Future Value techniques typically measure cash flows at the ***end*** of a project's life.

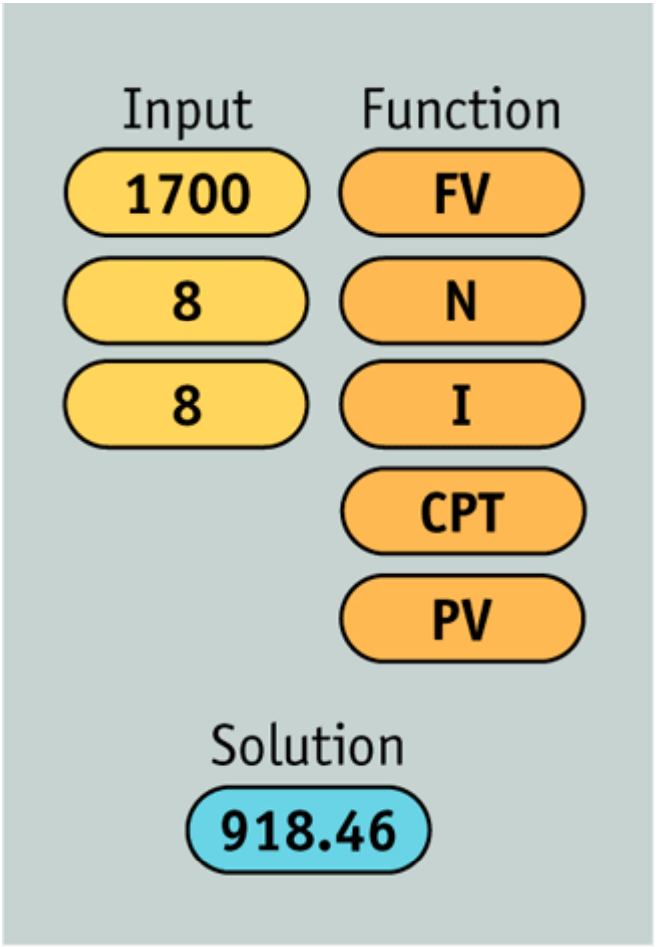
If Moby Dick places R800 in a savings account paying 6% interest compounded annually, how much will he have in the account at the end of five years?



PV of single amount...

Present value is the current dollar value of a future amount of money.

- Dakalo Mukwevho wishes to find the present value of R1,700 that will be received 8 years from now. Dakalo's opportunity cost is 8%.



Annuities

- Annuities are **equally-spaced** cash flows of equal size.
- Annuities can be either inflows or outflows.
- An **ordinary (deferred) annuity** has cash flows that occur at the *end* of each period.
- An **annuity due** has cash flows that occur at the *beginning* of each period.
- An annuity due will **always be greater** than an otherwise equivalent ordinary annuity because interest will compound for an additional period.

Annuities...

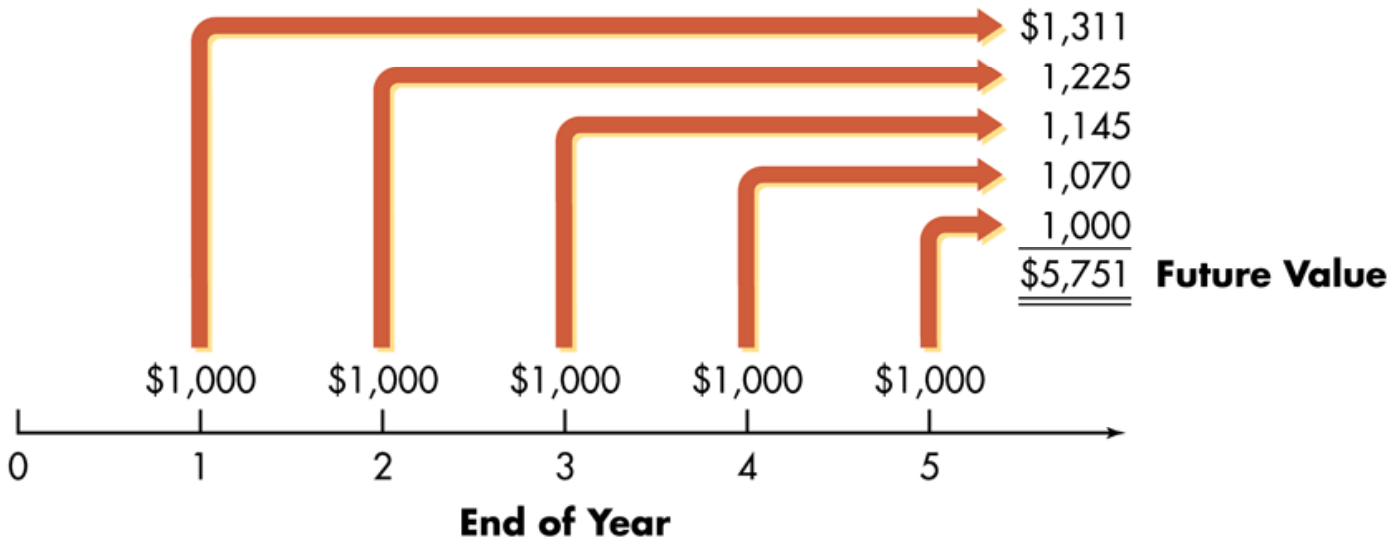
- Tom Jones is choosing which of two annuities to receive. Both are 5-year R1,000 annuities;
- Annuity A: ordinary annuity
- Annuity B: annuity due.
- Tom has listed the cashflows for both annuities as shown in Table 4.1

	Annual cash flows	
End of year[a]	Annuity A (*ordinary*)	Annuity B (*annuity due*)
0	$ 0	$1,000
1	1,000	1,000
2	1,000	1,000
3	1,000	1,000
4	1,000	1,000
5	1,000	0
Totals	$5,000	$5,000

[a]The ends of years 0, 1, 2, 3, and 4 are equivalent to the beginnings of years 1, 2, 3, 4, and 5, respectively.

Finding the FV of an ordinary annuity

- Tom Jones wishes to determine how much money he will have at the end of 5 years if he chooses annuity A, the ordinary annuity and it earns 7% annually. Annuity A is depicted graphically below:



FV of ordinary annuity

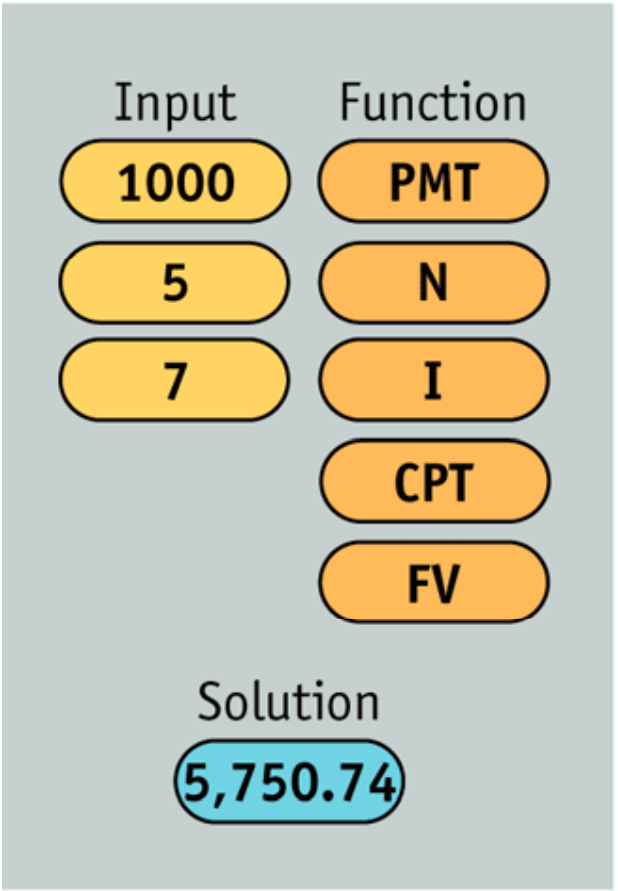
Using tables:

FVA = R1,000(FVIFA,7%,5)

= R1,000 (5.751)

