RASHTREEYA SIKSHANA SAMITHI TRUST
R V INSTITUTE OF MANAGEMENT
CA 17, 26 Main, 36th Cross, 4th T Block, Jayanagar
Bengaluru, Karnataka 560 041

COURSE DESIGN, DELIVERY AND ASSESSMENT

Semester: II

Course Code: 21MBA321

Course Name: Financial Management

Dr. Purushottam Bung

Director, RVIM, Bangalore

(Signature & Date)

COURSE DESIGN, DELIVERY AND ASSESSMENT

Course Code and Title: **21MBA321 Financial Management**	Course Credits : 4
Internal Assessment Marks : **50 Marks**	SEE : **50 Marks**
Total No of Theory / Lab Hours : 36 sessions	
Reviewed by : Dr. Purushottam Bung	

Prerequisite of the courses
• Basic knowledge of Company's Annual Report
• Basic MS Excel
• Basic Accounting Knowledge

COURSE OUTCOMES (CO):

At the successful completion of this course the students should be able to;

CO1	Apply the time value concepts for basic financial decision making
CO2	Calculate the cost of capital for a business or a project
CO3	Evaluate projects using capital budgeting techniques
CO4	Analyse the impact of different kinds of dividends on shareholder wealth and the optimum capital structure for a business.
CO5	Evaluate working capital effectiveness of a firm

Module Wise Outcomes: -

On Successful completion of each module students will be able to:

Module 1:

MO1-Describe the financial environment within which organizations must operate with special focus on shareholder's wealth maximization

MO2 -Outline the role of chief financial officer in light of growing needs of a modern organization.

Module 2

MO3 Identify various types of cash flow patterns and apply the Time Value of Money concept compute Future Value and Present value of different cash flow stream.

MO4-Calculate rates of return and know their use in making financial decisions

Module **3**

MO5-Analyze the impact of change in EBIT on EPS under different capital structures

MO6 - Understand the concept of cost of capital that impacts the capital investment decisions of a business

MO7- Appreciate the importance of leverage analysis in capital structure decisions.

Module 4

MO8 Appreciate the importance of cash & cash flows in project appraisal and Understand what all is involved in the evaluation of capital budgeting

M09- Analyze various techniques of project evaluation and evaluate the impact of income tax and working capital on capital budgeting decisions

Module 5

MO10- Evaluate the role of short-term financial management in financial decision

MO11- Analyze the key strategies and techniques used to manage cash, receivables, inventory and payables.

MO12-Understand the concept of Dividend Decision.

MO13- Appreciate the Theories of Relevance and irrelevance of Dividend and also understand the Dividend Policies in Practice in India.

PEDAGOGY	a. Classroom Discussion b. Financial modeling using Spreadsheet- Time value of Money, Investment Decisions c. Application based teaching (Time value of Money Mobile Applications) d. Project Based teaching- Listed companies for Cost of capital e. Industry Interaction with the Practitioner

SYLLABUS

21MBA321: FINANCIAL MANAGEMENT

INTRODUCTION

"Beware of little expenses. A small leak will sink a great ship"- By Benjamin Franklin

The subject helps the students to understand the basics concepts of financial management such as Time value of money, cost of capital, Capital Budgeting, Working capital and so on. This course aims at equipping a potential manager with the tools and techniques that help make financial decisions of the business and thereby lead to achieving the goal of business – 'wealth maximization.

Module 1: Overview and Time Value of Money (8 Hours)

- **Introduction:** Objectives of Financial Management, Profit Maximization v/s Wealth Maximisation and Three Decisions in Finance.
- Time value of money, Future Values - Compounding Process, Present Values - Discounting Process, Single Cash Flow, Annuity, Perpetuity, Uneven Cash Flows, Multi-Periods in Compounding and Discounting, Loan Amortisation, Nominal v/s Effective Annual Rates.

Module 2: Cost of Capital (6 Hours)

- **Cost of Capital**: Cost of Debt, Post-Tax Cost of Debt, Cost of Equity: DDM (Dividend Discount Model), CAPM (Capital Assets Pricing Model) and Weighted Average Cost of Capital (WACC).

Module 3: Investment Decision (10 Hours)

- Estimation of Project Cash flows: Initial Cash flow & Subsequent Cash flow
- Evaluation of Investment Decisions: Traditional and Modern Methods: Payback Period, Average Rate of Return, Net Present Value NPV, Internal Rate of Return, Modified Internal Rate of Return and Discounted Payback Period.

Module 4: Capital Structure and Dividend Policy (6 Hours)

- **Introduction**, Planning the Capital Structure, Capital Structure Theory (in brief), Factors Affecting Capital Structure Decisions.
- **Dividend Policies**: Dividend policy in Practice Dividend theories – relevance and irrelevance: Walter, Gordon and Modigliani-Miller Hypothesis (including problems).

Module 5: Working Capital Management (6 Hours)

- Estimation of Working Capital: Current Assets and Current Liabilities, Concept of Working Capital Management, Operating Cycle, Cash Cycle, Cost of Trade Credit. (Problems on Estimation of Working Capital)

Teaching Learning Resources:

Essential Readings

1. Prasanna Chandra, "Financial Management", McGraw Hill Education
2. Brigham and Houston (2015), Fundamentals of Financial Management, Cengage (15th edition)
3. Brealey, R. A. (2007). Principles of Corporate Finance, Tata McGraw-Hill Education
4. Van, Horne James, C. (2002), Financial Management & Policy, Pearson Education India, (12th edition)

References

1. Bahal, Mohit, "Practical Aspects of Financial Management", Suchita Prakashan
2. Sharma, Dhiraj, "Working Capital Management – A conceptual Approach", Himalaya Publishing House
3. Bhalla, V.K., "Financial Markets and Institutions", S. Chand and Co
4. Hampton, John, "Financial Decision Making – Concepts, Problems and Cases", Prentice Hall of India
5. Khan, M.Y; "Indian Financial System", The McGraw Hill Companies

Supplementary Resources

- MOOC on Financial Management – Illinois University (Coursera)
- https://jgateplus.com/home/
- https://capitaline.com/
- http://web.b.ebscohost.com/ehost/search/basic?vid=1&sid=c8b5124d-307d-4f0a-843e-3b13e9156a4a%40pdc-v-sessmgr06
- https://elibrary.in.pearson.com/login

CONCEPT MAP

Financial Management

deals with	deals with	deals with	deals with	deals with
1.0: **Overview TVM**	2.0: **Cost of Capital**	3.0 **Investment Decision**	4.0 **Capital Structure and Dividend Policy**	5.0 **Working Capital Management**
1.1 Profit Maximization v/s Wealth Maximisation	2.1 Introduction to Cost of Capital	3.1 Estimation of Project Cash flows	4.1 Introduction: Planning the Capital Structure	5.1 Estimation of Working Capital
1.2 Three Decisions in Finance	2.2 Problems on Cost of equity & Preference Shares	3.2 Evaluation of Investment Decisions: Traditional	4.2 Capital Structure Theory & Factors Affecting Capital Structure Decisions	5.2 Operating Cycle, Cash Cycle
1.3 Problems on Time value of money	2.3 Problems on Cost of Debt	3.3 Evaluation of Investment Decisions: Modern Methods	4.3 Dividend policy	5.3 Cost of Trade Credit.
	2.4 Problems on Cost of Retained Earnings			

Course Contents and Session Plan

Part B
Session Plan

#	Coverage of Key Components	Pedagogy/ Activity	Reading Material to be referred	BT
Module 1				
1	Introduction: Objectives of Financial Management, Profit Maximization v/s Wealth Maximization and Three Decisions in Finance.	a. Lectures b. Classroom Discussion c. Case Study	Chapter 1 of Book 1 Chapter 1 of Book 2 PPT - Module 1	L1
2	Basic Concepts of Time value of money, Future Values - Compounding Process, Present Values - Discounting Process, Single Cash Flow, Annuity,	a. Lectures b. Classroom Discussion	Chapter 6 of Book 1 Chapter 2 of Book 2 PPT - Module 1a	L3
3	Perpetuity, Uneven Cash Flows. Multi-Periods in Compounding and Discounting, Loan Amortization, Nominal v/s Effective Annual Rates	a. Lectures b. Classroom Discussion	Chapter 6 of Book 1 Chapter 2 of Book 2 PPT - Module 1a The time value of money Calculating the Real Value of your investment Finance for Managers - Harvard Business school press	L3
4	Additional Problems on Time Value of Money	a. Lectures b. Classroom discussion c. Problems	Chapter 6 of Book 1 Chapter 2 of Book 2 PPT - Module 1a	L3
5	Additional Problems on Time value of Money	a. Lectures b. Problems	Chapter 6 of Book 1 Chapter 2 of Book 2 PPT - Module 1a	L3
6	Excel Modules	a. Lab		L4
7	Excel Modules	a. Lab		L4
8	Unit End Assignment / Unit Test			
9	Cost of Capital: Cost of Debt, Post-Tax Cost of Debt	a. Lectures b. Classroom discussion c. Problems	Chapter 18 of Book 3 Chapter 14 of Book 1 Chapter 9 of Book 2 PPT - Module 2	L3
10	Cost of Equity: DDM (Dividend Discount Model)	a. Lectures b. Classroom discussion c. Problems	Chapter 18 of Book 3 Chapter 14 of Book 1 Chapter 9 of Book 2 PPT - Module 2	L3

			Note on Theory of Optimal Capital Structure	
11	CAPM(Capital Assets Pricing Model)	a. Lectures b. Classroom discussion c. Problems	Chapter 18 of Book 3 Chapter 14 of Book 1 Chapter 9 of Book 2 PPT - Module 2 Note on Theory of Optimal Capital Structure	L3
12	Weighted Average Cost of Capital(WACC)	a. Lectures b. Classroom discussion c. Problems	Chapter 13 & 19 of Book 3 PPT _ Module 2	L3
13	Additional Problems on Cost of Capital	a. Lectures b. Classroom discussion c. Problems	Chapter 13 & 19 of Book 3 PPT _ Module 2	L3
14	Unit End Assignment / Unit Test	a. Lectures b. Classroom discussion c. Problems		
15	Estimation of Project Cash Flows: Initial Cash flow & Subsequent Cash flow	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L2
16	Evaluation of Investment Decisions: Traditional and Modern Methods: Payback Period	a. Lectures b. Classroom discussion c. Problems	Chapter 12 of Book 1 Chapter 10 of Book 2 PPT Module 3	L3
17	Accounting Rate of Return - Concept Equation and problems	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3
18	Net Present Value NPV	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3
19	Internal Rate of Return, Modified Internal Rate of Return	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3
20	Discounted Payback Period	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3

21	Additional Problems on Investment Decision	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3
22	Additional Problems on Investment Decision	a. Lectures b. Classroom discussion c. Problems	Chapter 11 of Book 1 Chapter 8 of Book 2 PPT Module 3	L3
23	Excel Modules	a. Lectures b. Classroom discussion c. Problems		L3
24	Unit Test	a. Lectures b. Classroom discussion c. Problems		
25	Introduction, Planning the Capital Structure, Capital Structure Theory (in brief), Factors Affecting Capital Structure Decisions.	a. Lectures b. Classroom discussion c. Problems	Chapter 17 of Book 1 Chapter 14 of Book 3 PPT - Module 4	L2
26	Dividend Policies: Dividend policy in Practice Dividend theories – relevance and irrelevance: Walter models - problems	a. Lectures b. Classroom discussion c. Problems	Chapter 22 of Book 1 Chapter 18 of Book 2 PPT Module 3	L2
27	Gordon - Problems	a. Lectures b. Classroom discussion c. Problems	Chapter 22 of Book 1 Chapter 18 of Book 2 PPT Module 3	L3
28	Modigliani-Miller Hypothesis - Problems	a. Lectures b. Classroom discussion c. Problems	Chapter 22 of Book 1 Chapter 17 & 18 of Book 2 PPT Module 3	L3
29	Excel Modules	a. Lectures b. Classroom discussion c. Problems		L3
30	Unit Test	a. Lectures b. Classroom discussion c. Problems		
31	Estimation of Working Capital: Current Assets and Current Liabilities, Concept of Working Capital Management, Operating Cycle, Cash Cycle, Cost of Trade Credit.	a. Lectures b. Classroom discussion c. Problems	Chapter 23 of Book 1 Chapter 27 of Book 2 PPT Module 5	L2
32	Problems on Estimation of Working Capital	a. Lectures	Chapter 23 of Book 1 Chapter 27 of Book 2	L3

		b. Classroom discussion c. Problems	PPT Module 5	
33	Problems on Estimation of Working Capital	a. Lectures b. Classroom discussion c. Problems	Chapter 23 of Book 1 Chapter 27 of Book 2 PPT Module 5	L3
34	Problems on Estimation of Working Capital	a. Lectures b. Classroom discussion c. Problems	Chapter 23 of Book 1 Chapter 27 of Book 2 PPT Module 5	L3
35	Excel Modules	a. Lectures b. Classroom discussion c. Problems		L3
36	Unit Test	a. Lectures b. Classroom discussion c. Problems		
37	Final Assignment Report Submission	a. Lectures b. Classroom discussion c. Problems		L4

Text Books to be referred:

1. Chandra Prasanna, “Financial Management - Theory and Practice”, Tata McGraw - Hill Publishing Company Ltd
2. Pandey I M, “Financial Management - Theory and Practice” Vikas Publications
3. Shashi K Gupta, Neeti Gupta, Financial Management, Kalyani Publishers

RBT: L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 – Creating.

**Remarks: This column includes space for noting reasons for deviations in date of class conduction and HOI’s sign*

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	1	1	2	2	2	-	1
CO2	3	1	-	1	2	2	1	3	2	1	2
CO3	3	2	1	2	1	2	1	3	1	1	1
CO4	3	1	-	1	-	2	1	2	2	1	2
CO5	3	1	-	1	1	-	1	2	1	-	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No Co-relation

(a) OTHER ASSESSMENT:

Course Evaluation Plan:				
Sl. No	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	All the end of the semester
2	Mid- Term Exam	Individual	20	After completion of 2-3 modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Module wise Quiz	Individual	10	End of each module
5	Capstone Project	Individual	15	End of all modules

Sl. No.	ACL technique	Timeline
1.	Bookend Method, Jigsaw Technique-Time Value of Money	Module 1
2.	Bookend Method, Think-Pair-Share Technique-Cost of Capital	Module 2
3.	Bookend Method- Capital Budgeting	Module 3
4.	Flipped - Capital Structure Theory	Module 4
5.	Bookend Method- Working Capital Management	Module 5

	Name	**Signature with Date**

Prepared by	**Dr. Dileep S**	
Prepared by	**Dr. Jahnavi M.**	
Prepared by	**Prof. Pooja R Takalkar**	
Reviewed by	**Dr. Purushottam Bung**	

Course Evaluation Plan:			
Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
End Term Exam	Individual	50	All the end of the semester
Mid- Term Exam	Individual	20	After completion of 2-3 modules
Attendance and Class Participation	Individual	5	At the end of the semester
Module wise Quiz	Individual	10	End of each module
Capstone Project	Individual	15	End of 3rd Module

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21MBA321: FINANCIAL MANAGEMENT

2nd Semester 2022-24 Batch
Section: A
Capstone Project on Investment Decision on.....