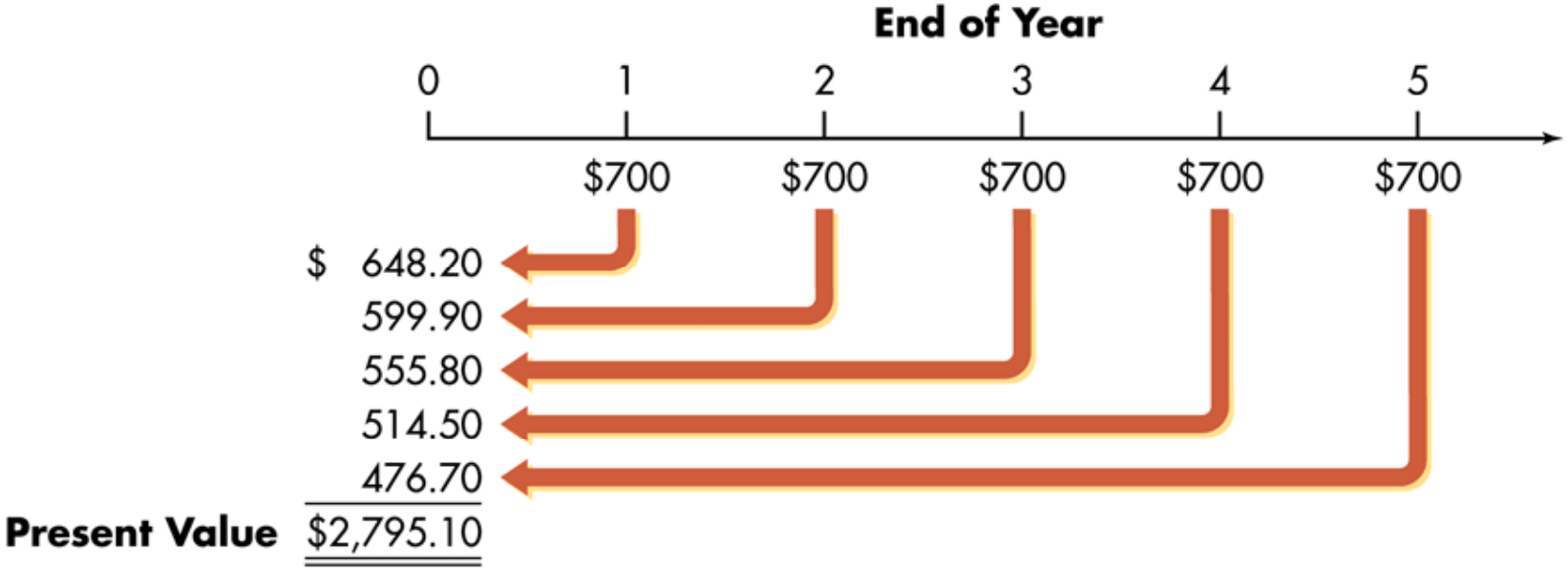
= R5,751

Using a calculator:



PV of ordinary annuity

- Educ8 Inc., a producer of educational toys, wants to determine the most it should pay to purchase a particular annuity. The annuity consists of cash flows of $700 at the end of each year for 5 years. The required return is 8%.



PV of ordinary annuity

PVA = 700 (PVIFA,8%,5)

= R700 (3.993)

= R2,795.10

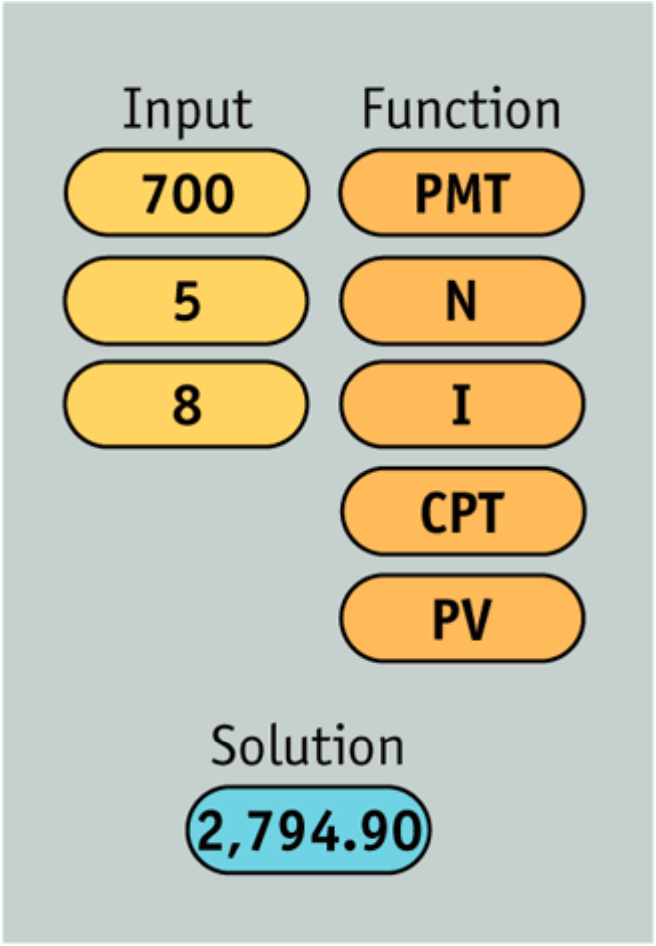
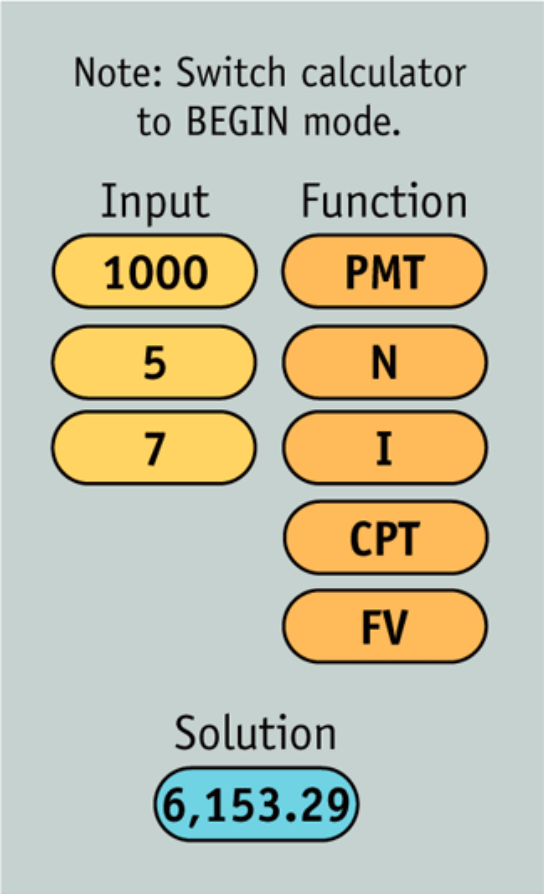


Table 4.2 Long Method for Finding the Present Value of an Ordinary Annuity

Year (n)	Cash flow (1)	$PVIF_{8\%,n}$[a] (2)	Present value [(1) × (2)] (3)
1	$700	0.926	$ 648.20
2	700	0.857	599.90
3	700	0.794	555.80
4	700	0.735	514.50
5	700	0.681	476.70
		Present value of annuity	$2,795.10

[a]Present value interest factors at 8% are from Table A–2.

FV of an annuity due



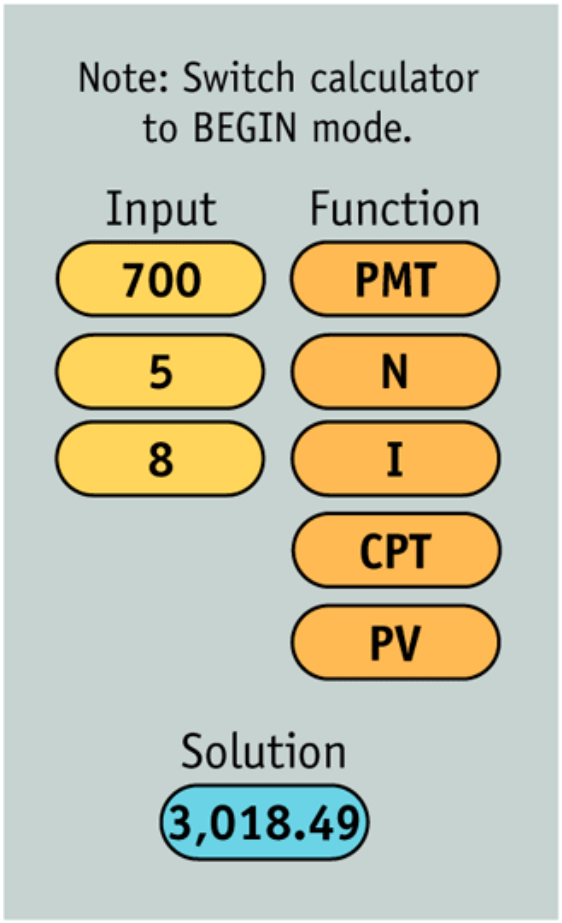
- Tom Jones now wishes to calculate the future value of an annuity due for annuity B in Table 4.1. Recall that annuity B was a 5-period annuity with the first annuity beginning immediately.

FVA=R1,000(FVIFA,7%,5)(1+.07)

= R1,000 (5.751) (1.07)

= R6,154

PV of an annuity due



- In the earlier example, we found that the value of Educ8's R700, 5 year ordinary annuity discounted at 8% to be about R2,795.
- If we now assume that the cash flows occur at the beginning of the year, we can find the PV of the annuity due:

PVA = R700 (PVIFA,8%,5) (1.08)

= R700 (3.993) (1.08)

= R3,018.40

PV of a perpetuity

- A perpetuity is a special kind of annuity.
- With a perpetuity, the periodic annuity or cash flow stream *continues forever*.
- For example, how much do I have to deposit today in order to withdraw R1,000 each year forever if I can earn 8% on my deposit?

PV = annuity/ interest rate

PV = R1,000/.08 = R12,500

Future Value of a Mixed Stream

End of year	Cash flow
1	$11,500
2	14,000
3	12,900
4	16,000
5	18,000

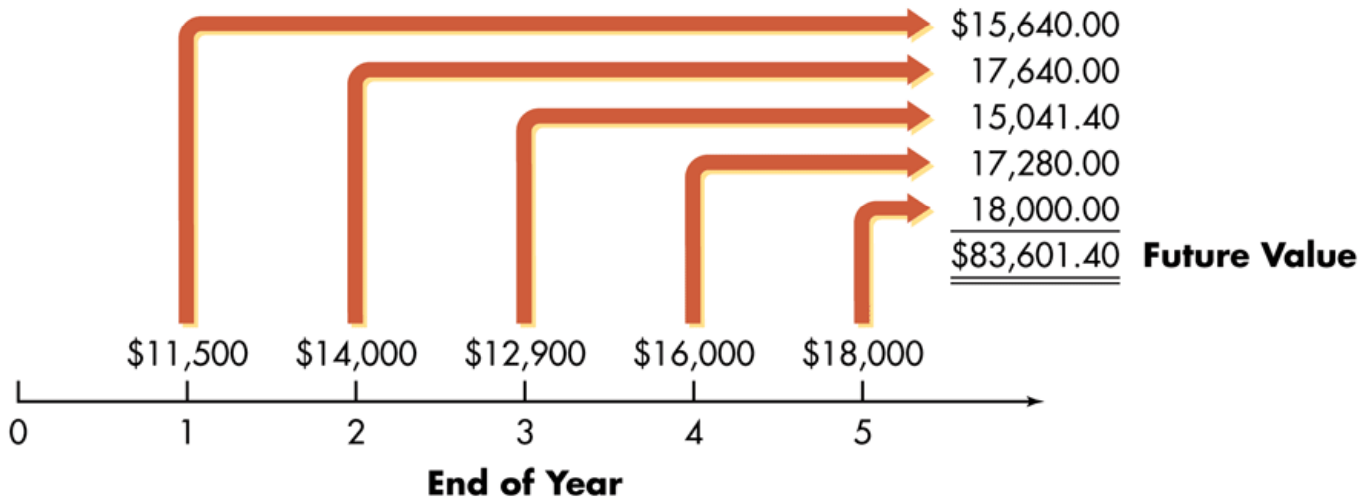


Table 4.3 Future Value of a Mixed Stream of Cash Flows

Year	Cash flow (1)	Number of years earning interest (n) (2)	$FVIF_{8\%,n}$[a] (3)	Future value [(1) × (3)] (4)
1	$11,500	$5-1=4$	1.360	$15,640.00
2	14,000	$5-2=3$	1.260	17,640.00
3	12,900	$5-3=2$	1.166	15,041.40
4	16,000	$5-4=1$	1.080	17,280.00
5	18,000	$5-5=0$	1.000[b]	18,000.00
			Future value of mixed stream	$83,601.40

[a]Future value interest factors at 8% are from Table A–1.

[b]The future value of the end-of-year-5 deposit at the end of year 5 is its present value because it earns interest for zero years and $(1+0.08)^0=1.000$.

PV of a mixed stream: an example

- Soles Ltd, a shoe manufacturer, has been offered an opportunity to receive the following mixed stream of cash flows over the next 5 years.

End of year	Cash flow
1	$400
2	800
3	500
4	400
5	300

Present Value of a Mixed Stream

- If Soles must earn at least 9% on its investments, what is the most it should pay for this opportunity?
- This situation is depicted on the following tir

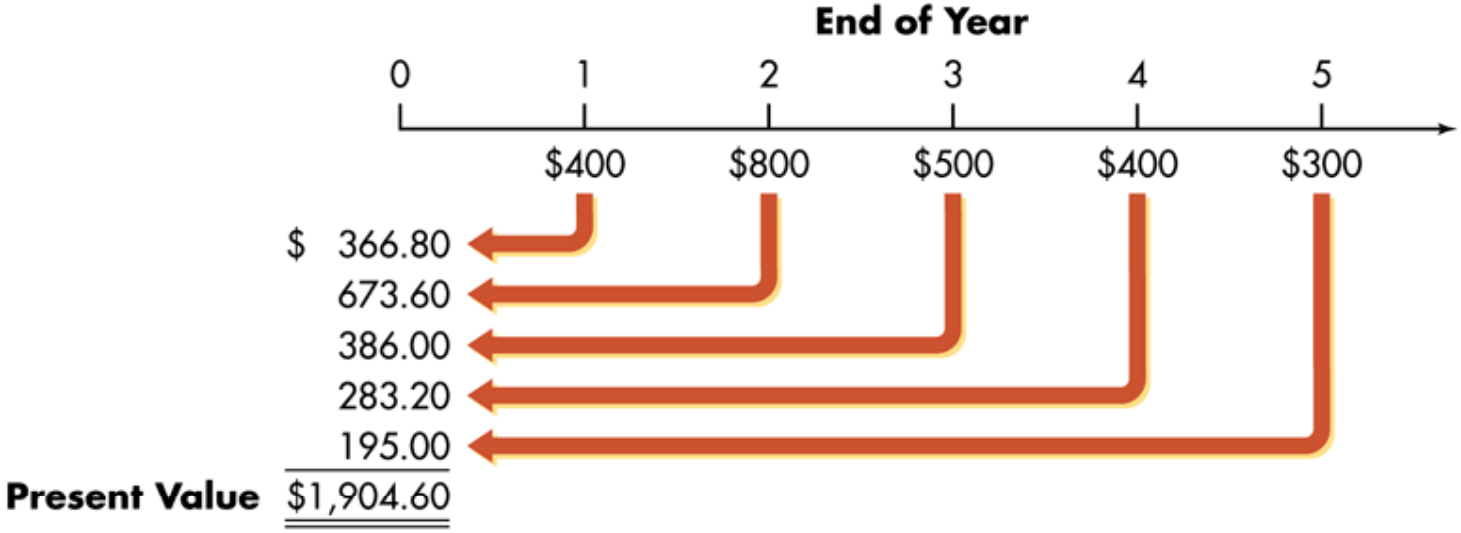


Table 4.4 Present Value of a Mixed Stream of Cash Flows

Year (n)	Cash flow (1)	$PVIF_{9\%,n}$[a] (2)	Present value [(1) × (2)] (3)
1	$400	0.917	$ 366.80
2	800	0.842	673.60
3	500	0.772	386.00
4	400	0.708	283.20
5	300	0.650	195.00
		Present value of mixed stream	$1,904.60

[a]Present value interest factors at 9% are from Table A–2.

Compounding Interest More Frequently Than Annually

- Compounding more frequently than once a year results in a ***higher*** effective interest rate because you are earning on interest on interest more frequently.
- As a result, the effective interest rate is greater than the nominal (annual) interest rate.
- Furthermore, the effective rate of interest will increase the more frequently interest is compounded.

A General Equation for Compounding More Frequently than Annually

$$FVIF_{i,n} = \left(1 + \frac{i}{m}\right)^{m \times n}$$

$$FV_n = PV \times \left(1 + \frac{i}{m}\right)^{m \times n}$$

Example

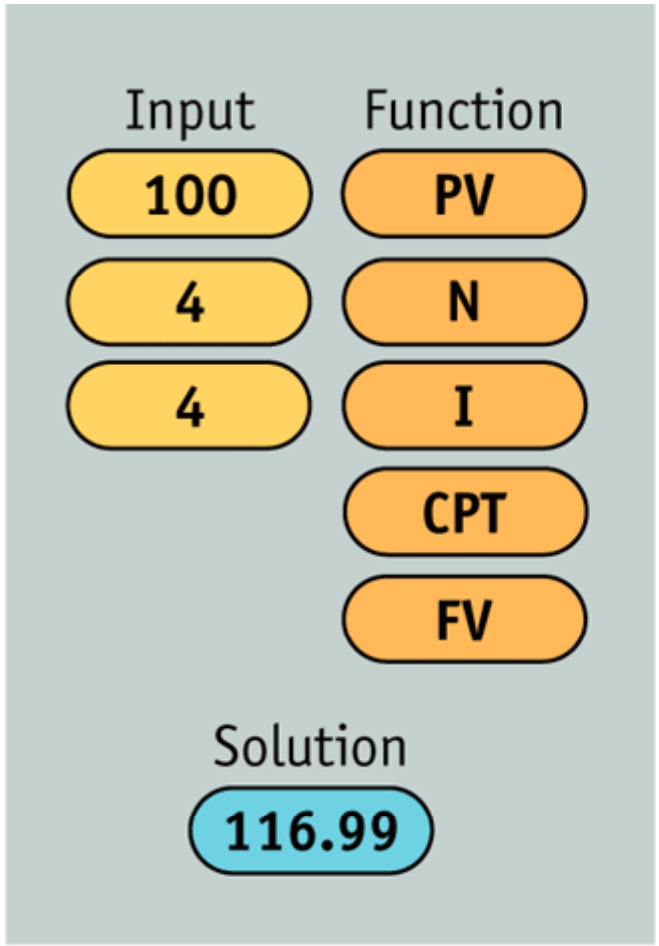
- Dorcas Morena has found an institution that will pay her 8% annual interest. If she leaves the money in the account for 24 months (2 years), we can find the FV assuming (1) semiannual compounding and (2) quarterly compounding as follows:

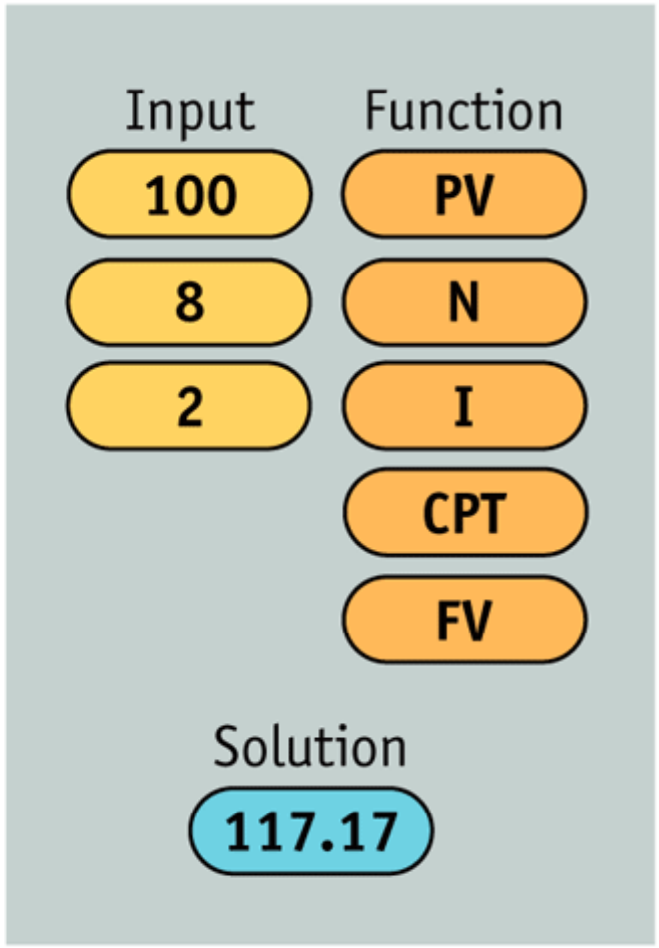
$$FV_2 = \$100 \times \left(1 + \frac{0.08}{2}\right)^{2\times 2} = \$100 \times (1 + 0.04)^4 = \$116.99$$

$$FV_2 = \$100 \times \left(1 + \frac{0.08}{4}\right)^{4\times 2} = \$100 \times (1 + 0.02)^8 = \$117.17$$

	Compounding period		
End of year	Annual	Semiannual	Quarterly
1	$108.00	$108.16	$108.24
2	116.64	116.99	117.17

Compounding Interest More Frequently Than Annually: Using a Financial Calculator





Nominal & Effective Annual Rates of Interest

- The nominal interest rate is the stated or contractual rate of interest charged by a lender or promised by a borrower.
- The effective interest rate is the rate actually paid or earned.
- In general, the effective rate is greater than nominal rate whenever compounding occurs more than once per year

$$EAR = \left(1 + \frac{i}{m}\right)^m - 1$$

Effective annual rates

- Dorcas Morena wishes to find the effective annual rate associated with an 8% nominal annual rate (i = 0.08) when interest is compounded (1) annually (m=1); (2) semiannually (m=2); and (3) quarterly (m=4).

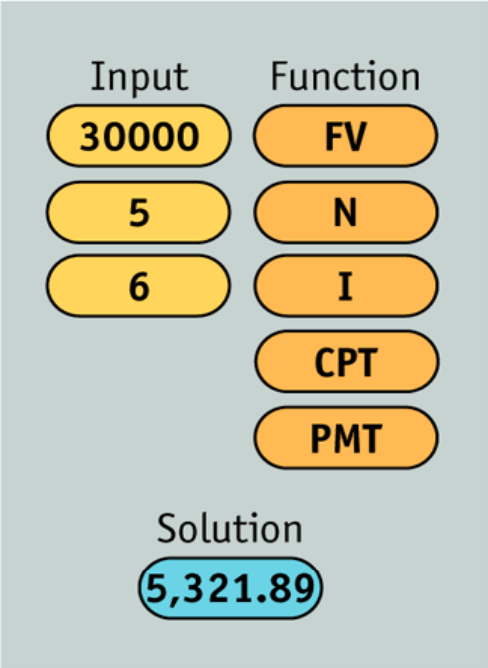
$$EAR = \left(1 + \frac{0.08}{2}\right)^2 - 1 = (1 + 0.04)^2 - 1 = 1.0816 - 1 = 0.0816 = 8.16\%$$

$$EAR = \left(1 + \frac{0.08}{4}\right)^4 - 1 = (1 + 0.02)^4 - 1 = 1.0824 - 1 = 0.0824 = 8.24\%$$

Deposits Needed to Accumulate to a Future Sum

$$FVA_n = PMT \times (FVIFA_{i,n})$$

PMT = 30,000/ 5.637
= R5321,98



- Suppose you want to buy a house in Malelane 5 years from now and you estimate that the down payment needed will be R30,000.
- How much would you need to deposit at the end of each year for the next 5 years to accumulate R30,000 if you can earn 6% on your deposits?

Loan amortisation

- **Table 4.8** Loan Amortization Schedule (R6,000 Principal, 10% Interest, 4-Year Repayment Period)

End of year	Beginning-of-year principal (1)	Loan payment[a] (2)	Payments		End-of-year principal [(1) − (4)] (5)
			Interest [0.10 × (1)] (3)	Principal [(2) − (3)] (4)	
1	$6,000.00	$1,892.74	$600.00	$1,292.74	$4,707.26
2	4,707.26	1,892.74	470.73	1,422.01	3,285.25
3	3,285.25	1,892.74	328.53	1,564.21	1,721.04
4	1,721.04	1,892.74	172.10	1,720.64	—[b]

[a]Based on the use of tables.

[b]Because of rounding, a slight difference ($0.40) exists between the beginning-of-year-4 principal (in column 1) and the year-4 principal payment (in column 4).

Interest rate or growth rate

- At times, it may be desirable to determine the compound interest rate or growth rate implied by a series of cash flows.
- E.g., Ray Mond wishes to find the rate of interest or growth reflected in the stream of cashflows he received from a property investment between 2005 and 2009.