Sl. No	Student Name	Company Name	Industry
1		ACC Ltd.	CEMENT & CEMENT PRODUCTS
2		AU Small Finance Bank Ltd.	FINANCIAL SERVICES
3		Aarti Industries Ltd.	CHEMICALS
4		Adani Enterprises Ltd.	METALS
5		Adani Green Energy Ltd.	POWER
6		Adani Ports and Special Economic Zone Ltd.	SERVICES
7		Adani Total Gas Ltd.	OIL & GAS
8		Adani Transmission Ltd.	POWER
9		Aditya Birla Capital Ltd.	FINANCIAL SERVICES
10		Aditya Birla Fashion and Retail Ltd.	CONSUMER SERVICES
11		Ajanta Pharmaceuticals Ltd.	PHARMA

12		Alembic Pharmaceuticals Ltd.	PHARMA
13		Alkem Laboratories Ltd.	PHARMA
14		Amara Raja Batteries Ltd.	AUTOMOBILE
15		Ambuja Cements Ltd.	CEMENT & CEMENT PRODUCTS
16		Apollo Hospitals Enterprise Ltd.	HEALTHCARE SERVICES
17		Apollo Tyres Ltd.	AUTOMOBILE
18		Ashok Leyland Ltd.	AUTOMOBILE
19		Asian Paints Ltd.	CONSUMER GOODS
20		Astral Ltd.	INDUSTRIAL MANUFACTURING
21		Aurobindo Pharma Ltd.	PHARMA
22		Avenue Supermarts Ltd.	CONSUMER SERVICES
23		Axis Bank Ltd.	FINANCIAL SERVICES
24		Bajaj Auto Ltd.	AUTOMOBILE
25		Bajaj Finance Ltd.	FINANCIAL SERVICES
26		Bajaj Finserv Ltd.	FINANCIAL SERVICES
27		Bajaj Holdings & Investment Ltd.	FINANCIAL SERVICES
28		Balkrishna Industries Ltd.	AUTOMOBILE
29		Bandhan Bank Ltd.	FINANCIAL SERVICES
30		Bank of Baroda	FINANCIAL SERVICES
31		Bank of India	FINANCIAL SERVICES
32		Bata India Ltd.	CONSUMER GOODS

33		Berger Paints India Ltd.	CONSUMER GOODS
34		Bharat Petroleum Corporation Ltd.	OIL & GAS
35		Biocon Ltd.	PHARMA
36		Bosch Ltd.	AUTOMOBILE
37		Britannia Industries Ltd.	CONSUMER GOODS
38		Cadila Healthcare Ltd.	PHARMA
39		Canara Bank	FINANCIAL SERVICES
40		Castrol India Ltd.	OIL & GAS
41		Cholamandalam Investment and Finance Company Ltd.	FINANCIAL SERVICES
42		Cipla Ltd.	PHARMA
43		City Union Bank Ltd.	FINANCIAL SERVICES
44		Coal India Ltd.	METALS
45		Coforge Ltd.	IT
46		Colgate Palmolive (India) Ltd.	CONSUMER GOODS
47		Container Corporation of India Ltd.	SERVICES
48		Coromandel International Ltd.	FERTILISERS & PESTICIDES
49		Crompton Greaves Consumer Electricals Ltd.	CONSUMER GOODS
50		Cummins India Ltd.	INDUSTRIAL MANUFACTURING
51		DLF Ltd.	CONSTRUCTION
52		Dabur India Ltd.	CONSUMER GOODS

53		Dalmia Bharat Ltd.	CEMENT & CEMENT PRODUCTS
54		Deepak Nitrite Ltd.	CHEMICALS
55		Dhani Services Ltd.	FINANCIAL SERVICES
56		Divi's Laboratories Ltd.	PHARMA
57		Dixon Technologies (India) Ltd.	CONSUMER GOODS
58		Dr. Lal Path Labs Ltd.	HEALTHCARE SERVICES
59		Dr. Reddy's Laboratories Ltd.	PHARMA
60		Eicher Motors Ltd.	AUTOMOBILE

2nd Semester 2021-23 Batch

Section: B

Capstone Project on Measuring Financial Health of Selected Company

Sl. No	Student Name	Company Name	Industry
61		Emami Ltd.	CONSUMER GOODS
62		Endurance Technologies Ltd.	AUTOMOBILE
63		Escorts Ltd.	AUTOMOBILE
64		Exide Industries Ltd.	AUTOMOBILE
65		Federal Bank Ltd.	FINANCIAL SERVICES
66		Fortis Healthcare Ltd.	HEALTHCARE SERVICES
67		GAIL (India) Ltd.	OIL & GAS
68		Gland Pharma Ltd.	PHARMA
69		Glenmark Pharmaceuticals Ltd.	PHARMA
70		Godrej Consumer Products Ltd.	CONSUMER GOODS

71		Godrej Industries Ltd.	CONSUMER GOODS
72		Godrej Properties Ltd.	CONSTRUCTION
73		Grasim Industries Ltd.	CEMENT & CEMENT PRODUCTS
74		Gujarat Gas Ltd.	OIL & GAS
75		Gujarat State Petronet Ltd.	OIL & GAS
76		HCL Technologies Ltd.	IT
77		HDFC Asset Management Company Ltd.	FINANCIAL SERVICES
78		HDFC Bank Ltd.	FINANCIAL SERVICES
79		Havells India Ltd.	CONSUMER GOODS
80		Hero MotoCorp Ltd.	AUTOMOBILE
81		Hindalco Industries Ltd.	METALS
82		Hindustan Aeronautics Ltd.	INDUSTRIAL MANUFACTURING
83		Hindustan Copper Ltd.	METALS
84		Hindustan Petroleum Corporation Ltd.	OIL & GAS
85		Hindustan Unilever Ltd.	CONSUMER GOODS
86		Hindustan Zinc Ltd.	METALS
87		Housing Development Finance Corporation Ltd.	FINANCIAL SERVICES
88		ICICI Bank Ltd.	FINANCIAL SERVICES
89		IDFC First Bank Ltd.	FINANCIAL SERVICES
90		ITC Ltd.	CONSUMER GOODS
91		Indiamart Intermesh Ltd.	CONSUMER SERVICES

92		Indian Bank	FINANCIAL SERVICES
93		Indian Hotels Co. Ltd.	CONSUMER SERVICES
94		Indian Oil Corporation Ltd.	OIL & GAS
95		Indian Railway Catering And Tourism Corporation Ltd.	SERVICES
96		Indian Railway Finance Corporation Ltd.	FINANCIAL SERVICES
97		Indraprastha Gas Ltd.	OIL & GAS
98		Indus Towers Ltd.	TELECOM
99		IndusInd Bank Ltd.	FINANCIAL SERVICES
100		Info Edge (India) Ltd.	CONSUMER SERVICES
101		Infosys Ltd.	IT
102		InterGlobe Aviation Ltd.	SERVICES
103		Ipca Laboratories Ltd.	PHARMA
104		JSW Energy Ltd.	POWER
105		JSW Steel Ltd.	METALS
106		Jindal Steel & Power Ltd.	METALS
107		Jubilant Foodworks Ltd.	CONSUMER SERVICES
108		Kotak Mahindra Bank Ltd.	FINANCIAL SERVICES
109		L&T Finance Holdings Ltd.	FINANCIAL SERVICES
110		L&T Technology Services Ltd.	IT
111		LIC Housing Finance Ltd.	FINANCIAL SERVICES

112		Larsen & Toubro Infotech Ltd.	IT
113		Larsen & Toubro Ltd.	CONSTRUCTION
114		Laurus Labs Ltd.	PHARMA
115		Lupin Ltd.	PHARMA
116		MRF Ltd.	AUTOMOBILE
117		Mahindra & Mahindra Financial Services Ltd.	FINANCIAL SERVICES
118		Mahindra & Mahindra Ltd.	AUTOMOBILE
119		Manappuram Finance Ltd.	FINANCIAL SERVICES
120		Marico Ltd.	CONSUMER GOODS

2nd Semester 2021-23 Batch
Section: C
Capstone Project on Measuring Financial Health of Selected Company

Sl. No	**Student Name**	**Company Name**	**Industry**
121		Maruti Suzuki India Ltd.	AUTOMOBILE
122		MindTree Ltd.	IT
123		MphasiS Ltd.	IT
124		Muthoot Finance Ltd.	FINANCIAL SERVICES
125		NATCO Pharma Ltd.	PHARMA
126		NMDC Ltd.	METALS
127		NTPC Ltd.	POWER
128		National Aluminium Co. Ltd.	METALS

129		Navin Fluorine International Ltd.	CHEMICALS
130		Nestle India Ltd.	CONSUMER GOODS
131		Nippon Life India Asset Management Ltd.	FINANCIAL SERVICES
132		Oberoi Realty Ltd.	CONSTRUCTION
133		Oil & Natural Gas Corporation Ltd.	OIL & GAS
134		Oil India Ltd.	OIL & GAS
135		PI Industries Ltd.	FERTILISERS & PESTICIDES
136		Page Industries Ltd.	TEXTILES
137		Petronet LNG Ltd.	OIL & GAS
138		Pidilite Industries Ltd.	CHEMICALS
139		Piramal Enterprises Ltd.	FINANCIAL SERVICES
140		Polycab India Ltd.	INDUSTRIAL MANUFACTURING
141		Power Finance Corporation Ltd.	FINANCIAL SERVICES
142		Power Grid Corporation of India Ltd.	POWER
143		Prestige Estates Projects Ltd.	CONSTRUCTION
144		Procter & Gamble Hygiene & Health Care Ltd.	CONSUMER GOODS
145		Punjab National Bank	FINANCIAL SERVICES
146		RBL Bank Ltd.	FINANCIAL SERVICES
147		REC Ltd.	FINANCIAL SERVICES
148		Reliance Industries Ltd.	OIL & GAS
149		SBI Cards and Payment Services Ltd.	FINANCIAL SERVICES

150		SBI Life Insurance Company Ltd.	FINANCIAL SERVICES
151		SRF Ltd.	CHEMICALS
152		Sanofi India Ltd.	PHARMA
153		Shree Cement Ltd.	CEMENT & CEMENT PRODUCTS
154		Shriram Transport Finance Co. Ltd.	FINANCIAL SERVICES
155		Siemens Ltd.	INDUSTRIAL MANUFACTURING
156		Sona BLW Precision Forgings Ltd.	AUTOMOBILE
157		State Bank of India	FINANCIAL SERVICES
158		Steel Authority of India Ltd.	METALS
159		Sun Pharmaceutical Industries Ltd.	PHARMA
160		Sun TV Network Ltd.	MEDIA ENTERTAINMENT & PUBLICATION
161		TVS Motor Company Ltd.	AUTOMOBILE
162		Tata Chemicals Ltd.	CHEMICALS
163		Tata Communications Ltd.	TELECOM
164		Tata Consultancy Services Ltd.	IT
165		Tata Consumer Products Ltd.	CONSUMER GOODS
166		Tata Motors Ltd.	AUTOMOBILE
167		Tata Steel Ltd.	METALS
168		Tech Mahindra Ltd.	IT
169		The Ramco Cements Ltd.	CEMENT & CEMENT PRODUCTS
170		Titan Company Ltd.	CONSUMER GOODS

171		Trent Ltd.	CONSUMER SERVICES
172		UltraTech Cement Ltd.	CEMENT & CEMENT PRODUCTS
173		Union Bank of India	FINANCIAL SERVICES
174		United Breweries Ltd.	CONSUMER GOODS
175		United Spirits Ltd.	CONSUMER GOODS
176		Varun Beverages Ltd.	CONSUMER GOODS
177		Voltas Ltd.	CONSUMER GOODS
178		Whirlpool of India Ltd.	CONSUMER GOODS
179		Wipro Ltd.	IT
180		Zee Entertainment Enterprises Ltd.	MEDIA ENTERTAINMENT & PUBLICATION

Dr. Dileep S, Dr. Jahnavi M. & Prof. Pooja Taklakar

Course Facilitator

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21MBA321: FINANCIAL MANAGEMENT

2nd Semester 2021-23 Batch
Section: A / B / C

Rubrics for Evaluation

1	**Calculation of Cost of Capital- RUBRICS**	**4 Marks**
2	**Calculation of Expected Cash Flows – Rubrics for steps to estimate cash inflows and cash outflows**	**4 Marks**
3	**Calculation of Investment Decision - Rubrics for methods used for calculations**	**5 Marks**
4	**Over all report**	**2 Marks**

Note:

- **Time line for submission**
- **Brief write-up about the assignment.**

1. **More weightage will be considered on Interpretation**
2. **Use MS Excel (Spread sheet) for calculations**
3. **Considered or Collect the data from Prowess IQ or Screener Database or any other relevant data source.**

Course Title	FINANCIAL MANAGEMENT
Term/Semester	II
Course ID	21MBA321
Credits	3

Introduction:
"Beware of little expenses. A small leak will sink a great ship"- By Benjamin Franklin
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Course Outcomes (COs):

After completion of this course, students will be able to;
CO1: Apply the time value concepts for basic financial decision making.
CO2: Calculate the cost of capital for a business or a project.
CO3: Evaluate projects using capital budgeting techniques.
CO4: Analyse the impact of different kinds of dividends on shareholder wealth and the optimum capital structure for a business.
CO5: Evaluate working capital effectiveness of a firm

Course content and Structure: (36 hours)

Module 1: Overview and Time Value of Money (8 Hours)

- **Introduction:** Objectives of Financial Management, Profit Maximization v/s Wealth Maximisation and Three Decisions in Finance.
- Time value of money, Future Values - Compounding Process, Present Values - Discounting Process, Single Cash Flow, Annuity, Perpetuity, Uneven Cash Flows, Multi-Periods in Compounding and Discounting, Loan Amortisation, Nominal v/s Effective Annual Rates.

Module 2: Cost of Capital (6 Hours)

- **Cost of Capital**: Cost of Debt, Post-Tax Cost of Debt, Cost of Equity: DDM (Dividend Discount Model), CAPM (Capital Assets Pricing Model) and Weighted Average Cost of Capital (WACC).

Module 3: Investment Decision (10 Hours)

- Estimation of Project Cash flows: Initial Cash flow & Subsequent Cash flow
- Evaluation of Investment Decisions: Traditional and Modern Methods: Payback Period, Average Rate of Return, Net Present Value NPV, Internal Rate of Return, Modified Internal Rate of Return and Discounted Payback Period.

Module 4: Capital Structure and Dividend Policy (6 Hours)

- **Introduction**, Planning the Capital Structure, Capital Structure Theory (in brief), Factors Affecting Capital Structure Decisions.
- **Dividend Policies**: Dividend policy in Practice Dividend theories – relevance and irrelevance: Walter, Gordon and Modigliani-Miller Hypothesis (including problems).

Module 5: Working Capital Management (6 Hours)

- Estimation of Working Capital: Current Assets and Current Liabilities, Concept of Working Capital Management, Operating Cycle, Cash Cycle, Cost of Trade Credit. (Problems on Estimation of Working Capital)

Pedagogy:

1) Classroom Discussion
2) Financial modelling using Spreadsheet- Time value of Money, Investment Decisions
3) Application based teaching (Time value of Money Mobile Applications)
4) Project Based teaching- Listed companies for Cost of capital
5) Industry Interaction with the Practitioner

Teaching Learning Resources:

Essential Readings

1. Prasanna Chandra, "Financial Management", McGraw Hill Education
2. Brigham and Houston (2015), Fundamentals of Financial Management, Cengage (15th edition)
3. Brealey, R. A. (2007). Principles of Corporate Finance, Tata McGraw-Hill Education
4. Van, Horne James, C. (2002), Financial Management & Policy, Pearson Education India, (12th edition)

References

1. Bahal, Mohit, "Practical Aspects of Financial Management", Suchita Prakashan
2. Sharma, Dhiraj, "Working Capital Management – A conceptual Approach", Himalaya Publishing House
3. Bhalla, V.K., "Financial Markets and Institutions", S. Chand and Co
4. Hampton, John, "Financial Decision Making – Concepts, Problems and Cases", Prentice Hall of India
5. Khan, M.Y; "Indian Financial System", The McGraw Hill Companies

Supplementary Resources

- MOOC on Financial Management – Illinois University (Coursera)
- https://jgateplus.com/home/
- https://capitaline.com/
- http://web.b.ebscohost.com/ehost/search/basic?vid=1&sid=c8b5124d-307d-4f0a-843e-3b13e9156a4a%40pdc-v-sessmgr06
- https://elibrary.in.pearson.com/login

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	1	1	2	2	2	-	1
CO2	3	1	-	1	2	2	1	3	2	1	2
CO3	3	2	1	2	1	2	1	3	1	1	1
CO4	3	1	-	1	-	2	1	2	2	1	2
CO5	3	1	-	1	1	-	1	2	1	-	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No Co-relation

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid – Term Test	Individual	20	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Remaining assignments (Quiz, Individual assignment, Cap-Stone project, Major or minor project, Group assignments etc.)	Individual	25	Full Semester

PG – 597

II Semester M.B.A. Degree Examination, July 2018
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** of the following questions. **Each** question carries **5** marks. **(5×5=25)**

1. Define the scope of Financial Management. What role should the financial manager play in a modern enterprise ? Explain.

2. Discuss the factors that should be considered while deciding a firm's capital structure.

3. "Walter's model asserts that retentions influence stock prices only through their effect on future dividends" – Discuss.

4. A company has Rs. 40,00,000 8% debentures outstanding to-day. It has to redeem the debentures after 5 years and establishing a sinking fund to provide funds for redemption. Sinking Fund Investments can earn interest @ 12 percent per annum. The investments are made at the end of each year. What annual payment must the firm make to ensure that the needed Rs. 40,00,000 is available on the designated date.

5. ABC Ltd. has current sales of Rs. 40,00,000. The company planning to introduce a cash discount policy of 2/10, net 30. As a result the company expects the average collection period to go down by 10 days and 70% of the sales opt for cash discount facility. If the company's required return on investment in receivables is 20%. Should it introduce the new discount policy ?

6. If the combined leverage and operating leverage of a company are 2.5 and 1.25 respectively. Find the financial leverage and P/V ratio. Given that the equity dividend per share is Rs. 2, interest payable per year is Rs. 1,00,000, total fixed cost Rs. 50,000 and sales Rs. 10,00,000.

P.T.O.

7. ABC Ltd. sells its product @ a gross profit of 20% on sales. The following information is extracted from its annual accounts for the year.

	Amount Rs.
Sales (3 months credit)	60,00,000
Raw-materials	18,00,000
Wages (15 days in arrears)	9,60,000
Manufacturing expenses (one month in arrears)	12,00,000
Administrative expenses (one month in arrears)	4,80,000
Sales promotion expenses (payable half yearly in advance)	2,00,000
Income tax (last quarter installment due)	4,00,000

The company enjoys one month credit from the suppliers of raw-materials and maintains two month's stock of raw-materials and one month's finished goods. Cash balance is maintained at Rs. 1,00,000.

Calculate its net working capital.

SECTION – B

Answer **any three** of the following questions. **Each** question carries **10** marks. **(3×10=30)**

8. What are the different methods of appraising capital investments ? Discuss briefly each of the methods.

9. Explain the different sources of financing working capital needs of an organisation.

10. The existing capital structure of XYZ Ltd. is as follows

	Amount Rs.
Equity shares of Rs. 100 each	40,00,000
Retained earnings	10,00,000
9% preference shares	25,00,000
7% debentures	25,00,000

Company earns a return of 12% and tax on income is 35%.

The company wants to raise Rs. 25,00,000 for its expansion project for which it is considering following alternatives.

i) Issue of 20,000 equity shares @ a premium of Rs. 25 per share.

ii) Issue 10% preference shares.

iii) Issue 9% debentures.

Projected that P/E ratios in case of equity, preference and debenture financing 20, 17 and 16 respectively.

Which alternative would you consider to be the best ? Give reasons for your choice.

11. You are required to determine the weighted average cost of capital of M/s Vinayaka Enterprises Ltd., Bengaluru using (i) Book value weights (ii) Market value weights. The company's present book value capital structure is

	Amount Rs.
Debenture (Rs. 100 per debenture)	16,00,000
Preference shares (Rs. 100 per share)	4,00,000
Equity shares (Rs. 10 per share)	20,00,000

All these securities are traded in the capital markets. Recent prices are Debentures @ Rs. 110, preference shares @ Rs. 120 and equity shares @ Rs. 22. Anticipated external financing opportunities are

i) Rs. 100 per debenture redeemable at par, 10 years maturity, 8% coupon rate, 4% floatation cost, sale price Rs. 100.

ii) Rs. 100 preference shares, redeemable @ par, 15 years maturity, 10% dividend rate, 5% floatation cost, sale price Rs. 100.

iii) Equity shares Rs. 2 per share floatation cost, sale price Rs. 22. In addition the dividend expected on equity share at the end of the year Rs. 2 per share, the anticipated growth rate in dividends is 5%. The tax rate is 50%.

SECTION – C
(Compulsory) **(1×15=15)**

12. X Company Ltd. is considering two different investment proposals. Proposal – A has an investment cost of Rs. 10 lakhs and Proposal – B has an investment cost of Rs. 28 lakhs. Both the projects are expected to yield returns for a period of 5 years. The estimated income before depreciation and tax of the two proposals are as follows :

Year End	Proposal – A Rs.	Proposal – B Rs.
1	3,30,000	9,00,000
2	5,00,000	11,00,000
3	3,70,000	12,00,000
4	3,00,000	8,00,000
5	2,00,000	7,00,000

a) Which is the most attractive investment proposal considering the discount rate of 12% ? Use NPV criteria to answer this question.

b) Find out the IRR of the two proposals.

PG – 872

II Semester M.B.A. Degree Examination, July 2017
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

***Instruction**: Answer **all** the Sections.*

SECTION – A

Answer **any five** of the following questions. **Each** question carries **5** marks. **(5x5=25)**

1. When can there arise a conflict between shareholders' and managers' goals ? How can it be resolved ?

2. Briefly explain the features of Venture Capital.

3. Explain the factors influencing dividend policy.

4. The earnings per share of a company are Rs. 10. It has an internal rate of return of 15% and the capitalization rate of its risk class is 12.5%. If Walter's model is used :
   i) What should the optimum payout ratio of the firm ?
   ii) What would be the price of the share at this payout ?

5. Assuming that a firm pays tax at a 40% tax rate, compute the after tax cost of capital in the following cases :
   a) A bond, sold at Rs. 100 with a 7 percent interest and a redemption price of Rs. 110, if the company redeems it in 5 years.
   b) An ordinary share, selling at a current market price of Rs. 120 and paying a current dividend of Rs. 9 per share, which is expected to grow at a rate of 8% ?

6. Rao Corporation has a target capital structure of 60% equity and 40% debt. Its cost of equity is 18% and its pre-tax cost of debt is 13%. If the relevant tax rate is 35%, what is Rao Corporation's WACC ?

7. Explain the role of finance manager in the changing scenario of financial management in India.

P.T.O.

SECTION – B

Answer **any three** of the following, **each** question carries **ten** marks. **(10×3=30)**

8. "Finance function of a business is closely related to its other functions". Discuss with suitable examples.

9. A firm's sales, variable costs and fixed cost amount to Rs. 75,00,000, Rs. 42,00,000 and Rs. 6,00,000 respectively. It has borrowed Rs. 45,00,000 at 9 percent and its equity capital totals Rs. 55,00,000.
   a) What is the firm's ROI ?
   b) Does it have a favorable financial leverage ?
   c) If the firm belongs to an industry whose asset turnover is 3, does it have a high or low asset leverage ?
   d) What are the operating, financial and combined leverages of the firm ?
   e) If the sales drop to Rs. 50,00,000, what will the new EBIT be ?
   f) At what level will the EBT of the firm equal to zero ?

10. JKL Limited is considering the revision of its credit policy with a view to increasing its sales and profit. Currently all its sales are on credit and the customers are given one month's time to settle the dues. It has a contribution of 40% on sales and it can raise additional funds at a cost of 20% per annum. The marketing manager of the company has given the following options along with estimates for considerations :

Particulars	**Current Position**	**Option I**	**Option II**	**Option III**
Sales (in Lakh Rs.)	200	210	220	250
Credit period (in months)	1	1.5	2	3
Bad debts (% of sales)	2	2.5	3	5
Cost of credit administration (in Rs. Lakhs)	1.20	1.30	1.50	3.00

You are required to advise the company for the best option.

11. A proforma cost sheet of a company provides the following particulars :

	Amount per unit (₹)
Raw material	80
Direct labour	30
Overheads	60
Total cost	170
Profit	30
Selling price	**200**

The following further particulars are available. Raw materials are in stock on an average for one month, WIP on an average for half a month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month, credit allowed to customers is two months. Lag in payment of wages is 1½ weeks (1.5), lag in payment of overhead expenses is one month. One-forth of the output is sold against cash, cash in hand and at bank is expected to be ₹ 25,000. You are required to prepare a statement showing the working capital needed to finance a level of activity of 1,04,000 units of production. You may assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

SECTION – C

12. **Compulsory** question : **(1×15=15)**

Case study :

You are a financial analyst for Hitesh Co. Ltd. The Director of capital budgeting has asked you to analyze the two proposed capital investments, Project X and Project Y. Each project has a cost of Rs. 2 million and the cost of capital for each project is 12%. The project's expected profit before depreciation and taxes are :

Year	Project X (PBDT)	Project Y (PBDT)
1	8,00,000	15,00,000
2	8,00,000	10,00,000
3	8,00,000	6,00,000
4	8,00,000	2,00,000

a) Calculate Pay Back Period, Net Present Value and Profitability Index.

b) Which project/projects should be accepted if they are independent ?

Student Copy

PG – 922

II Semester M.B.A. Degree Examination, July 2016
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** of the following questions. **Each** question carries **five** marks. **(5×5=25)**

1. Explain the various types of decisions which are to taken by financial manager in the emerging business scenario.
2. Discuss any five factors relevant in determining capital structure.
3. Why dividend policy is important for a company ? Explain.
4. A company has Rs. 20,00,000 6% Debentures outstanding today, which will be redeemed after 5 years. For redemption the company established a sinking fund and its investments earn interest @ 10% p.a. What annual payment must the firm make to ensure that the needed Rs. 20,00,000 available on the designated date.
5. The capital structure of Bombay Traders Ltd. as on 31-3-2015 is as follows

	Rs. in crores
Equity capital : 100 lakh equity shares of Rs. 10 each	10
Retained Earnings	2
14% debentures	3

For the year ended 31-3-2015 the company has paid a equity dividend at 20% and the growth rate is 5% every year. The equity shares are traded at Rs. 80 per share in the stock exchange. Tax rate applicable to the company is 40%. Calculate the current weighted average cost of capital.

P.T.O.

6. The following details of ABC Ltd. for the year ended 31-3-2015 are furnished.

Operating leverage	3
Financial leverage	2
Interest charges p.a.	Rs. 20 lakhs
Corporate tax	40%
Variable cost as a % of sales	60%

Prepare the Income Statement of the company.

7. A company sells 40,000 units of its product per year @ Rs. 35 per unit. The variable cost per unit is Rs. 28. The average collection period is 60 days. Bad debt losses are 3% on sales and the collection charges amount to Rs. 15,000.

The company is considering the proposal to follow stricter collection policy which would bring down bad debts to 1% of sales and average collection period to 45 days. It would however, reduce the sales volume by 1000 units and increase the collection expenses to Rs. 25,000.

The company requires a rate of return of 20% would you recommend the adoption of the new credit policy ?

SECTION – B

Answer **any three** of the following questions. **Each** questions carries **ten** marks. **(3×10=30)**

8. What is working capital policy ? Explain the different types of working capital policies of the business firm.

9. "Walter's model asserts that retentions influence stock price only through their effect on future dividends" – Discuss.

10. XYZ Ltd. is considering three financing plans.

Financial Plan	Equity	Debt	Preference
A	100%	–	–
B	50%	50%	–
C	50%	–	50%

Total funds to be raised	Rs. 200 crores
Rate of Interest on debt	12%
Corporate tax rate	35%
Dividend on preference shares	9%
Face value of equity share	Rs. 10 each. These shares will be issued at a premium of Rs. 10 per share
Expected E.B.I.T	Rs. 80 crore

Determine :

i) E.P.S. under each plan

ii) Indifference points between financial plans A and B and A and C.

11. Capro industries plans an investment of Rs. 75,000 in a new machinery that would produce inflow of Rs. 25,000 every year for 5 years. The representative of another equipment manufacturer presents an alternative proposal. By investing Rs. 1,60,000 in his company's equipment Capro industries can obtain a cash inflow of Rs. 50,000 every year for five years. In future, an investment of this type can be expected to yield a discounted rate of return of 12%.

You are required to find :

a) Which alternative is more attractive if a discounted rate of 12% is expected ?

b) The discounted rate of return on investment alternatives.

c) Discounted rate of return on incremental investment.

SECTION – C

12. Case study – **Compulsory**. **15**

XYZ Ltd. is presently operating at 60% level producing 36000 units and proposes to increase capacity utilization in the coming year 33 $\frac{1}{3}$ % over the existing level of production. The following data has been supplied.

a) The expected ratio's of cost to selling price are :

Raw material	–	40%
Direct wages	–	20%
Overheads	–	20%

b) Selling price per unit Rs. 15.

c) Raw materials will remain in stores for 1 month. Material will remain in process for further one month.

d) Suppliers grant 3 months credit to the company and debtors are allowed 2 months credit.

e) Finished goods remain in godown for one month.

f) Lag in wages and overhead payment is one month.

Prepare a projected profitability statement and the working capital requirement at the new level, assuming that a minimum cash balance of Rs. 50,000 has to be maintained.

PG – 993

II Semester M.B.A. Degree Examination, June/July 2015
(CBCS Scheme)
2.5 : FINANCIAL MANAGEMENT

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** questions. **Each** question carries **five** marks. The answer must not exceed **250** words. **(5×5=25)**

1. Comment on the emerging role of finance manager in India.
2. Explain the determinants of working capital.
3. Discuss the various methods of calculating cost of equity.
4. Explain briefly the long term sources of finance available to business.
5. A company has 20,00,000, 6% debentures outstanding today. The company has to redeem the debentures after 5 years and establishes a sinking fund to provide funds for redemption. Sinking fund investments can earn @ 10% p.a. The investments are made at the end of each year. What annual payments must the firm make to ensure that the needed 20,00,000 is available on the designated date ?
6. From the following extracts of financial data prepare income statement for Radiant Ltd. and comment on its financial performance :

Variable cost (% of sales)	–	65
Interest burden	–	200
Degree of operating leverage	–	4%
Degree of financial leverage	–	3%

Tax rate @ 35%.

P.T.O.

7. The management of Royal industries has called for a statement showing the working capital needs to finance a level of activity of 1,80,000 units of output for the year. The cost structure for the company's product line the above mentioned activity level is detailed below :

	Cost per Unit (Rs.)
Raw materials	20
Direct labour	5
Overheads	15
	40
Profit	10
Selling price	50

Additional Information :

a) Minimum desired cash balance is Rs. 20,000.

b) Raw materials are held in stock, on an average, for 2 months.

c) Work-in-progress (assume 50% completion stage) will approximate to half month's production.

d) Finished goods remain in warehouse, on an average, for a month.

e) Suppliers of materials extend a month's credit and debtors are provided two month's credit; cash sales are 25% of total sales.

f) There is a time lag in payment of wages of a month and half-a-month in case of overheads.