Year	Cash flow	
2009	$1,520	4
2008	1,440	3
2007	1,370	2
2006	1,300	1
2005	1,250	

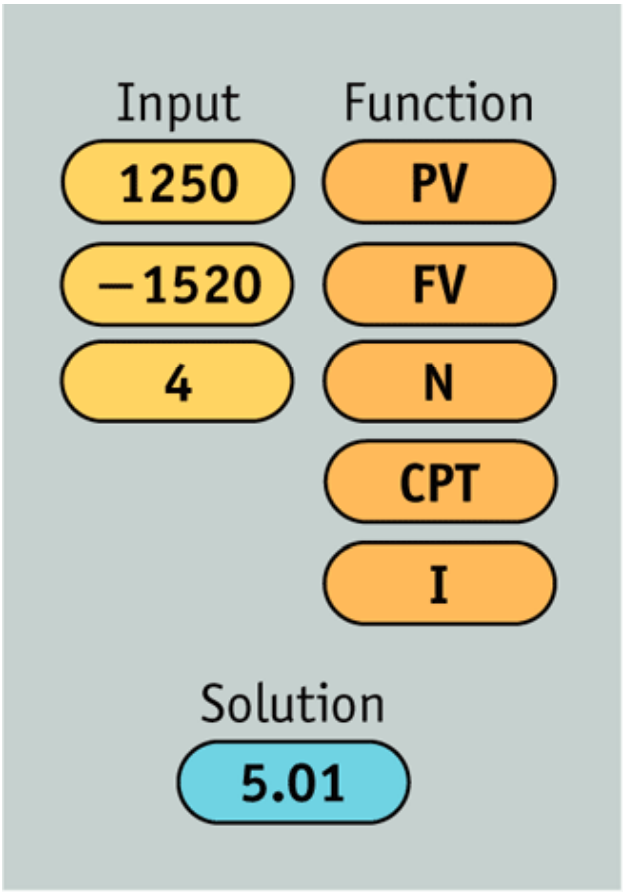
Interest rate or growth rate

$PVIF_{i,5yrs} = PV/FV =$

$(R1,250/R1,520) = 0.822$

$PVIF_{i,5yrs} =$

approximately 5%

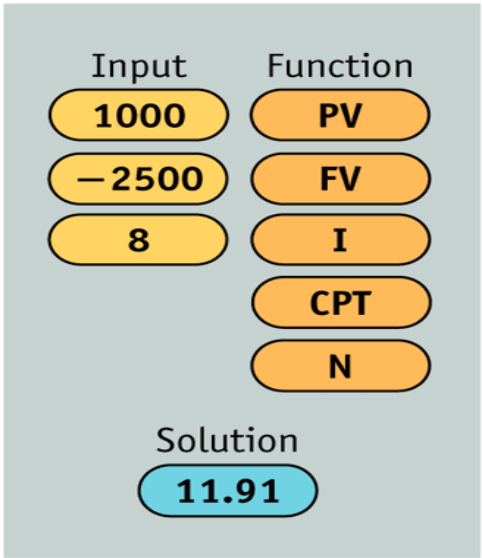


Finding an Unknown Number of Periods

- At times, it may be desirable to determine the number of periods needed to generate a given amount of cash flow from an initial amount.
- Anita wishes to determine the number of years it will take for her initial R1,000 deposit, earning 8% annual interest, to grow to equal R2,500.

$PVIF_{8\%,n}$ = PV/FV = (R1,000/R2,500) = .400

$PVIF_{8\%,n}$ = approximately 12 years



chapter 5

risk and return

Learning Outcomes

- Understand the relationship (or “trade-off”) between risk and return.
- Define risk and return and show how to measure them by calculating expected return, standard deviation, and coefficient of variation.
- Discuss the different types of investor attitudes toward risk.
- Explain risk and return in a portfolio context, and distinguish between individual security and portfolio risk.
- Distinguish between avoidable (unsystematic) risk and unavoidable (systematic) risk and explain how proper diversification can eliminate one of these risks.
- Define and explain the capital-asset pricing model (CAPM), beta, and the characteristic line.
- Calculate a required rate of return using the capital-asset pricing model (CAPM).

Defining Return

Income received on an investment plus any change in market price, usually expressed as a percent of the beginning market price of the investment.

$$r_t = \frac{C_t + P_t - P_{t-1}}{P_{t-1}}$$

r_t = actual, expected, or required rate of return during period t

C_t = cash (flow) received from the asset investment in the time period $t-1$ to t

P_t = price (value) of asset at time t

P_{t-1} = price (value) of asset at time $t-1$

Return Example

Q) The stock price for Share A was R10 per share 1 year ago. The stock is currently trading at 9.50 per share and shareholders just received a R1 dividend. What return was earned over the past year?

A) $R = \frac{\text{R1.00} + (\text{R9.50} - \text{R10.00})}{\text{R10}}$

$= 5\%$

Defining Risk

- ***The variability of returns from those that are expected.***

- **Risk** is therefore a measure of the uncertainty surrounding the return that an investment will earn

Q) What rate of return do you ***expect*** on your investment (savings) this year?

Q) What rate will you ***actually*** earn?

Q) Does it matter if it is a Govt TB or a share of stock?

Risk Preferences

- Economists use three categories to describe how investors respond to risk.
  - **Risk averse** is the attitude toward risk in which investors would require an increased return as compensation for an increase in risk.
  - **Risk-neutral** is the attitude toward risk in which investors choose the investment with the higher return regardless of its risk.
  - **Risk-seeking** is the attitude toward risk in which investors prefer investments with greater risk even if they have lower expected returns.

Risk of a Single Asset: Risk Measurement

- **Standard deviation (σ_r)** is the most common statistical indicator of an asset's risk; it measures the dispersion around the *expected value*.
- **Expected value of a return (*r*)** is the average return that an investment is expected to produce over time.

$$\bar{r} = \sum_{j=1}^{n} r_j \times Pr_j$$

Where:

r_j = return for the j^{th} outcome

Pr_t = probability of occurrence of the j^{th} outcome

n = number of outcomes considered

Determining the Expected Return and Standard Deviation

Stock BlackWhale		
R_j (%)	P_i	$(R_i)(P_i)$
-15 -3 9 21 33	0.10 0.20 0.40 0.20 0.10	-1.5 -0.6 3.6 4.2 3.3
Sum (∑)	1.00	**9% =** Expected Return

Determining Standard Deviation (Risk Measure)

$$\sigma_r = \sqrt{\sum_{j=1}^{n} (r_j - \bar{r})^2 \times Pr_j}$$

Generally, the higher the standard deviation, the greater the risk.

*show working on board (table)

σ = √172.93 = **13.15%**

Template for finding std deviation

TABLE 8.4 The Calculation of the Standard Deviation of the Returns for Assets A and B[a]

j	r_j	$\bar{r}$	$r_j - \bar{r}$	$(r_j - \bar{r})^2$	Pr_j	$(r_j - \bar{r})^2 \times Pr_j$
Asset A						
1	13%	15%	−2%	4%	.25	1%
2	15	15	0	0	.50	0
3	17	15	2	4	.25	1

$$\sum_{j=1}^{3}(r_j - \bar{r})^2 \times Pr_j = 2\%$$

$$\sigma_{r_A} = \sqrt{\sum_{j=1}^{3}(r_j - \bar{r})^2 \times Pr_j} = \sqrt{2\%} = 1.41\%$$

Coefficient of Variation

- The ratio of the ***standard deviation*** of a distribution to the *mean* of that distribution.
- It is a measure of ***RELATIVE*** risk useful in comparing the risks of assets with differing expected returns.

$$CV = \frac{\sigma_r}{\bar{r}}$$

CV of BlackWhale = 13.15/ 9 = 1.46

NB: CV is just a number; **not** a %

Example of CV

- Suppose you have two assets, A and B. The std dev of Asset A is 1.41% while that of Asset B is 5.66%. Both assets have exactly the same expected return. Which asset is the safer option, and why?

$$\boldsymbol{CV_A = 1.41\% \div 15\% = 0.094}$$

$$\boldsymbol{CV_B = 5.66\% \div 15\% = 0.377}$$

- **NB**: A ***higher*** coefficient of variation means that an investment has ***more volatility*** relative to its expected return

Portfolio risk and return

- In real-world situations, the risk of any single investment would not be viewed independently of other assets.
- New investments must be considered in light of their impact on the risk and return of an investor's **portfolio** of assets.
- **Portfolio**: a collection of assets
- The financial manager's goal is to create an **efficient portfolio,** a portfolio that maximum return for a given level of risk.

Risk of a Portfolio: Portfolio Return and Standard Deviation

$$r_p = (w_1 \times r_1) + (w_2 \times r_2) + \cdots + (w_n \times r_n) = \sum_{j=1}^{n} w_j \times r_j$$

and

$$b_p = (w_1 \times b_1) + (w_2 \times b_2) + \cdots + (w_n \times b_n) = \sum_{j=1}^{n} w_j \times b_j$$

Where:

- W_j = proportion of the portfolio's total monetary value represented by asset *j*
- R_j = return on asset *j*
- R_P = the expected return for the portfolio

Types of Risk

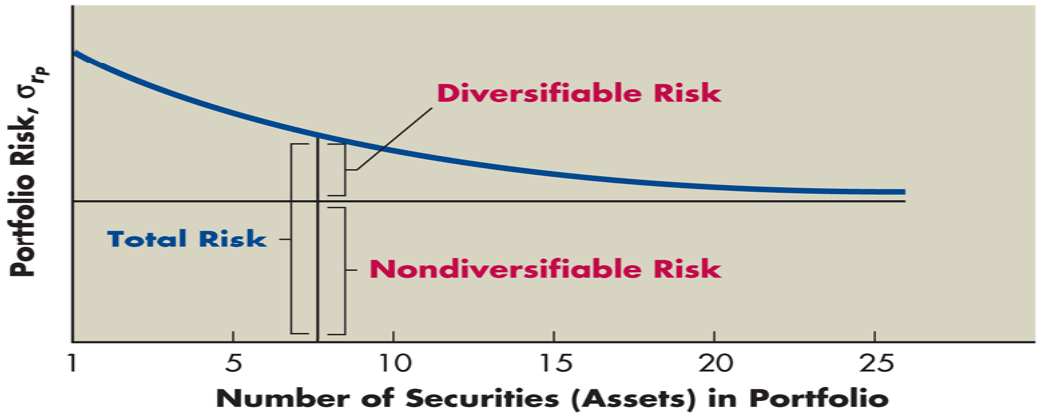
- **Total risk** is the combination of a security's nondiversifiable risk and diversifiable risk.
- **Diversifiable risk:** the portion of an asset's risk attributable to firm-specific, random causes; can be eliminated/ avoided through diversification. Also called **unsystematic risk**.
- **Nondiversifiable risk:** the relevant portion of an asset's risk attributable to market factors that affect all firms; cannot be eliminated through diversification. Also called **systematic risk.**