From the above data, you are required to

1) Prepare a statement showing working capital needs;

SECTION – B

Answer **any three** questions. **Each** question carries **ten** marks. The answer must not exceed **500** words. **(3×10=30)**

8. Discuss the Walter's model of dividend policy. What are its implications ?

9. What is capital structure ? Explain the factors that influence capital structure.

10. Three financing plans are available for Texas Manufacturing which needs Rs. 10,00,000 for construction of a new plant. Texas wants to maximize EPS. Currently the equity share is selling for Rs. 30 per share. The EBIT resulting from the plant operation is Rs. 1,50,000 p.a. The marginal tax rate is 30%. Money can be borrowed at the rates indicated below :

Upto Rs. 1,00,000 @ 10%

Over Rs. 1,00,000 to Rs. 5,00,000 @ 14%

Over Rs. 5,00,000 @ 18%.

The three financing plans are :

Plan A – Use 1,00,000 debt; expected EBIT Rs. 2,50,000

Plan B – Use 3,00,000 debt ; expected EBIT Rs. 3,50,000

Plan C – Use 6,00,000 debt ; expected EBIT Rs. 5,00,000.

Determine EPS for these three plans and indicate the plan which results in highest EPS.

11. Alpha Ltd. has the following capital structure as per its B/S as at 31-3-2015 :

	in lakhs
Equity share capital (fully paid share of Rs. 10 each)	8
18% Preference share capital (fully paid share of Rs. 100 each)	6
Reserves and surplus	2
12.5% debentures (fully paid debenture of Rs. 100 each)	16
12% term loans	8
	40

Additional Information :

a) The current market price of the company's share is Rs. 64.25. The prevailing default risk free interest rate on 10 year GOI treasury bonds is 5.5%. The average market risk premium is 8%. The beta of the company is 1.1875.

b) The Preference shares of the company which are redeemable after 10 years are currently selling at 90 per preference share.

c) The debentures of the company which are redeemable after 5 years are currently quoted at 95 per debenture.

d) The corporate tax rate is 30%.

Required :

Calculate weighted average cost of capital using

a) book value weights

b) market value weights.

SECTION – C

Case Study (Compulsory) : **(1×15=15)**

12. Karnataka Diagnostics a mid sized medical service company wished to invest in new medical diagnostic technology. The management is considering the following two projects which it is considered will meet Karnataka requirement :

	(Million)	
	Project 1	**Project 2**
Initial cash outlay	160	100
Net cash inflows :		
Year 1	30	30
Year 2	40	30
Year 3	50	30
Year 4	60	30
Year 5	70	30

Assume cost of capital as 10%.

a) Determine payback period, NPV, PI and IRP.

b) Indicate which project would you recommend ?

c) Discuss briefly any non-financial factors which Karnataka Diagnostics should consider ?

Q.P. Code : 61315

Second Semester (DAY) M.B.A. Degree Examination, July 2019

(CBCS – 2014 Scheme)

Management

Paper 2.5 – FINANCIAL MANAGEMENT

Time : 3 Hours] *[Max. Marks : 70*

Instruction : Answer All the Sections.

SECTION – A

Answer any **FIVE** of the following. Each question carries **5** marks : **(5 × 5 = 25)**

1. Explain the "Emerging role of finance manager in India".

2. Discuss the importance of venture capital to developing countries.

3. "Depreciation is an important source of working capital". Do you agree? Defend your answer.

4. The following information relates to XYZ Ltd. :

	Rs.
Paid-up equity capital	20,00,000
Earnings of the company	2,00,000
Dividend paid	1,60,000
Price-earning ratio	125
Number of shares outstanding	20,000

You are required to find out whether the company's dividend pay out ratio is optimal, using Walter's Model.

5. The following data are available for X Ltd. :

Selling Price per unit = ₹ 120

Variable cost per unit = ₹ 70

Fixed cost = ₹ 2,00,000

(a) What is the operating leverage when X Ltd. produces and sells 6,000 units?

(b) What is the percentage change that will occur in the EBIT of X Ltd. if output increases by 5%?

6. Vishnu Steels Ltd. has issued 30,000 irredeemable 14% Debentures of Rs. 150 each. The cost of floatation of Debentures is 5% of the total issued amount. The company's taxation rate is 40%. Calculate the cost of debt.

7. A firm has two alternative plans for raising additional funds of ₹ 10,00,000 :

   (a) Issue of 10,000 debentures of ₹ 100 each bearing 10% interest per annum.

   (b) Issue of 4,000 debentures of ₹ 100 each bearing 10% interest per annum and balance by the issue of 12% preference shares.

   You are required to calculate the Financial Break Even Point for each plan assuming a tax rate of 50%.

SECTION – B

Answer any **THREE** of the following. Each question carries **10** marks :

(3 × 10 = 30)

8. "Wealth Maximisation of the organisation leads to Economic growth of the country". Discuss.

9. A company proposes to install a machine involving a capital cost of ₹ 1,80,000. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of ₹ 34,000 per annum. The company's tax rate is 45%.

   The net present value factors for 5 years are as under :

Discounting rate :	14	15	16	17	18
Cumulative factor :	3.43	3.35	3.27	3.20	3.13

   You are required to calculate the internal rate of return of the proposal.

10. A company has the following capital structure :

		(Rs. lakhs)
Equity Capital	1,00,000 shares of Rs. 10 each	10
Reserves and surplus	(retained earnings)	8
12% debentures	5,000 numbers of Rs. 100 each	5
		23

   (a) If the company is paying dividend at 27%, calculate the cost of equity and weighted average cost of capital, based on book values.

   (b) If the market value of equity shares is Rs. 15 each and if the debentures are quoted at Rs. 95 each, what is the weighted average cost of capital, based on market values?

   Note : Tax rate in both cases is 50%.

11. Compute the market value of the firm value of shares and the average cost of capital :

	₹
Net operating income	2,00,000
Total investment	10,00,000

Equity capitalisation rate :

(a) If the firm uses no debt 10%

(b) If the firm uses ₹ 4,00,000 debentures

(c) If the firm uses ₹ 6,00,000 debentures

Assume that ₹ 4,00,000 debentures can be raised at 5% interest, whereas ₹ 6,00,000 debentures can be raised at 6% interest.

SECTION – C

12. Case Study (**Compulsory**) : **(1 × 15 = 15)**

The Board of Directors of Nanak Engineering Company Private Ltd. requests you to prepare a statement showing the Working Capital Requirements for a level of activity of 1,56,000 units of production.

The following information is available for your calculations :

		Per unit ₹
(a)	Raw materials	90
	Direct labour	40
	Overheads	75
		205
	Profit	60
	Selling price per unit	265

(b) (i) Raw materials are in stock, on average one month.

(ii) Materials are in process, on average 2 weeks.

(iii) Finished goods are in stock, on average one month.

(iv) Credit allowed by suppliers, one month.

(v) Time lag in payment from debtors, 2 months.

(vi) Lag in payment of wages, 1½ weeks.

(vii) Lag in payment of overheads is one month.

20% of the output is sold against cash. Cash in hand and at bank is expected to be ₹ 60,000. It is to be assumed that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

PG – 597

II Semester M.B.A. Degree Examination, July 2018
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** of the following questions. **Each** question carries **5** marks. (5×5=25)

1. Define the scope of Financial Management. What role should the financial manager play in a modern enterprise ? Explain.
2. Discuss the factors that should be considered while deciding a firm's capital structure.
3. "Walter's model asserts that retentions influence stock prices only through their effect on future dividends" – Discuss.
4. A company has Rs. 40,00,000 8% debentures outstanding to-day. It has to redeem the debentures after 5 years and establishing a sinking fund to provide funds for redemption. Sinking Fund Investments can earn interest @ 12 percent per annum. The investments are made at the end of each year. What annual payment must the firm make to ensure that the needed Rs. 40,00,000 is available on the designated date.
5. ABC Ltd. has current sales of Rs. 40,00,000. The company planning to introduce a cash discount policy of 2/10, net 30. As a result the company expects the average collection period to go down by 10 days and 70% of the sales opt for cash discount facility. If the company's required return on investment in receivables is 20%. Should it introduce the new discount policy ?
6. If the combined leverage and operating leverage of a company are 2.5 and 1.25 respectively. Find the financial leverage and P/V ratio. Given that the equity dividend per share is Rs. 2, interest payable per year is Rs. 1,00,000, total fixed cost Rs. 50,000 and sales Rs. 10,00,000.

P.T.O.

7. ABC Ltd. sells its product @ a gross profit of 20% on sales. The following information is extracted from its annual accounts for the year.

	Amount Rs.
Sales (3 months credit)	60,00,000
Raw-materials	18,00,000
Wages (15 days in arrears)	9,60,000
Manufacturing expenses (one month in arrears)	12,00,000
Administrative expenses (one month in arrears)	4,80,000
Sales promotion expenses (payable half yearly in advance)	2,00,000
Income tax (last quarter installment due)	4,00,000

The company enjoys one month credit from the suppliers of raw-materials and maintains two month's stock of raw-materials and one month's finished goods. Cash balance is maintained at Rs. 1,00,000.

Calculate its net working capital.

SECTION – B

Answer **any three** of the following questions. **Each** question carries **10** marks. **(3×10=30)**

8. What are the different methods of appraising capital investments ? Discuss briefly each of the methods.

9. Explain the different sources of financing working capital needs of an organisation.

10. The existing capital structure of XYZ Ltd. is as follows

	Amount Rs.
Equity shares of Rs. 100 each	40,00,000
Retained earnings	10,00,000
9% preference shares	25,00,000
7% debentures	25,00,000

Company earns a return of 12% and tax on income is 35%.

The company wants to raise Rs. 25,00,000 for its expansion project for which it is considering following alternatives.

i) Issue of 20,000 equity shares @ a premium of Rs. 25 per share.

ii) Issue 10% preference shares.

iii) Issue 9% debentures.

Projected that P/E ratios in case of equity, preference and debenture financing 20, 17 and 16 respectively.

Which alternative would you consider to be the best ? Give reasons for your choice.

11. You are required to determine the weighted average cost of capital of M/s Vinayaka Enterprises Ltd., Bengaluru using (i) Book value weights (ii) Market value weights. The company's present book value capital structure is

	Amount Rs.
Debenture (Rs. 100 per debenture)	16,00,000
Preference shares (Rs. 100 per share)	4,00,000
Equity shares (Rs. 10 per share)	20,00,000

All these securities are traded in the capital markets. Recent prices are Debentures @ Rs. 110, preference shares @ Rs. 120 and equity shares @ Rs. 22. Anticipated external financing opportunities are

i) Rs. 100 per debenture redeemable at par, 10 years maturity, 8% coupon rate, 4% floatation cost, sale price Rs. 100.

ii) Rs. 100 preference shares, redeemable @ par, 15 years maturity, 10% dividend rate, 5% floatation cost, sale price Rs. 100.

iii) Equity shares Rs. 2 per share floatation cost, sale price Rs. 22. In addition the dividend expected on equity share at the end of the year Rs. 2 per share, the anticipated growth rate in dividends is 5%. The tax rate is 50%.

SECTION – C

(Compulsory) **(1×15=15)**

12. X Company Ltd. is considering two different investment proposals. Proposal – A has an investment cost of Rs. 10 lakhs and Proposal – B has an investment cost of Rs. 28 lakhs. Both the projects are expected to yield returns for a period of 5 years. The estimated income before depreciation and tax of the two proposals are as follows :

Year End	**Proposal – A** **Rs.**	**Proposal – B** **Rs.**
1	3,30,000	9,00,000
2	5,00,000	11,00,000
3	3,70,000	12,00,000
4	3,00,000	8,00,000
5	2,00,000	7,00,000

a) Which is the most attractive investment proposal considering the discount rate of 12% ? Use NPV criteria to answer this question.

b) Find out the IRR of the two proposals.

PG – 872

II Semester M.B.A. Degree Examination, July 2017
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

Instruction: *Answer* ***all*** *the Sections.*

SECTION – A

Answer **any five** of the following questions. **Each** question carries **5** marks. **(5×5=25)**

1. When can there arise a conflict between shareholders' and managers' goals ? How can it be resolved ?
2. Briefly explain the features of Venture Capital.
3. Explain the factors influencing dividend policy.
4. The earnings per share of a company are Rs. 10. It has an internal rate of return of 15% and the capitalization rate of its risk class is 12.5%. If Walter's model is used :
   i) What should the optimum payout ratio of the firm ?
   ii) What would be the price of the share at this payout ?
5. Assuming that a firm pays tax at a 40% tax rate, compute the after tax cost of capital in the following cases :
   a) A bond, sold at Rs. 100 with a 7 percent interest and a redemption price of Rs. 110, if the company redeems it in 5 years.
   b) An ordinary share, selling at a current market price of Rs. 120 and paying a current dividend of Rs. 9 per share, which is expected to grow at a rate of 8% ?
6. Rao Corporation has a target capital structure of 60% equity and 40% debt. Its cost of equity is 18% and its pre-tax cost of debt is 13%. If the relevant tax rate is 35%, what is Rao Corporation's WACC ?
7. Explain the role of finance manager in the changing scenario of financial management in India.

P.T.O.

SECTION – B

Answer **any three** of the following, **each** question carries **ten** marks. **(10×3=30)**

8. "Finance function of a business is closely related to its other functions". Discuss with suitable examples.

9. A firm's sales, variable costs and fixed cost amount to Rs. 75,00,000, Rs. 42,00,000 and Rs. 6,00,000 respectively. It has borrowed Rs. 45,00,000 at 9 percent and its equity capital totals Rs. 55,00,000.
   a) What is the firm's ROI ?
   b) Does it have a favorable financial leverage ?
   c) If the firm belongs to an industry whose asset turnover is 3, does it have a high or low asset leverage ?
   d) What are the operating, financial and combined leverages of the firm ?
   e) If the sales drop to Rs. 50,00,000, what will the new EBIT be ?
   f) At what level will the EBT of the firm equal to zero ?

10. JKL Limited is considering the revision of its credit policy with a view to increasing its sales and profit. Currently all its sales are on credit and the customers are given one month's time to settle the dues. It has a contribution of 40% on sales and it can raise additional funds at a cost of 20% per annum. The marketing manager of the company has given the following options along with estimates for considerations :

Particulars	**Current Position**	**Option I**	**Option II**	**Option III**
Sales (in Lakh Rs.)	200	210	220	250
Credit period (in months)	1	1.5	2	3
Bad debts (% of sales)	2	2.5	3	5
Cost of credit administration (in Rs. Lakhs)	1.20	1.30	1.50	3.00

You are required to advise the company for the best option.

11. A proforma cost sheet of a company provides the following particulars :

	Amount per unit (₹)
Raw material	80
Direct labour	30
Overheads	60
Total cost	170
Profit	30
Selling price	**200**

The following further particulars are available. Raw materials are in stock on an average for one month, WIP on an average for half a month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month, credit allowed to customers is two months. Lag in payment of wages is 1½ weeks (1.5), lag in payment of overhead expenses is one month. One-forth of the output is sold against cash, cash in hand and at bank is expected to be ₹ 25,000. You are required to prepare a statement showing the working capital needed to finance a level of activity of 1,04,000 units of production. You may assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

SECTION – C

12. **Compulsory** question : **(1×15=15)**

Case study :

You are a financial analyst for Hitesh Co. Ltd. The Director of capital budgeting has asked you to analyze the two proposed capital investments, Project X and Project Y. Each project has a cost of Rs. 2 million and the cost of capital for each project is 12%. The project's expected profit before depreciation and taxes are :

Year	Project X (PBDT)	Project Y (PBDT)
1	8,00,000	15,00,000
2	8,00,000	10,00,000
3	8,00,000	6,00,000
4	8,00,000	2,00,000

a) Calculate Pay Back Period, Net Present Value and Profitability Index.

b) Which project/projects should be accepted if they are independent ?

PG – 922

II Semester M.B.A. Degree Examination, July 2016
(CBCS)
MANAGEMENT
2.5 : Financial Management

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** of the following questions. **Each** question carries **five** marks. **(5x5=25)**

1. Explain the various types of decisions which are to taken by financial manager in the emerging business scenario.
2. Discuss any five factors relevant in determining capital structure.
3. Why dividend policy is important for a company ? Explain.
4. A company has Rs. 20,00,000 6% Debentures outstanding today, which will be redeemed after 5 years. For redemption the company established a sinking fund and its investments earn interest @ 10% p.a. What annual payment must the firm make to ensure that the needed Rs. 20,00,000 available on the designated date.
5. The capital structure of Bombay Traders Ltd. as on 31-3-2015 is as follows

	Rs. in crores
Equity capital : 100 lakh equity shares of Rs. 10 each	10
Retained Earnings	2
14% debentures	3

For the year ended 31-3-2015 the company has paid a equity dividend at 20% and the growth rate is 5% every year. The equity shares are traded at Rs. 80 per share in the stock exchange. Tax rate applicable to the company is 40%. Calculate the current weighted average cost of capital.

P.T.O.

6. The following details of ABC Ltd. for the year ended 31-3-2015 are furnished.

Operating leverage	3
Financial leverage	2
Interest charges p.a.	Rs. 20 lakhs
Corporate tax	40%
Variable cost as a % of sales	60%

Prepare the Income Statement of the company.

7. A company sells 40,000 units of its product per year @ Rs. 35 per unit. The variable cost per unit is Rs. 28. The average collection period is 60 days. Bad debt losses are 3% on sales and the collection charges amount to Rs. 15,000.

The company is considering the proposal to follow stricter collection policy which would bring down bad debts to 1% of sales and average collection period to 45 days. It would however, reduce the sales volume by 1000 units and increase the collection expenses to Rs. 25,000.

The company requires a rate of return of 20% would you recommend the adoption of the new credit policy ?

SECTION – B

Answer **any three** of the following questions. **Each** questions carries **ten** marks. **(3×10=30)**

8. What is working capital policy ? Explain the different types of working capital policies of the business firm.

9. "Walter's model asserts that retentions influence stock price only through their effect on future dividends" – Discuss.

10. XYZ Ltd. is considering three financing plans.

Financial Plan	Equity	Debt	Preference
A	100%	–	–
B	50%	50%	–
C	50%	–	50%

Total funds to be raised	Rs. 200 crores
Rate of Interest on debt	12%
Corporate tax rate	35%
Dividend on preference shares	9%
Face value of equity share	Rs. 10 each.
	These shares will be issued at a premium of Rs. 10 per share
Expected E.B.I.T	Rs. 80 crore

Determine :

i) E.P.S. under each plan

ii) Indifference points between financial plans A and B and A and C.

11. Capro industries plans an investment of Rs. 75,000 in a new machinery that would produce inflow of Rs. 25,000 every year for 5 years. The representative of another equipment manufacturer presents an alternative proposal. By investing Rs. 1,60,000 in his company's equipment Capro industries can obtain a cash inflow of Rs. 50,000 every year for five years. In future, an investment of this type can be expected to yield a discounted rate of return of 12%.

You are required to find :

a) Which alternative is more attractive if a discounted rate of 12% is expected ?

b) The discounted rate of return on investment alternatives.

c) Discounted rate of return on incremental investment.

SECTION – C

12. Case study – **Compulsory**. 15

XYZ Ltd. is presently operating at 60% level producing 36000 units and proposes to increase capacity utilization in the coming year 33 $\frac{1}{3}$% over the existing level of production. The following data has been supplied.

a) The expected ratio's of cost to selling price are :

Raw material	–	40%
Direct wages	–	20%
Overheads	–	20%

b) Selling price per unit Rs. 15.

c) Raw materials will remain in stores for 1 month. Material will remain in process for further one month.

d) Suppliers grant 3 months credit to the company and debtors are allowed 2 months credit.

e) Finished goods remain in godown for one month.

f) Lag in wages and overhead payment is one month.

Prepare a projected profitability statement and the working capital requirement at the new level, assuming that a minimum cash balance of Rs. 50,000 has to be maintained.

PG – 993

II Semester M.B.A. Degree Examination, June/July 2015
(CBCS Scheme)
2.5 : FINANCIAL MANAGEMENT

Time : 3 Hours Max. Marks : 70

SECTION – A

Answer **any five** questions. **Each** question carries **five** marks. The answer must not exceed **250** words. **(5×5=25)**

1. Comment on the emerging role of finance manager in India.
2. Explain the determinants of working capital.
3. Discuss the various methods of calculating cost of equity.
4. Explain briefly the long term sources of finance available to business.
5. A company has 20,00,000, 6% debentures outstanding today. The company has to redeem the debentures after 5 years and establishes a sinking fund to provide funds for redemption. Sinking fund investments can earn @ 10% p.a. The investments are made at the end of each year. What annual payments must the firm make to ensure that the needed 20,00,000 is available on the designated date ?
6. From the following extracts of financial data prepare income statement for Radiant Ltd. and comment on its financial performance :

Variable cost (% of sales)	–	65
Interest burden	–	200
Degree of operating leverage	–	4%
Degree of financial leverage	–	3%

Tax rate @ 35%.

P.T.O.

7. The management of Royal industries has called for a statement showing the working capital needs to finance a level of activity of 1,80,000 units of output for the year. The cost structure for the company's product line the above mentioned activity level is detailed below :

	Cost per Unit (Rs.)
Raw materials	20
Direct labour	5
Overheads	15
	40
Profit	10
Selling price	50

Additional Information :

a) Minimum desired cash balance is Rs. 20,000.

b) Raw materials are held in stock, on an average, for 2 months.

c) Work-in-progress (assume 50% completion stage) will approximate to half month's production.

d) Finished goods remain in warehouse, on an average, for a month.

e) Suppliers of materials extend a month's credit and debtors are provided two month's credit; cash sales are 25% of total sales.

f) There is a time lag in payment of wages of a month and half-a-month in case of overheads.

From the above data, you are required to

1) Prepare a statement showing working capital needs;

SECTION – B

Answer **any three** questions. **Each** question carries **ten** marks. The answer must not exceed **500** words. **(3×10=30)**

8. Discuss the Walter's model of dividend policy. What are its implications ?

9. What is capital structure ? Explain the factors that influence capital structure.

10. Three financing plans are available for Texas Manufacturing which needs Rs. 10,00,000 for construction of a new plant. Texas wants to maximize EPS. Currently the equity share is selling for Rs. 30 per share. The EBIT resulting from the plant operation is Rs. 1,50,000 p.a. The marginal tax rate is 30%. Money can be borrowed at the rates indicated below :

Upto Rs. 1,00,000 @ 10%

Over Rs. 1,00,000 to Rs. 5,00,000 @ 14%

Over Rs. 5,00,000 @ 18%.

The three financing plans are :

Plan A – Use 1,00,000 debt; expected EBIT Rs. 2,50,000

Plan B – Use 3,00,000 debt ; expected EBIT Rs. 3,50,000

Plan C – Use 6,00,000 debt ; expected EBIT Rs. 5,00,000.

Determine EPS for these three plans and indicate the plan which results in highest EPS.

11. Alpha Ltd. has the following capital structure as per its B/S as at 31-3-2015 :

	in lakhs
Equity share capital (fully paid share of Rs. 10 each)	8
18% Preference share capital (fully paid share of Rs. 100 each)	6
Reserves and surplus	2
12.5% debentures (fully paid debenture of Rs. 100 each)	16
12% term loans	8
	40

Additional Information :

a) The current market price of the company's share is Rs. 64.25. The prevailing default risk free interest rate on 10 year GOI treasury bonds is 5.5%. The average market risk premium is 8%. The beta of the company is 1.1875.

b) The Preference shares of the company which are redeemable after 10 years are currently selling at 90 per preference share.

c) The debentures of the company which are redeemable after 5 years are currently quoted at 95 per debenture.

d) The corporate tax rate is 30%.

Required :

Calculate weighted average cost of capital using

a) book value weights

b) market value weights.

SECTION – C

Case Study (Compulsory) : **(1×15=15)**

12. Karnataka Diagnostics a mid sized medical service company wished to invest in new medical diagnostic technology. The management is considering the following two projects which it is considered will meet Karnataka requirement :

	(Million)	
	Project 1	**Project 2**
Initial cash outlay	160	100
Net cash inflows :		
Year 1	30	30
Year 2	40	30
Year 3	50	30
Year 4	60	30
Year 5	70	30

Assume cost of capital as 10%.

a) Determine payback period, NPV, PI and IRP.

b) Indicate which project would you recommend ?

c) Discuss briefly any non-financial factors which Karnataka Diagnostics should consider ?

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

Source:

"Financial Management Practices in India, Singapore and Thailand – A Comparison", by Jain P.K., and Surendra.S. Yadav, published in "Management & Accounting Research", Vol 3, No. 4, April-June, pp 84-102

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- The discounted cash flow techniques are more popular now.
- The corporate firms use multiple criteria in their project selection decisions. Vast majority of the sample corporate use a combination of traditional as well as DCF techniques.

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- The IRR is the most frequently used (85 per cent) capital budgeting technique.
- The NPV technique is also widely used (65 per cent). The IRR method is preferred over NPV Method.
- The pay-back period is equally popular method of project selection (68 percent).

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- Large firms more frequently use NPV while pay back period is more widely used by small firms. Similarly, high growth firms use IRR more frequently than small firms.
- PI technique is used more by public sector units than private sector firms.
- Capital budgeting decisions are undertaken at the top management level and are planned in advance. The corporate follow mostly top-down approach in this regard.

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- In risk analysis, most Indian corporate use more than one technique out of the available techniques viz., sensitivity analysis, scenario analysis, risk adjusted discounted rate, decision-tree analysis and Monte Carlo Simulation.
- The Sensitivity Analysis is used overwhelmingly (91 per cent).

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- Sensitivity Analysis is used more significantly by public sector units and private sector firms having chartered accounts as Chief Financial Officers.
- The Scenario Analysis is used widely (62 per cent) and it is used more frequently by large firms than small firms.

CAPITAL BUDGETING PRACTICES IN INDIAN CORPORATE SECTOR

- The risk adjusted discount rate is used by around one-third of the corportates.
- The decision tree analysis as well as Monte-Carlo Simulation to analyse project risk is not popular among corporate to any significant extent.
- Sensitivity analysis is the most popular approach for quantifying risk.

Capital Budgeting Practices of the Fortune 1000: How Have Things Changed?

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Forthcoming in the *Journal of Business and Management*, Volume 8, Number 4, Winter 2002.

JEL Classifications: G30/G31
Keywords: capital budgeting, net present value, NPV, survey, internal rate of return, IRR

The authors gratefully acknowledge the helpful comments Editor Ray Hogler, two anonymous reviewers, Raj Aggarwal, Robert Cooper, Samuel C. Weaver, and Kent Zumwalt. All errors remain the sole responsibility of the authors.

Capital Budgeting Practices of the Fortune 1000: How Have Things Changed?

ABSTRACT

Capital budgeting is one of the most important decisions that face the financial manager. Prior studies spanning the past four decades show financial managers prefer methods such as internal rate of return or non-discounted payback models over net present value; the model academics consider superior. This interesting anomaly has long been a puzzle to the academic community. A recent survey of the Fortune 1000 Chief Financial Officers finds net present value to be the most preferred tool over internal rate of return and all other capital budgeting tools. While most financial managers utilize multiple tools in the capital budgeting process, these results better reflect the alignment of the academic and business view.

Capital Budgeting Practices of the Fortune 1000: How Have Things Changed?

Corporate capital budgeting and cost of capital estimation are among the most important decisions made by the financial manager. In this process, it is crucial that management use accurate methods that will result in the maximization of shareholder wealth. Over time, managers have used various commonly taught capital budgeting models and cost of capital estimations procedures; however, the use of models has not always aligned with what is taught in collegiate finance. This study re-examines the capital budgeting decision methods used by the Fortune 1000 companies. We show management views net present value (NPV) as the most preferred capital budgeting tool. Both NPV and internal rate of return (IRR) are superior to other capital budgeting tools, a result that represents alignment between corporate America and academia.

The paper proceeds as follows. Section I provides a review of prior capital budgeting studies. Section II discusses the sample selection and survey methodology. Section III presents the results and Section IV concludes.

I. Review of Prior Capital Budgeting Studies

Over the past four decades, financial research has recorded how business use capital management methods and how large corporations determine the cost of capital used in capital budgeting decisions. Financial managers and academics have not been in full agreement as to the choice of the best capital budgeting method. In Exhibit 1, Miller (1960), Schall, Sundam, and Geijsbeek (1978), and Pike (1996) report payback technique as the most preferred method, while Istvan (1961) reports a preference for accounting rate of return. Early studies generally report discounted cash flow models to be the least

popular capital budgeting methods. This might be attributed to the lack of financial sophistication and limited use of computer technology in that era. Mao (1970) and Schall, Sundam, and Geijsbeek (1978) specifically point to NPV as the least popular capital budgeting tool; a result in contrast to modern financial theory. Klammer (1972) reports a preference for general discounted cash flow models, and subsequently, the overwhelming majority of published research indicate management prefer the use of internal rate of return (IRR) over all other capital budgeting methods.[1] Eight studies dating from 1970 to 1983 show profitability index, a ratio of present value and initial cost, to be the least most popular capital budgeting tool. Recently, Jog and Srivastava (1995) and Pike (1996) indicate a decreased acceptance of accounting rate of return in Canada and the United Kingdom, respectively.[2] Interestingly, throughout the literature, NPV has always trailed IRR in management preference. Managers have argued the perception of a percentage return is more easily understood and comparable than an absolute dollar value increase in shareholder wealth. Therefore, in the past, managers have chosen IRR over NPV. Evans and Forbes (1993) argue management view IRR as a more cognitively efficient measure of comparison. In a comparison of past studies, it is seen that managers are moving toward NPV as a method of choice, but never to the level of IRR.

Academics have long argued for the superiority of NPV over IRR for several reasons. First, NPV presents the expected change in shareholder wealth given a set of

[1] See Williams, 1970; Fremgen, 1973; Brigham, 1975; Petry, 1975; Petty, Scott, and Bird, 1975; Gitman and Forrester, 1977; Oblak and Helm, Jr., 1980; Hendricks, 1983; Ross, 1986.

[2] In a recent multinational study of the Asia-Pacific, Kester (et.al) found internal rate of return and net present value the most popular capital budgeting tools for large companies in that region.

projected cash flows and a discount rate. For mutually exclusive projects, there is some dispute over the appropriate method. Second, when cash flows come in over a longer time period, NPV assumes the intermediate term cash flows are reinvested at the cost of capital. Internal rate of return, on the other hand, assumes the intermediate term cash flows are reinvested at the IRR, which for any positive NPV project is higher than the cost of capital.[3] Finally, NPV is not sensitive to multiple sign changes in cash flows. It is a method that presents the expected dollar amount that shareholder wealth would increase or decrease upon the acceptance of a project.

II. Sample Selection Process

The interpretation of survey data presents some limitations as discussed in Aggarwal (1980). While the survey was mailed to the CFO, the responses were the opinion of one individual and thus may not fully reflect the firm's position. It is possible this person may not be the best to assess the capital budgeting process if he/she is far removed from capital management. There is also potential concern about a non-response bias. In an attempt to limit this limitation, two personalized mailings were sent six weeks apart. While the survey technique is not without flaws, it has been generally accepted as a reasonable proxy given the time and personal constraints in large corporations.

A two-page questionnaire was mailed to the Chief Financial Officers (CFO's) of each of the Fortune 1000 companies. In an attempt to increase the response rate, each letter was personalized and signed. Furthermore, we mailed a copy of the results to interested respondents. Each survey was coded to avoid duplication in a second mailing.