Diversification and Risk

- Because an investor can create a ***portfolio*** of assets that will eliminate virtually all diversifiable risk, ***the only relevant risk is nondiversifiable risk.***

FIGURE 8.7

Risk Reduction
Portfolio risk and diversification

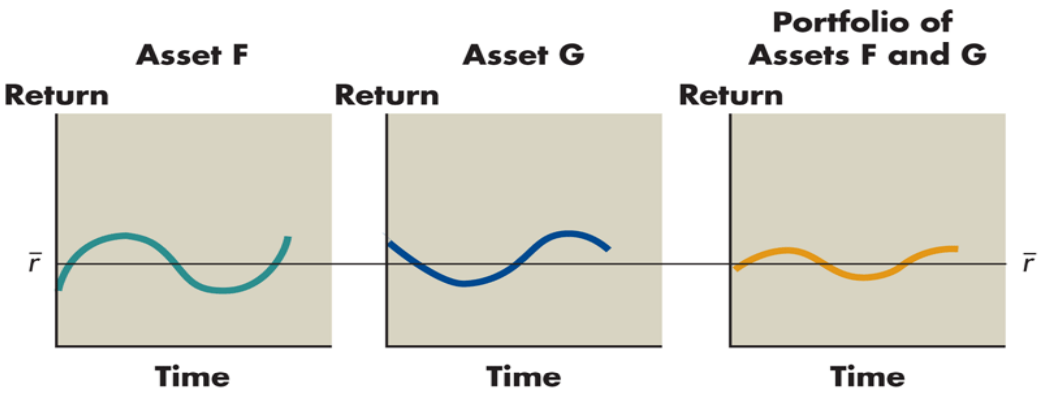


Diversification

- Combining securities that are not perfectly, positively correlated reduces risk … is called **diversification**

FIGURE 8.5

Diversification
Combining negatively correlated assets to reduce, or diversify, risk



Capital Asset Pricing Model (CAPM)

- **CAPM** is a model that describes the *relationship* between *risk* and expected (required) *return*
- In CAPM, a security's expected (required) return is the risk-free rate plus a premium based on the *systematic risk* of the security.
- Using the beta coefficient to measure nondiversifiable risk, CAPM is :

$$r_j = R_F + [b_j \times (r_m - R_F)]$$

where

- R_t = required return on asset *j*; B_j = beta coefficient
- R_F = risk-free rate of return; R_m = market return

CAPM: an example

Example

- Lisa Miller at Basket Wonders is attempting to determine the rate of return required by their stock investors. Lisa is using a **6%** R_f and a long-term market expected rate of return of **10%**. A stock analyst following the firm has calculated that the firm beta to be **1.2**.
- **Q)** What is the ***required rate of return*** on the stock of Basket Wonders?

$$\mathbf{R_{BW} = 6\% + 1.2(10\% - 6\%)}$$

$$\mathbf{R_{BW} = 10.8\%}$$

chapter 6

interest rates and bond valuation

Learning Outcomes

- Describe interest rate fundamentals
- Understand the key inputs and basic model used in the valuation process.
- Apply the basic valuation model to bonds and describe the impact of required return and time to maturity on bond values.
- Explain the yield to maturity (YTM), its calculation, and the procedure used to value bonds that pay interest semiannually.

Interest Rates & Required Returns: Nominal or Actual Rate of Interest (Return)

- The **nominal rate of interest** is the actual rate of interest charged by the supplier of funds and paid by the demander.
- The nominal rate differs from the real rate of interest, r* as a result of two factors:
  - Inflationary expectations reflected in an inflation premium (IP), and
  - Issuer and issue characteristics such as default risks and contractual provisions as reflected in a risk premium (RP).

Interest Rates & Required Returns: Nominal or Actual Rate of Interest (Return) (cont.)

Using this notation, the nominal rate of interest for security 1, r_1 is.

$$r_1 = \underbrace{r^* + IP}_{\text{risk-free rate, } R_F} + \underbrace{RP_1}_{\text{risk premium}}$$

$$r_1 = R_F + RP_1$$

Corporate Bonds: Bond Yields

- The three most widely cited yields are:
  - Current yield
  - Yield to maturity (YTM)
  - Yield to call (YTC)

Term structure of interest rates

- The **term structure of interest rates** is the relationship between the maturity and rate of return for bonds with similar levels of risk.
- A graphic depiction of the term structure of interest rates is called the **yield curve**.
- The **yield to maturity** is the compound annual rate of return earned on a debt security purchased on a given day and held to maturity.

Corporate Bonds: General Features

- The **conversion feature** of **convertible bonds** allows bondholders to exchange their bonds for a specified number of shares of common stock.
- Bondholders will exercise this option only when the market price of the stock is greater than the **conversion price**.
- A **call feature**, which is included in most corporate issues, gives the issuer the opportunity to repurchase the bond prior to maturity at the call price.

Corporate Bonds: General Features (cont.)

- In general, the **call premium** is equal to one year of coupon interest and compensates the holder for having it called prior to maturity.
- Furthermore, issuers will **exercise** the call feature when interest rates fall and the issuer can refund the issue at a lower cost.
- Issuers typically must pay a higher rate to investors for the call feature compared to issues without the feature.

Bond ratings…

TABLE 6.3 Moody's and Standard & Poor's Bond Ratings[a]

Moody's	Interpretation	Standard & Poor's	Interpretation
Aaa	Prime quality	AAA	Investment grade
Aa	High grade	AA	
A	Upper medium grade	A	
Baa	Medium grade	BBB	
Ba	Lower medium grade	BB	Speculative
	or speculative	B	
B	Speculative		
Caa	From very speculative	CCC	
Ca	to near or in default	CC	
C	Lowest grade	C	Income bond
		D	In default

[a]Some ratings may be modified to show relative standing within a major rating category; for example, Moody's uses numerical modifiers (1, 2, 3), whereas Standard & Poor's uses plus (+) and minus (−) signs.

Sources: Moody's Investors Service, Inc., and Standard & Poor's Corporation.

Basic Valuation Model

$$V_0 = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_n}{(1+r)^n}$$

V_0 = value of the asset at time zero
CF_t = cash flow *expected* at the end of year t
r = appropriate required return (discount rate)
n = relevant time period

$$V_0 = [CF_1 \times (PVIF_{r,1})] + [CF_2 \times (PVIF_{r,2})] + \cdots + [CF_n \times (PVIF_{r,n})]$$

Bond Valuation: Basic Bond Valuation

- Mills Company, a large defense contractor, on January 1, 2007, issued a 10% coupon interest rate, 10-year bond with a $1,000 par value that pays interest semiannually.

$$B_0 = I \times \left[\sum_{t=1}^{n} \frac{1}{(1 + r_d)^t}\right] + M \times \left[\frac{1}{(1 + r_d)^n}\right]$$

$$= I \times (PVIFA_{r_d,n}) + M \times (PVIF_{r_d,n})$$

B_0 = value of the bond at time zero

I = *annual* interest paid in dollars[12]