[3] Brealey and Myers (1995) dispute this point and argue the reinvestment rate assumptions are not essential to evaluating a given project since reinvestment rates represent the return on another, separate project.

Ten surveys were returned as undeliverable and thirty-two firms indicated they did not respond to mail surveys. Two hundred and five usable responses were received, for a response rate of 20.5%, which is comparable to similar surveys.[4] One hundred twenty responses were received from the first mailing and eighty-five from the second mailing.

III. Results

Although all the firms are large, the size of the annual capital budget did vary among the respondents. The size of the capital budget is subdivided as follows:

Size of Capital Budget	Number	Percentage
Less than $50 million	35	17.1%
$50 - $99.9 million	42	20.5%
$100 - $499.9 million	78	38.0%
$500 - $1 billion	22	10.7%
Greater than $1 billion	28	13.7%
	205	100.0%

Next, the CFO's were asked at what level a formal capital budgeting analysis was required. As can be seen, 99.5% of the companies require a formal analysis; however, the minimum capital expenditure for the analysis varied substantially.

Amount of Capital Expenditure Required for Formal Capital Budgeting Analysis	Number	Percentage
Less than $10,000	42	21.2%
$10,000 - $99,999	54	27.3%
$100,000 - $500,000	63	31.8%
Greater than $500,000	38	19.2%
Never	1	0.5%
	198	100.0%

A. Use of Basic Capital Budgeting Methods

[4] For example, Jog and Srivastava (1995) have a response rate of 22.9%; Trahan and Gitman (1995), 12%; Gitman and Maxwell (1985), 23.6%; and Poterba and Summers (1995), 26.3%.

Respondents were asked how frequently they used seven capital budgeting methods: net present value, profitability index, internal rate of return, modified internal rate of return, payback, discounted payback, and accounting rate of return. The responses were on a five point Likert scale with the following percentages attached to each alternative in an attempt to quantify the responses: "always" (100%), "often" (approximately 75%), "sometimes" (approximately 50%), "rarely" (approximately 25%), and "never" (0%).

<Insert Exhibit 2 about here.>

In Exhibit 2, it is seen that NPV was always utilized by 49.8% of the respondents and frequently (always and often combined) used by 85.1% of the respondents. Finally, when including the "sometimes" category, the cumulative use of NPV climbs to 96% of the firms. Net present value gains the highest positive response in comparison to other basic capital budgeting techniques. Internal rate of return was always used by 44.6% of the firms, and frequently (always and sometimes combined) used by 76.7% of the respondents. Finally, when including the "sometimes" category, the usage rates increase to 92.1% of all respondents. The results show that NPV and IRR are preferred over all other capital budgeting methods. This is a notable alignment of theory and practice.

The size of the capital budget is a significant factor in the choice of capital budgeting methodology. Within NPV, the Pearson Chi-squared test of independence is significant at the 1% level; within IRR, it is significant at the 5% level.[5] This indicates a positive relationship between the size of the capital budget and the use of NPV and IRR.

[5] The Pearson Chi-squared test of independence is frequently used to test for differences in proportions between two or more groups. The Chi-squared test is used to see of grouped data fit into declared groups. Rejection indicates the data do not fit into the group. The statistical tests were performed in Excel.

Similar analyses were performed based on the size of the capital expenditure. The results are qualitatively similar.

The third model was the payback, a favorite of business in the 1960's and used at least half of the time by 74.5% of the respondents. Fourth in popularity was the discounted payback model, used at least half of the time by 56.7% of the companies. Finally, at least half time usage was reported for the last three models as follows: profitability index ranks fifth at 43.9%, followed by accounting rate of return at 33.3% and finally, modified internal rate of return (MIRR) at 21.9%. Examination of within model proportions for profitability index, accounting rate of return, and modified internal rate of return reflect chi-squared significance at the 1% level, while the proportion distributions for payback are chi-squared significant at the 5% level. The only model that is not chi-squared significant when subdivided by the size of the capital budget is discounted payback. Payback and profitability index are more frequently used by firms with smaller capital budgets, while modified internal rate of return appears to be used more frequently by firms with capital budgets in the range of $100-$500 million.

Modified internal rate of return is the least popular of all discounted and non-discounted models. Some argue MIRR is superior to IRR because it allows the manager to adjust the discount rate of intermediate term cash flows to better match a realistic return for the cash flows. Samuel C. Weaver, Director of Financial Planning and Analysis of Hershey Foods, commented at the 1988 FMA meeting (Financial Management Panel Discussion; 1989),

> …modified internal rate of return… is a subject that is thinly written about. (In his discussion, he referred to modified IRR as terminal IRR) terminal internal rate of return will always give an answer that is consistent with net present value, as long as the

> reinvestment rate is identical to the discount rate that would have been used for net present value. … (MIRR) gives the right answer and in such a way that management can understand it as a rate of return.

Given strong theoretical support and the inclusion of MIRR in popular financial spreadsheet packages, it may appear surprising that MIRR has garnered so little acceptance from the CFO's in this study. It is possible MIRR will gain acceptance in the delayed manner that NPV gained acceptance over a period of several decades. If this is to be the case, we may see a surge in MIRR applications over the next decade as more financial managers work with this technique especially if the reinvestment rate argument is valid.[6]

B. Use of Advanced Capital Budgeting Methods

The same format was used to ask about the use of more specialized methods. In Exhibit 3, it is shown that sensitivity analysis was the most popular tool, followed by scenario analysis. Inflation adjusted cash flows were used by 46.6% of the responding firms on a regular basis.

<Insert Exhibit 3 about here.>

Stern Stewart's Economic Value Added (EVA®) and Market Value Added (MVA®) models receive strong acceptance and use despite the relative youth of the methods. Stern Stewart argues that EVA is the financial performance measure that comes closer than any other to capturing the economic profit of an enterprise. They define EVA as the difference between a firm's net operating after tax income and the cost

[6] If, as posited by Brealey and Myers (1995), the assumption of reinvestment rates is not required, modified internal rate of return may not gain additional support.

of capital while MVA is a cumulative measure of wealth creation. EVA was used by over half of the respondents while MVA was used by approximately one third.

Incremental IRRs were used by 47.3% of the respondents, while simulation models were used by 37.2%. PERT/CPM charting and decision trees were each used by about 31% of the firms. From this point, the more complex mathematical models, such as linear programming and option models, receive less corporate acceptance.

C. Management Determination of Appropriate Cost of Capital

Several studies examine the cost of capital for large firms [Gitman and Mercurio (1982), Jog and Srivastava (1995), and Oblak and Helm, Jr. (1980)] and other studies examine the approximate cost of capital facing large companies [Schall, Sundem, and Geijsbeek, Jr. (1978), and Gitman and Forrester (1977)]. Oblak and Helm, Jr. (1980) examine the cost of capital practices of multinationals and found weighted average cost of capital (WACC) was used by 54% of the respondents. Other measures cited in their study include the cost of debt, past experience, expected growth rate, and CAPM. Jog and Srivastava (1995) found WACC to be used by 47% of Canadian firms, but significant numbers of firms also use the other measures found in Oblak and Helm, Jr. (1980).

In academia, it is argued that WACC is the superior base level for cost of capital determinations. The following closed ended question was posed; "In general, which of the following does your company consider to be the best discount rate?" The vast majority, 83.2% chose WACC, while 7.4% chose the cost of debt, 1.5% chose the cost of retained earnings, and 1.0% chose the cost of new equity. A minority (5.4%) chose cost of equity for a project financed with equity and cost of debt for a project financed with debt and 1.5% indicated they had another measure for calculating the base discount rate.

The results indicate that WACC was the strong preference among the respondents, in alignment with academia.

IV. Conclusion and Implications

It appears the views of academics and senior financial managers of Fortune 1000 companies on basic capital budgeting techniques are in stronger agreement than ever before. Discounted capital budgeting methods are generally preferred over non-discounted techniques. While it is possible the survey results reflect the increased financial sophistication and availability of inexpensive computer technology, it was shown that net present value is the most frequently cited capital budgeting tool of choice, followed closely by IRR. Additionally, firms with larger capital budgets tend to favor NPV and IRR. The vast majority of respondents agree that WACC is the best starting point to determine the appropriate discount rate. Popular supplemental methods include sensitivity analysis, scenario analysis, inflation adjusted cash flows, economic value added, and incremental IRR. It will be interesting to track the progression of MIRR over the next decade to see if this technique gains more acceptance, especially for those firms with large capital budgets.

Exhibit 1
Comparative Results of Prior Studies

The first 11 results were compiled from Scott and Petty (1984). DCF was used when specific discounted cash flow techniques were not enumerated. The following abbreviations are used: Payback: PB, Internal Rate of Return: IRR, Net Present Value: NPV, Profitability Index: PI, and Accounting Rate of Return: AROR.

Authors	Journal	Year Published	Population	Most Popular Capital Budgeting Tool	Least Popular Capital Budgeting Tool
Miller	NAA Bulletin (now Management Accounting)	1960	Fortune 500 and "Manual of Excellently Managed Companies"	PB	DCF
Istvan	Bureau of Business Research	1961	Selected large companies	AROR	DCF
Mao	Journal of Finance	1970	Selected large and medium companies	IRR	NPV and PI
Williams	Managerial Planning	1970	Fortune 500 and selected small companies	IRR	PI
Klammer	Journal of Business	1972	Compustat	DCF	PB
Fremgen	Management Accounting	1973	Dun and Bradstreet's Reference Book	IRR	PI
Brigham	Financial Management	1975	Selected financial managers	IRR	PI
Petry	Business Horizons	1975	Fortune 500 and Fortune 50 retailing, transportation and utilities	IRR	NPV
Petty, Scott, Bird	Engineering Economist	1975	Fortune 500	IRR	PI
Gitman and Forrester	Financial Management	1977	Sample from Forbes	IRR	PI
Schall, Sundam, and Geijsbeek	Journal of Finance	1978	Compustat	PB	NPV
Oblak and Helm	Financial Management	1980	Fortune 500 MNC's in at least 12 countries	IRR	PI
Hendricks	Managerial Planning	1983	Some of Fortune 500	IRR	PI
Ross	Financial Management	1986	12 large manufacturers	IRR	PB
Jog and Srivastava	Financial Planning and Education	1995	582 Canadian companies	IRR	AROR
Pike	Journal of Business Finance and Accounting	1996	Large UK companies	PB	AROR

Exhibit 2

Comparison of Basic Capital Budgeting Tools

Response to the question: "Please classify how frequently your firm utilizes each of the following budgeting tools. "Often" would generally mean that you use this tool about 75% of the time, "sometimes" would refer to about 50%, and "rarely" would mean about 25% of the time." The absolute percentages are in columns 3-7 and the cumulative percentages are in columns 8-10. Results are based on 205 responses ***by*** size of capital budget. All tools can be completed with basic Excel or other spreadsheet functions.

Capital Budgeting Tool (level of technical difficulty, L=Low, M=Medium, H=High)*	Size of Capital Budget (in millions)	Always (100%)	Often (75%)	Sometimes (50%)	Rarely (25%)	Never (0%)	Always or Often (>=75%)	Always, Often, or Sometimes (>=50%)	Rarely or Never (<=25%)
Net Present Value (NPV) * (L)**	Less than $100	32.9%	52.6%	13.2%	1.3%	0.0%	85.5%	98.7%	1.3%
	$100 - $499.9	56.0%	25.3%	10.7%	5.3%	2.7%	81.3%	92.0%	8.0%
	Greater than $500	67.3%	22.5%	8.2%	2.0%	0.0%	89.8%	98.0%	2.0%
	Full Sample	**49.8%**	**35.3%**	**10.9%**	**3.0%**	**1.0%**	**85.1%**	**96.0%**	**4.0%**
Internal Rate of Return (IRR) **(L)	Less than $100	30.3%	43.4%	21.1%	3.9%	1.3%	73.7%	94.8%	5.2%
	$100 - $499.9	49.3%	25.3%	12.0%	12.0%	1.4%	74.6%	86.6%	13.4%
	Greater than $500	60.0%	24.0%	12.0%	2.0%	2.0%	84.0%	96.0%	4.0%
	Full Sample	**44.6%**	**32.2%**	**15.3%**	**6.4%**	**1.5%**	**76.7%**	**92.1%**	**7.9%**
Payback ** (L)	Less than $100	26.0%	37.7%	20.8%	13.0%	2.5%	63.7%	84.5%	15.5%
	$100 - $499.9	14.1%	33.8%	22.5%	12.7%	16.9%	47.9%	70.4%	29.6%
	Greater than $500	17.0%	25.5%	23.4%	27.7%	6.4%	42.5%	65.9%	34.1%
	Full Sample	**19.4%**	**33.2%**	**21.9%**	**16.8%**	**8.7%**	**52.6%**	**74.5%**	**25.5%**
Discounted Payback (L)	Less than $100	17.6%	28.3%	20.3%	20.3%	13.5%	45.9%	66.2%	33.8%
	$100 - $499.9	11.3%	18.3%	23.9%	22.6%	23.9%	29.6%	53.5%	46.5%
	Greater than $500	18.8%	18.8%	10.4%	20.8%	31.2%	37.6%	48.0%	52.0%
	Full Sample	**15.5%**	**22.2%**	**19.1%**	**21.1%**	**22.2%**	**37.6%**	**56.7%**	**43.3%**
Profitability Index* (L)	Less than $100	2.8%	22.2%	25.0%	20.8%	29.2%	25.0%	50.0%	50.0%
	$100 - $499.9	11.4%	14.3%	17.1%	18.6%	38.6%	25.7%	42.8%	57.2%
	Greater than $500	2.3%	6.8%	27.3%	29.5%	34.1%	9.1%	36.4%	63.6%
	Full Sample	**5.9%**	**15.5%**	**22.5%**	**21.9%**	**34.2%**	**21.4%**	**43.9%**	**56.1%**
Accounting Rate of Return * (L)	Less than $100	8.2%	5.5%	24.6%	9.6%	52.1%	13.7%	38.3%	61.7%
	$100 - $499.9	1.4%	12.7%	11.3%	23.9%	50.7%	14.1%	25.4%	74.6%
	Greater than $500	6.8%	11.4%	20.4%	15.9%	45.5%	18.2%	38.6%	61.4%
	Full Sample	**5.3%**	**9.5%**	**18.5%**	**16.4%**	**50.3%**	**14.7%**	**33.3%**	**66.7%**
Modified IRR * (M)	Less than $100	0.0%	4.2%	14.1%	25.4%	56.3%	4.2%	18.3%	81.7%
	$100 - $499.9	1.5%	13.2%	13.2%	28.0%	44.1%	14.7%	27.9%	72.1%
	Greater than $500	7.0%	2.3%	9.3%	32.6%	48.8%	9.3%	18.6%	81.4%
	Full Sample	**2.2%**	**7.1%**	**12.6%**	**27.9%**	**50.3%**	**9.3%**	**21.9%**	**78.1%**

where *** is χ^2 significant within the specific capital budgeting method at the .01 level,

** is χ^2 significant within the specific capital budgeting method at the .05 level, and

* is χ^2 significant within the specific capital budgeting method at the .10 level.

Exhibit 3
Relative Usage of Various Supplementary Capital Budgeting Tools

Response to the question: "Please classify how frequently your firm utilizes each of the following budgeting tools. "Often" would generally mean that you use this tool about 75% of the time, "sometimes" would refer to about 50%, and "rarely" would mean about 25% of the time." The absolute percentages are in columns 2-6 and the cumulative percentages are in columns 7-9. Results are based on 205 responses.