n = number of years to maturity

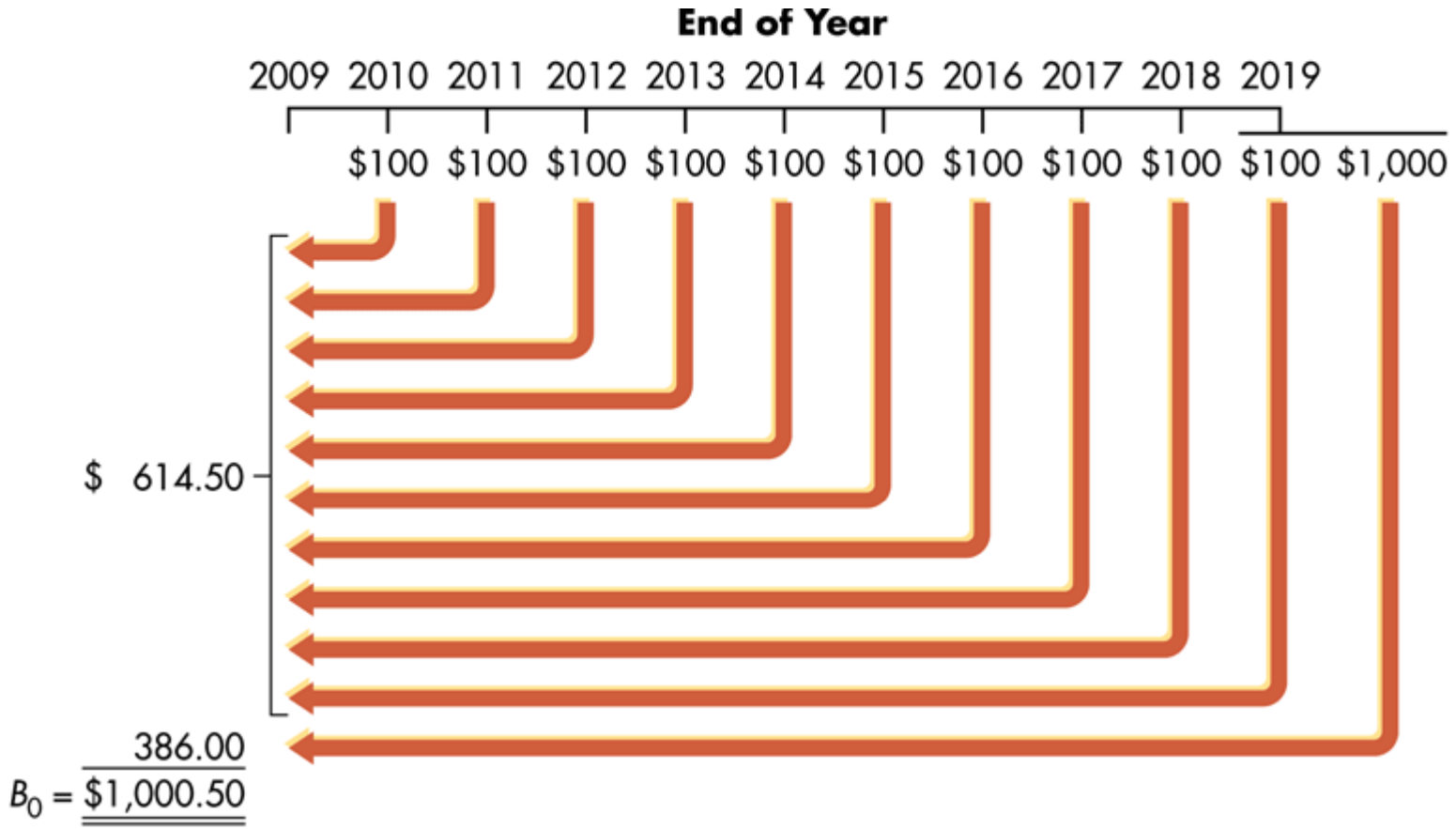
M = par value in dollars

r_d = required return on a bond

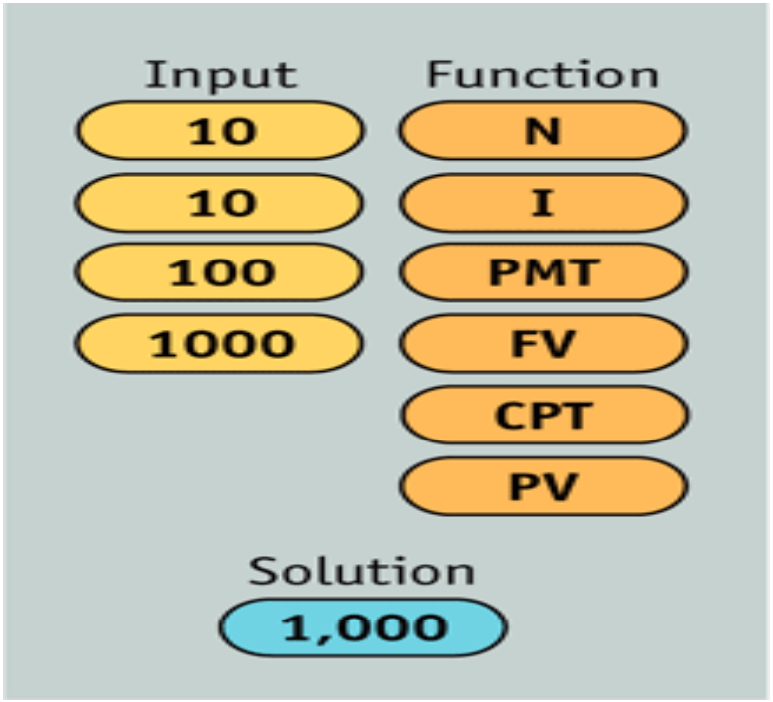
Example…cont'd

- Investors who buy this bond receive the contractual right to two cash flows: (1) \$100 annual interest (10% coupon interest rate × \$1,000 par value) distributed as \$50 (1/2 × \$100) at the end of each 6 months, and (2) the \$1,000 par value at the end of the tenth year.
- Assuming that interest on the Mills Company bond issue is paid annually and that the required return is equal to the bond's coupon interest rate, I = \$100, r_d = 10%, M = \$1,000, and n = 10 years.

Bond Valuation: Bond Fundamentals



Bond Valuation:
Bond Fundamentals (cont.)



Yield to Maturity (YTM)

- The **yield to maturity (YTM)** measures the compound annual return to an investor and considers all bond cash flows.
- YTM is essentially the bond's IRR based on the current price.
- **NB**: the YTM will only be equal to the current yield if the bond is selling for its face value (R1,000).
- And that rate will be the same as the bond's coupon rate.
- For premium bonds, the current yield > YTM.
- For discount bonds, the current yield < YTM.

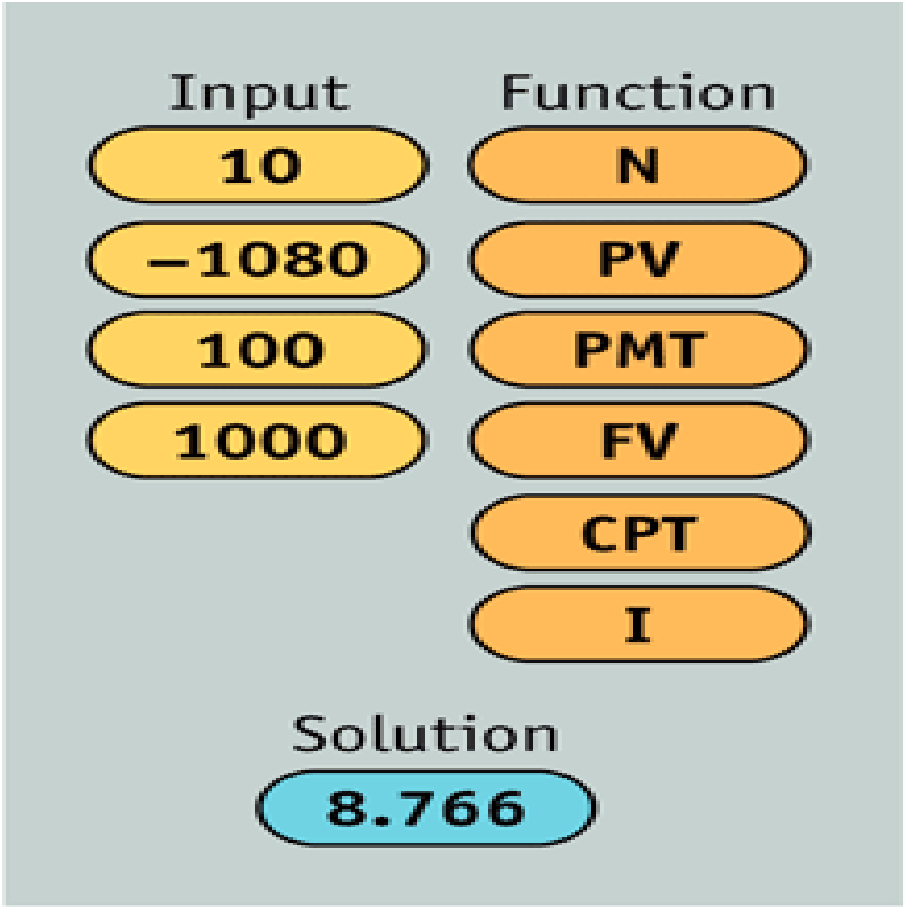
Yield to Maturity (YTM) (cont.)

- The Mills Company bond, which currently sells for $1,080, has a 10% coupon interest rate and $1,000 par value, pays interest annually, and has 10 years to maturity. What is the bond's YTM?

$1,080 = \$100 \times (PVIFA_{rd,10yrs}) + \$1,000 \times (PVIF_{rd,10yrs})$

$$
\begin{aligned}
&\$100 \times (PVIFA_{8\%,10\text{yrs}}) + \$1{,}000 \times (PVIF_{8\%,10\text{yrs}}) \\
&= \$100 \times (6.710) + \$1{,}000 \times (0.463) \\
&= \$671.00 + \$463.00 \\
&= \$1{,}134.00
\end{aligned}
$$

Yield to Maturity (YTM) (cont.)



Semi-annual interest and bond values…

- The procedure used to value bonds paying interest semiannually is similar to that shown in Chapter 5 for compounding interest more frequently than annually, except that here we need to find present value instead of future value. It involves
  1. Converting annual interest, *I*, to semiannual interest by dividing *I* by 2.
  2. Converting the number of years to maturity, *n*, to the number of 6-month periods to maturity by multiplying *n* by 2.
  3. Converting the required stated (rather than effective) annual return for similar-risk bonds that also pay semiannual interest from an annual rate, r_d, to a semiannual rate by dividing r_d by 2.

Yield to Maturity (YTM): Semiannual Interest and Bond Values

$$B_0 = \frac{I}{2} \times \left[\sum_{t=1}^{2n} \frac{1}{\left(1 + \frac{r_d}{2}\right)^t} \right] + M \times \left[\frac{1}{\left(1 + \frac{r_d}{2}\right)^{2n}} \right]$$

$$= \frac{I}{2} \times (PVIFA_{r_d/2,2n}) + M \times (PVIF_{r_d/2,2n})$$

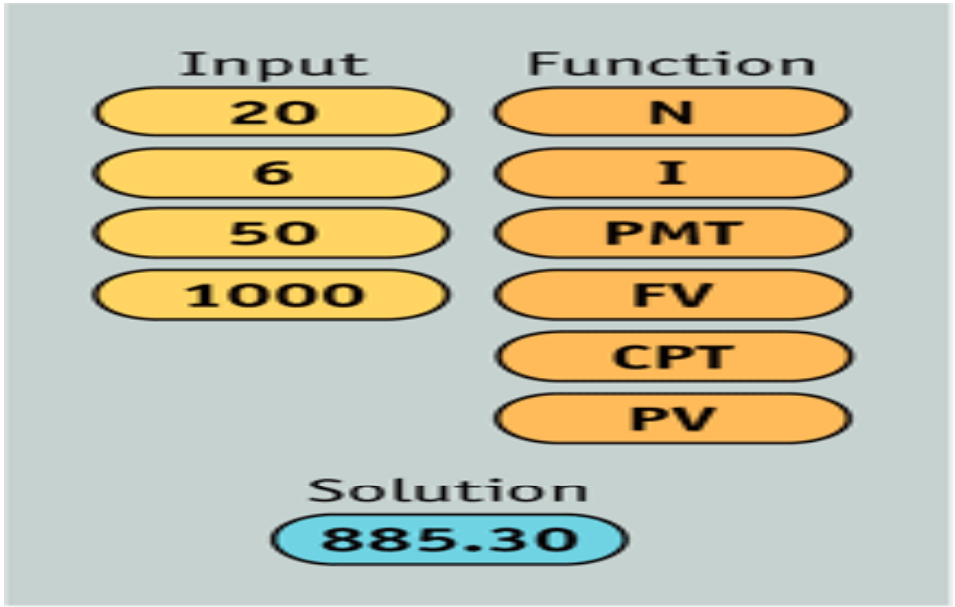
Assuming that the Mills Company bond pays interest semiannually and that the required stated annual return, r_d is 12% for similar risk bonds that also pay semiannual interest, substituting these values into the Equation yields

YTM: Semiannual Interest and Bond Values

$$B_0 = \$50 \times (PVIFA_{6\%,20\text{periods}}) + \$1{,}000 \times (PVIF_{6\%,20\text{periods}})$$

$$= \$50 \times (11.470) + \$1{,}000 \times (0.312) = \underline{\$885.50}$$

$$B_0 = \frac{\$100}{2} \times \left[\sum_{t=1}^{20} \frac{1}{\left(1 + \frac{0.12}{2}\right)^t} \right] + \$1{,}000 \times \left[\frac{1}{\left(1 + \frac{0.12}{2}\right)^{20}} \right] = \$885.30$$



chapter 7

share valuation

Learning Outcomes

- Differentiate between debt and equity
- Identify key features of ordinary and preference shares
- Understand the concept of market efficiency
- Value shares using zero growth, constant growth, and variable growth models.
- Discuss the free cash flow valuation model and the book value, liquidation value, and price/earnings (P/E) multiple approaches.

Differences Between Debt & Equity

Characteristic	Type of capital	
	Debt	Equity
Voice in management[a]	No	Yes
Claims on income and assets	Senior to equity	Subordinate to debt
Maturity	Stated	None
Tax treatment	Interest deduction	No deduction

[a]In the event that the issuer violates its stated contractual obligations to them, debtholders and preferred stockholders *may* receive a voice in management; otherwise, only common stockholders have voting rights.

Share Valuation

- shareholders expect to be compensated for their investment in a firm's shares through periodic **dividends** and **capital gains**.
- Investors purchase shares when they feel they are **undervalued** and sell them when they believe they are **overvalued**.
- This section describes specific share valuation techniques after first discussing the concept of market efficiency.

Market efficiency

- Investors base their investment decisions on their perceptions of an asset's **risk**.
- In competitive markets, the interaction of many buyers and sellers result's in an **equilibrium price**—the market value—for each security.
- This price is reflective of all information available to market participants in making buy or sell investment decisions.

Market efficiency

- The **efficient market hypothesis**, which is the basic theory describing the behaviour of a “perfect” market specifically states:
  - Securities are typically in equilibrium, meaning they are fairly priced and their expected returns equal their required returns.
  - At any point in time, security prices fully reflect all public information available about a firm and its securities and these prices react quickly to new information.
  - Because stocks are fairly priced, investors need not waste time trying to find and capitalize on improperly priced securities (a.k.a “trying to beat the market”).

EMH

- EMH has 3 forms:
  - Weak form: prices reflect all **past** public info
  - Semi-strong form: prices reflect all publicly available info
  - Strong form: prices reflect all info, including hidden or insider info, i.e. all publicly and privately available information, making it impossible to earn abnormal returns on the stock market

Mkt adjustment to new info

- The process of market adjustment to new information can be viewed in terms of **rates of return**.
- Whenever investors find that the expected return is not equal to the required return, price adjustment will occur.
- If **expected return** is greater than **required return**, investors will buy and bid up price until new equilibrium price is reached.
- The opposite would occur if required return is greater than expected return.

Ordinary share Valuation

E(r) = D/P + g

For example, if the firm's R1 dividend on a R25 share is expected to grow at 7%, the expected return is:

E(r) = 1/25 + .07 = 11%

Share Valuation Models: The Basic Share Valuation Equation

$$P_0 = \frac{D_1}{(1 + r_s)^1} + \frac{D_2}{(1 + r_s)^2} + \cdots + \frac{D_\infty}{(1 + r_s)^\infty}$$

P_0 = value of common stock

D_t = per-share dividend *expected* at the end of year t

r_s = required return on common stock

Share Valuation Models: The Zero Growth Model

The **zero growth dividend growth** model assumes that the share will pay the same dividend each year, year after year.

$$P_0 = D_1 \times \sum_{t=1}^{\infty} \frac{1}{(1 + r_s)^t} = D_1 \times (PVIFA_{r_s,\infty}) = D_1 \times \frac{1}{r_s} = \frac{D_1}{r_s}$$

Share Valuation Models: The Zero Growth Model (cont.)

The dividend of Denham Company, an established textile manufacturer, is expected to remain constant at R3 per share indefinitely. What is the value of Denham's stock if the required return demanded by investors is 15%?

$$\mathbf{P_0 = R3/0.15 = R20}$$

Note that the zero growth model is also the appropriate valuation technique for valuing *preferred* shares.

Share Valuation Models: Constant Growth Model

The constant dividend growth model assumes that the share will pay dividends that grow at a constant rate each year—year after year forever.

$$P_0 = \frac{D_0 \times (1+g)^1}{(1+r_s)^1} + \frac{D_0 \times (1+g)^2}{(1+r_s)^2} + \cdots + \frac{D_0 \times (1+g)^\infty}{(1+r_s)^\infty}$$

$$P_0 = \frac{D_1}{r_s - g}$$

Share Valuation Models: Constant Growth Model (cont.)

Lamar Company, a small cosmetics company, paid the following per share dividends:

Year	Dividend per share
2009	$1.40
2008	1.29
2007	1.20
2006	1.12
2005	1.05
2004	1.00

Share Valuation Models: Constant Growth Model (cont.)

Using the formula on the next slide and time value techniques, we can determine that the growth in dividends is 7%*.

$$P_0 = \$1.50/(0.15 - 0.07) = \$18.75$$

Finding the growth rate, “g”

$$g = \left[\left(\frac{div_{new}}{div_{old}} \right)^{\frac{1}{n}} - 1 \right] x100$$

So, to find the growth rate in the previous table,

$$g = \left[\left(\frac{1.40}{1.00} \right)^{\frac{1}{5}} \right] - 1 = 1.0696 - 1 = 6.9610 = 7\%$$

PART 3

ASSESSMENTS

SUMMATIVE ASSESSMENT

The structure of the examination has now changed. The examination shall comprise of 1 paper, **2 hrs** long and consisting of two sections. It will be marked out of 70 marks and constitutes 90% of the final mark. **Section A** will consist of 40 multiple choice questions worth 40 marks. **Section B** consists of 2 long questions worth 30 marks. **Section B** will be based on **any 3** of the prescribed chapters.