Supplemental Capital Budgeting Tools* (level of technical difficulty, L=Low, M=Medium, H=High)	Always (100%)	Often (75%)	Sometimes (50%)	Rarely (25%)	Never (0%)	Always or Often (>=75%)	Always, Often, or Sometimes (>=50%)	Rarely or Never (<=25%)
Sensitivity Analysis (M)	20.5%	44.6%	20.0%	4.1%	10.8%	65.1%	85.1%	14.9%
Scenario Analysis (M)	10.5%	31.1%	25.3%	12.1%	21.1%	41.6%	66.8%	33.2%
Inflation Adjusted Cash Flows (M)	12.0%	19.4%	15.2%	25.1%	28.3%	31.4%	46.6%	53.4%
Economic Value Added (EVA) (M)	12.0%	18.8%	23.0%	19.9%	26.2%	30.9%	53.9%	46.1%
Incremental IRR (M)	8.5%	19.1%	19.7%	16.5%	50.3%	27.7%	47.3%	52.7%
Simulation (H)	3.1%	16.2%	17.8%	27.2%	35.6%	19.4%	37.2%	62.8%
Market Value Added (MVA) (M)	3.7%	11.2%	18.1%	26.6%	40.4%	14.9%	33.0%	67.0%
PERT/CPM (M)	1.1%	7.1%	22.8%	26.1%	42.9%	8.2%	31.0%	69.0%
Decision Tree (M)	1.1%	6.8%	23.2%	33.7%	35.3%	7.9%	31.1%	68.9%
Complex mathematical models (H)	1.1%	6.5%	13.5%	22.2%	56.8%	7.6%	21.1%	78.9%
Linear Programming (H)	0.0%	5.4%	11.4%	23.2%	60.0%	5.4%	16.8%	83.2%
Option Pricing Model (H)	0.0%	5.3%	15.5%	26.7%	52.4%	5.3%	20.9%	79.1%
Real Options (H)	0.5%	1.1%	9.7%	23.2%	65.4%	1.6%	11.4%	88.6%

*All models can be constructed in Excel or similar spreadsheets with embedded macros for the more advanced models.

Brief description of supplementary capital budgeting tools:

- Sensitivity analysis allows for the change in one input variable at a time, such as sales or cost of capital, to see the change in NPV.
- Scenario analysis allows for the change in more than one variable at a time, including probabilities of such changes, to see the change in NPV.
- Inflation Adjusted Cash Flows adjusts expected future cash flows by an estimated inflation factor.
- Economic Value Added (EVA) measures managerial effectiveness in a given year or period (net operating profit after taxes – after tax cost of capital required to support operations)
- Incremental IRR is the IRR of the difference in cash flows of two comparison projects; commonly used in replacement decisions
- Simulation is a method for calculating the probability distribution of possible outcomes.
- Market Value Added (MVA) is the market value of equity – equity capital supplied by shareholders.
- PERT/CPM is the analysis and mapping of the most efficient financial decision.
- Decision trees are graphical illustrations used to model a series of sequential outcomes, along with their associated probabilities.
- Complex mathematical models a general term inclusive of various option pricing model techniques, complex real options, and firm specific proprietary models and methods.
- Linear programming identifies a set of projects that maximizes NPV subject to constraints (such as maximum available resources)
- Option pricing model include either binomial option pricing model or the Black-Scholes option pricing model, the latter used by firms such as Merck with high R&D expenditures and relatively few, albeit large positive NPV investments.
- Real options include the opportunity for expansion, contraction, or abandonment of a capital project before the end of its life.

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CAPITAL STRUCTURE PRACTICES IN INDIA

Jain, P.K., and Surendra S Yadav, "Financial Management Practices in India, Singapore and Thailand – A Comparison", Management & Accounting Research, Vol 3, No. 4, April – June 2002.

CAPITAL STRUCTURE PRACTICES IN INDIA

- Indian Corporates employ substantial amount of debt in their capital structure in terms of the debt-equity ratio as well as total debt to total assets ratio. Nonetheless, the foreign controlled companies in India use less debt than the domestic companies. The dependence of the Indian companies on debt as a source of finance has over the years declined particularly since mid-nineties.
- Indian companies – more short and medium term debt.
- Foreign companies – more long term loans.

CAPITAL STRUCTURE PRACTICES IN INDIA

- Indian companies are exposed to very high degree of operating and financial risk as reflected in the high degree of operating and financial leverage and, consequently, are subject to a high cost of financial distress which includes a broad spectrum of problems ranging from relatively minor liquidity shortages to extreme cases of bankruptcy. The foreign controlled companies are exposed to lower overall risk as well as financial risk.
- The debt service capacity of a sizeable corporates is inadequate and unsatisfactory as measured by interest coverage ratio and debt service coverage ratio.

CAPITAL STRUCTURE PRACTICES IN INDIA

- Low profitable firms use different forms of debt than the highly profitable firms.
- Retained earnings are the most favoured source of finance.
- Loan from financial institutions and private placement of debt are the next most widely used source of finance. The large firms are more likely to issue bonds in the market than the small corporates.
- The hybrid securities is the least popular source of finance amongst corporate India. They are more used by public sector units and low growth corporates.
- Equity capital as a source of funds is not preferred across the board.

Harvard Business School

9-279-069
February 1, 1979

Note on Theory of Optimal Capital Structure

This note examines the interrelationships between the objective of maximizing shareholder value and the objective of achieving an optimal capital structure. The problem of meeting these objectives will be approached from the standpoint of theory since a basic understanding of the theory is important in dealing with the practical problems encountered in attempting to achieve an optimal capital structure for a specific firm.

In raising funds to finance operations, firms can utilize a number of alternatives including issuing debt or equity. **Exhibit 1** illustrates the capital structure choice in a highly simplified context. A firm has invested $500,000 in plant, equipment and working capital. The investment generates earning before interest and taxes of $120,000 in perpetuity. Annual depreciation charges exactly equal capital expenditures, and the firm pays out all of its earnings as dividends. The firm's sales do not grow, but remain stable over time. The firm has the opportunity to select its capital structure from among the debt / total capital ratios presented in line 1 of **Exhibit 1**.

Locating the optimum capital structure for our hypothetical firm, given the data in **Exhibit 1**, is a trivial problem. Simply locating this optimum point is not our objective. The educational usefulness of **Exhibit 1** comes from achieving an understanding of the logic behind the assumptions utilized in the exhibit and the interrelationships among the variables presented in the exhibit. These assumptions and interrelationships need to be explored in some detail.

Impact of Leverage on Total Payments to Security Holders

Lines 1-8 of **Exhibit 1** show the impact of leverage on the firm's income statement. The firm's earnings stream, EBIT, is unaffected by leverage. As debt is added to the capital structure, interest charges increase and profit after taxes falls. Total payments to security holders (i.e., interest plus profit after taxes) increase with leverage. This increase can be attributed entirely to tax savings resulting from the tax deductibility of interest payments. The increase in total payments to security holders is a key advantage flowing from the use of debt capital.

The Cost of Funds

Lines 9-10 of **Exhibit 1** show the rates of return required to induce investors to acquire the debt and equity securities of our hypothetical firm. As leverage increases both bondholders and shareholders are subjected to increased risk. This risk includes both the risk of bankruptcy and the risk of increased variability in annual returns. As the level of debt increases, investors require higher

This note was prepared as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

returns to compensate them for accepting increased risk. The required (expected) returns (lines 9 and 10) represent the critical assumptions in the optimal capital structure analysis which follows. These assumptions reflect a fundamental trade-off between risk and return. Since the returns must be paid to investors in order to allow the firm to raise funds, these returns represent capital costs. The required return on the firm's debt is the cost of debt capital, k_D (line 9) and the required return on the firm's equity is the cost of equity capital, k_E (line 10).

Market Value of Securities

In theory the market value of any security can be determined by calculating the present value of its expected cash flows. The discount rate employed in the present value calculation must be the investors' required return on a security of comparable risk (i.e., the rates in lines 9 and 10). The resulting present value is an estimate of the aggregate market value and price of the security. If investors purchase the security at this price, they expect to earn the required return on their investment. If the price were higher, investors would not purchase the security since their expected return would be less than the return on other securities with comparable risk. If the price were less, investors would promptly purchase the security since it would offer a higher return than other securities of comparable risk. The actions of investors would bid up the price of the security until its value equaled the present value calculated as described above.

The example in **Exhibit 1** employs cash flows which are expected to continue in perpetuity. The present value (V) of a stream of cash payments (CF) which is expected to continue in perpetuity is calculated in the following way. $V = CF/r$ where r is the appropriate discount rate. The market value of the firm's equity can be estimated as the present value of the future cash flows expected by shareholders (i.e., dividends) discounted at the cost of equity capital or $V_E = DIV/k_E$ (line 12). Similarly, the market value of the firm's debt is $V_D = \text{interest}/k_D$ (line 11). The market value of the firm as a whole is simply the sum of the market value of its debt and equity or $V_F = V_D + V_E$ (line 13). Note that as debt is added to the capital structure, the market value of the firm, V_F (line 13) first rises and later falls. The reasons for this phenomenon will be explored below. The maximum value of the firm, $540,274, occurs with $150,000 of debt in the capital structure.

Profitability and *Business* versus *Investor* Returns

Lines 14-18 of **Exhibit 1** present book value and profitability data for the firm. The *market* values of both the firm's equity (line 12) and its total capital (line 13) are greater than the *book* values (lines 15 and 16) of the firm's equity and total capital. The use of leverage has created this incremental value. The entire value increase accrues to the shareholders, since they are the residual owners of the firm. This value increase is a one-time windfall gain to the shareholders. Thereafter the shareholders can expect to receive only their required rate of return (i.e., the firm's cost of equity capital).

The return on total capital (ROTC) is simply EBIT after tax divided by total invested capital. Total capital is measured at book values. Return on total capital is unaffected by leverage. Return on equity (ROE) is profit after taxes divided by the book value of equity: $ROE = PAT/BV_E$. With no debt, ROTC = ROE. However, the addition of debt "leverages" the return on equity and ROE rises above ROTC. While ROE represents the return on the book value of equity, investors do not necessarily receive this same return. Investors instead receive the *market* return which reflects dividends received plus any changes in the price of their shares. ROE is thus a measure of *business* return, not *investor* return. This is a critical distinction.

Earnings Per Share and Price/Earnings Ratios

Lines 19-22 of **Exhibit 1** demonstrate the effects of changes in a firm's capital structure on its earnings per share (EPS) and on its price/earnings ratio. The calculations assume the firm has no debt

initially. In adding a given amount of debt to the capital structure, it is assumed that the firm issues debt and repurchases shares of stock with the proceeds of the debt issue. Specifically, the following sequence of events is assumed: (1) the firm announces its intention to carry out an alteration in its long-run capital structure, (2) the price of its stock changes to reflect the new anticipated value of the firm (thereby producing a one-time windfall gain for shareholders), and then, (3) the firm markets a debt issue and repurchases stock at the new price. Note that EPS increases with additional debt. However, this does not *necessarily* imply that shareholders are always better off with higher levels of debt. The price/earnings ratio of the stock falls with increased leverage since EPS is *riskier*.[1] As debt increases, investors pay a smaller price per dollar of expected earnings per share in order to reflect the increased risk (or lower "quality") of earnings. By definition P = (P/EPS) x (EPS). As leverage increase, EPS rises, and the stock's price/earnings ratio falls. The impact on stock price of leverage is determined by the trade-off of these two effects. Note that for low levels of leverage the increase in EPS dominates the reduction in the price/earnings ratio, and the stock price rises with leverage. For high levels of debt the opposite occurs. Thus, the price of the stock first rises and then falls with leverage.

The Weighted Average Cost of Capital

The weighted average cost of capital is the percentage of debt in the capital structure multiplied by the after-tax cost of debt, plus the percentage of equity in the capital structure multiplied by the after-tax cost of equity. Because of the tax deductibility of interest payments, the after-tax cost of debt to the firm, K_D^t, is less than the return paid to bondholders, k_D. With t = .50, the after-tax cost of debt is only one-half its pretax cost. The cost of equity is already in after-tax terms. Thus, using market value weights, the weighted average cost of the firm's capital is

$$k = \left(\frac{V_D}{V_E + V_D}\right)k_D(1-t) + \left(\frac{V_E}{V_E + V_D}\right)k_E = \left(\frac{V_D}{V_F}\right)k_D^t + \left(\frac{V_E}{V_F}\right)k_E$$

Most financial theorists recommend calculating a firm's cost of capital using *market* value weights rather than *book* value weights for debt and equity in the firm's capital structure. Although market values are used in the calculation of k in line 25, the use of book values would have very little impact on the results. This is a particularly happy outcome since financial managers, lenders, and rating agencies characterize a firm's capital structure, almost without exception, in terms of *book value* weights. It is important to note also that when a firm sells a new issue of common stock the issue is sold at market prices. For this incremental equity addition the book value and the market value of the capital raised are equal. This equality removes the potential for any conflict in the use of market versus book value weights in setting hurdle rates for capital investments financed in part via new equity additions.

In lines 11-13, the value of the firm was calculated by adding the value of the firm's debt and equity securities. In a capital budgeting analysis, a comparable valuation is reached in a more direct manner. The technique involves calculating the firm's (or investment project's) free cash flow (FCF). Free cash flow is the after-tax cash flow generated by the firm's investments ignoring all payments to providers of capital (i.e., ignoring all financing charges such as interest and dividends and ignoring the tax savings attributable to the use of debt). In the example outlined in **Exhibit 1**, free cash flow is simply EBIT after tax. The value of the firm is the present value of FCF discounted at the weighted average cost of the capital invested in the firm. In our perpetuity example, V_F = FCF/k. The costs of financing are not deducted in the calculation of FCF. They are incorporated by discounting FCF at the weighted average cost of capital which includes these capital costs. Thus, using free cash flow and the

[1] In this simple perpetuity example the cost of equity capital is equal to the inverse of the price-earnings ratio (i.e., k_E = EPS/P). This is *not* true in general.

weighted average cost of capital, the value of the firm (or the investment project) can be calculated directly. Note that the resulting values of V_F in line 27 are the same as those in line 13 which are derived by valuing debt and equity separately.

Implications

The most important results of the **Exhibit 1** example are contained in lines 13, 20 and 25. In the simple world outlined in **Exhibit 1**, the firm's optimal capital structure *simultaneously* (a) maximizes the value of the firm and (b) its share price, and (c) minimizes the firm's weighted average cost of capital. Given the assumptions concerning the cost of debt and equity (lines 9 and 10), as debt is added to the capital structure, the weighted average cost of capital falls. This increases the value of the firm. Since this increase in the firm's value accrues to the owners of the firm, the price of the firm's stock rises. In this example the firm's optimal (or target) book value debt ratio is in the range of 30%-40%. The determination of the firm's optimal (or target) capital structure is also displayed in the graphs in **Exhibit 2**.

Exhibits 1 and **2** are based on very simple assumptions. They are designed to delineate the mechanics of the capital structure decision. The exhibits do not provide a detailed explanation of the economic rationale for the behavior portrayed. One common rationale is that as debt is added, V_F rises (P rises, k falls) due to the tax savings provided by debt. Recall that these tax savings increase the total cash payments to security holders (line 8). The value of the firm is, therefore, increased by the present value of these tax savings. This is a major benefit of leverage. As leverage is increased, however, so is the probability of financial distress. Firms with very high debt ratios (and low bond ratings) may have difficulty raising funds in periods of tight money. This affects the firm's ability to make investments and remain competitive. Higher debt ratios also increase the chances that in periods of difficulty management decisions will be constrained by creditors. Violation of debt covenants could restrict the freedom of managers to make decisions which are in the best interest of shareholders. The firm might be unable to undertake attractive investment opportunities, or might be forced by creditors to sell assets or issue equity at extremely unattractive times. At worst, the firm could face bankruptcy or liquidation. Such decisions would probably not be in the long-term interests of shareholders.

The other side of the argument has also been advanced as an explanation of the limits to leverage, however. During a period of extreme financial distress, a management group might feel that it has little to lose by making operating or investment decisions with a very high potential payoff (i.e., high enough to save the firm from bankruptcy if the projects were successful) but with a very low probability that the projects would actually be successful. Such decisions could serve the interests of managers and equity shareholders, but work to the detriment of creditors. To insure against this risk, the return required by bondholders, k_D (the cost of debt) rises precipitously at high levels of debt.

There are many potential costs associated with financial distress. These costs are embedded implicitly in the costs of capital assumed in this example (lines 9 and 10). As a firm's debt ratio rises, the probability of financial distress increases, and the value of the firm is reduced by the present value of these expected costs. At low levels of debt the disadvantages of leverage are outweighted by the advantages of leverage and the value of the firm rises. At high debt ratios, the present value of the expected costs of financial distress is larger than the present value of the tax savings, and increased leverage reduces the value of the firm. An intermediate level of debt which represents the optimal trade-off between these two factors maximizes the value of the firm (and the price of the stock) and minimizes the cost of capital.

Conclusions

The example outlined in this note is based on many simplifications i.e., perpetuity cash flows, 100% dividend payout, capital expenditures equal to depreciation, no sales growth, etc. However, the

analysis in **Exhibits 1** and **2** does provide a conceptual framework for the determination of optimal capital structure. Unfortunately, in practice it is not easy to apply these concepts in a straightforward manner. It is quite difficult to accurately estimate the cost of capital for a firm given its existing capital structure. It is no simpler to estimate the firm's capital cost given some proposed *new* capital structure. To further complicate the problem, in contrast to the **Exhibit 1** example, firms' capital structures can include not only straight debt and common equity but also preferred stock and convertible securities.

While there are significant practical problems associated with determining a firm's optimum capital structure, some statistical tools and benchmarks are available to aid financial decision makers in their search for the best capital structure.[2] These tools provide substantial insight concerning the levels of debt which are clearly too high or too low. In the last analysis, the capital structure decision rests heavily upon the financial manager's business judgment. The conceptual framework for dealing with the capital structure decision can be combined with available benchmarks and the financial manager's business judgment to facilitate the setting of a reasonable target debt policy for the firm.

[2] For example, bond ratings and their determinants, interest rates by bond rating, statistics on the availability of debt in credit crunches by bond rating, interest coverage and cash flow coverage ratios as measures of leverage, statistical studies of similar firms with different debt ratios, statistical estimates of the cost of equity capital, etc. A statistical method for estimating the cost of equity capital for a firm can be found in "Diversification, the Capital Asset Pricing Model, and the Cost of Equity Capital" 9-276-183 and "Financial Leverage, The Capital Asset Pricing Model and The Cost of Equity Capital" 9-280-100.

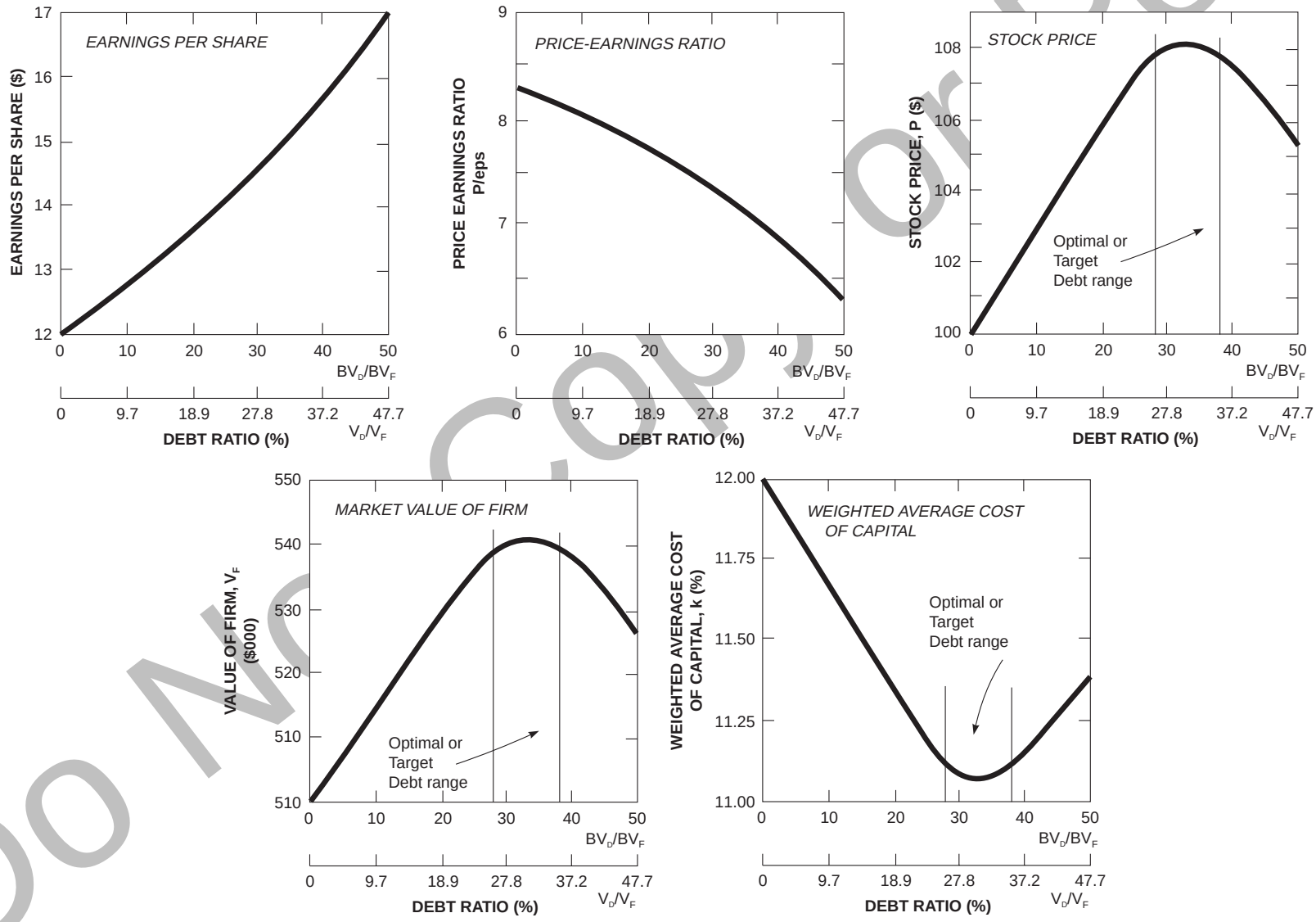
Exhibit 1 Note on Theory of Optimal Capital Structure

Hypothetical Calculation of the Impact of Capital Structure on Securities Valuation

1	Debt in the Capital Structure* (%)	0	10%	20%	30%	40%	50%
2	Earnings Before Interest & Taxes, EBIT	$120,000	$120,000	$120,000	$120,000	$120,000	$120,000
3	Interest	0	4,125	8,750	14,625	22,000	31,250
4	Profit Before Taxes, PBT	120,000	115,875	111,250	105,375	98,000	88,750
5	Taxes	60,000	57,938	55.625	52,688	49,000	44,375
6	Profit After Taxes, PAT	60,000	57,937	55,625	52,687	49,000	44,375
7	Dividends, DIV	60,000	57,937	55,625	52,687	49,000	44,375
8	Total Payments to Security Holders (line 3 + line 7)	$60,000	$62,062	$64,375	$67,312	$71,000	$75,625
9	Required Return on Debt Capital, k_D (Cost of Debt Capital)	8.00%	8.25%	8.75%	9.75%	11.00%	12.50%
10	Required Return on Equity Capital, k_E (Cost of Equity Capital)	12.00%	12.50%	13.00%	13.50%	14.50%	16.00%
11	Market Value of Debt, V_D (line 3 ÷ line 9)	$0	$50,000	$100,000	$150,000	$200,000	$250,000
12	Market Value of Equity, V_E (line 7 ÷ line 10)	500,000	463,496	427,885	390,274	337,931	277,344
13	Market Value of the Firm, V_F (line 11 + line 12)	$500,000	$513,496	$527,885	$540,274	$537,931	$527,344
14	Book Value of Debt, BV_D	$0	$50,000	$100,000	$150,000	$200,000	$250,000
15	Book Value of Equity, BV_E	500,000	450,000	400,000	350,000	300,000	250,000
16	Book Value of the Firm, BV_F (Total Capital)	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
17	Return on Total Capital, ROTC (EBIT(1 - t) ÷ line 16)	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
18	Return on Equity, ROE (line 6 ÷ line 15)	12.0%	12.9%	13.9%	15.1%	16.3%	17.8%
19	Number of Shares Outstanding, N	5,000	4,513	4,053	3,612	3,141	2,630
20	Price per Share of Common Stock, P($) (line 12 ÷ line 19)	$100.0	$102.7	$105.6	$108.1	$107.6	$105.5
21	Earnings per Share of Common Stock, EPS ($) (line 6 ÷ line 19)	$12.00	$12.84	$13.72	$14.59	$15.60	$16.87
22	Price-Earnings Ratio, P/EPS (line 20 ÷ line 21 = line 12 ÷ line 6)	8.3	8.0	7.7	7.4	6.9	6.3
23	Book Value Debt Ratio (line 14 ÷ line 16)	0%	10%	20%	30%	40%	50%
24	Market Value Debt Ratio, V_D/V_F (line 11 ÷ line 13)	0%	9.7%	18.9%	27.8%	37.2%	47.7%
25	Weighted Average Cost Capital, k (using market values; see text)	12.0 %	11.7 %	11.4%	11.1%	11.2 %	11.4%
26	Free Cash Flow, FCF (EBIT (1 - t) = line 2x.50)	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
27	Market Value of the Firm, V_F (line 26 ÷ line 25)	$500,000	$513,496	$527,885	$540,274	$537,931	$527,344

*Calculated using book value weights for debt and equity.

Exhibit 2 Note on Theory of Optimal Capital Structure



The Engineering Economist, 50: 55–67

ISSN: 0013-791X print / 1547-2701 online
DOI: 10.1080/00137910590916676

Taylor & Francis
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ARE THERE DIFFERENCES IN CAPITAL BUDGETING PROCEDURES BETWEEN INDUSTRIES? AN EMPIRICAL STUDY

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This study breaks down the use of capital budgeting procedures between industries. While it is easy to state that the use of capital budgeting analysis has become more sophisticated over the decades, the question remains as to whether different industries have followed the same pattern. Three hundred two Fortune 1,000 companies responded to a survey organized along industry lines. Chi-square independence of classification tests indicated that a null hypothesis of no significant relationship between industry classification and capital budgeting procedures could be rejected in a number of decision-making areas including goal setting, rates of return, and portfolio considerations. Just as industry patterns affect financing decisions (debt vs. equity), they also affect capital budgeting decisions, and this study emphasizes that point.

INTRODUCTION

The changes in capital budgeting procedures over the decades have been well documented in prior studies. The research of Canada and Miller [2], Fremgen [4], Gitman and Forrester [5], Gurnani [6], Kim and Farragher [8], Mao [10], Petty, Scott, and Bird [13], Procter and Canada [15], Schall, Sundem, and Geijsbeck [16], Scott and Petty [17], and Stanley and Block [19] all indicate that increasingly sophisticated capital budgeting procedures have been put in practice.

However, a generalization that more sophisticated practices take place across all industries is subject to investigation and challenge. This consideration is important because an analyst within a given industry may be intent

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on following industry norms but misled by general observations that relate to the studies cited above. Just as there are different valuation procedures or financing norms between industries, there may also be different capital budgeting procedures.

INDUSTRY BREAKDOWN

Studies by Chan, Martin, and Kensinger [3] and McConnell and Muscarella [11] provide a simple pattern of breakdown between industries. However, in this study the author went beyond high versus low technology or industrial versus public utility firms for a more comprehensive inclusion of firms that are part of the *Fortune* 1,000 companies.

After a careful analysis of performance metrics, size variations, operational procedures, and management strategy, the author developed the breakdown of industries as shown in Table 1. Subcategories for inclusion within a given category are also included.

While not all the classifications are mutually exclusive, they clearly delineate eight different types of commercial activity. The classifications were also cross-checked against two-digit SIC codes for appropriate placement of companies.

Table 1. Industrial classifications

Energy	*Technology*
Oil & gas	Aerospace
Energy service	Computers
Petroleum refining	Computer software
Pipelines	Engineering
	Semiconductors
Manufacturing	*Retail*
Automobiles	Household products
Chemicals	Beverages
Electronics	Food products
Metals	Drugstores
	Sporting goods
Finance	*Healthcare*
Commercial banks	Hospitals
Insurance companies	Pharmaceuticals
Savings institutions	Medical products
Brokerage firms	
Utilities	*Transportation*
Electric utilities	Airlines
Gas utilities	Railroads
Communications	Freight delivery
	Trucking

Table 2. Year 2003 total revenue of survey participants (in billions)

	Median ($)	1st Decile ($)	10th Decile ($)
Energy (19)	5.85	20.21	1.45
Technology (53)	3.97	10.43	1.82
Manufacturing (70)	6.15	9.72	1.73
Retail (68)	2.79	11.38	1.24
Finance (34)	4.35	9.67	1.35
Healthcare (27)	4.12	13.13	1.29
Utilities (19)	3.60	8.17	1.36
Transportation (12)	5.02	13.02	1.44

DATABASE

As previously mentioned, the *Fortune* 1,000 companies served as the initial database for the study. A three-page questionnaire was sent to the top-ranking financial officers of the firms, and 302 usable responses were returned. The choice of questions was based on a pilot study of financial executives of top U.S. firms to insure clarity of meaning and importance of the topic.

The financial characteristics of the responding companies are presented in Tables 2, 3, 4, and 5. The values after the industry names indicate the number of respondents in that category.

The data indicate that the largest firms can be found in manufacturing and energy as measured by revenue and assets. The industries with the largest commitment of fixed assets to total assets are utilities, manufacturing, energy, and transportation. The low value for technology (21.7%) can be misleading because of a large presence of intangible assets. The small values for retailing (19.8%) and finance (11.7%) are attributable to

Table 3. Year-end 2003 total assets of survey participants (in billions)

	Median ($)	1st Decile ($)	10th Decile ($)
Energy (19)	4.49	14.37	1.50
Technology (53)	1.02	6.60	.97
Manufacturing (70)	6.62	13.06	1.00
Retail (68)	1.35	9.62	1.01
Finance (34)	4.04	8.67	1.35
Healthcare (27)	2.50	8.17	1.19
Utilities (19)	3.51	7.27	1.28
Transportation (12)	4.82	11.18	1.45

Table 4. Year-end 2004 ratio of fixed assets to total assets of survey participants

	Median (%)	1st Decile (%)	10th Decile (%)
Energy (19)	67.56	77.62	50.42
Technology (53)	21.70	38.90	10.20
Manufacturing (70)	70.30	80.80	36.60
Retail (68)	19.80	35.70	5.20
Finance (34)	11.70	15.60	8.40
Healthcare (27)	30.10	44.20	13.80
Utilities (19)	74.00	90.10	40.40
Transportation (12)	60.10	75.10	38.30

the presence of leasing for retail stores and highly liquid investments for financial institutions.

Finally, in terms of return on stockholders' equity: energy, healthcare, and technology are in the lead, with transportation in last place.

CORPORATE POLICY

In evaluating the capital budgeting procedures of the respondent firms, there should be some examination of the corporate goals that affect their decisions. At least two prior studies addressed the issue of what management considered its primary goal to be. In the Petty, Scott, and Bird study [13] of Fortune 500 Companies in the 1970s, 37% of the respondents stated their predominant goal was return on assets, 36% opted for growth in earnings per share, 16% tried to maximize aggregate dollar earnings, and only 11% choose to maximize stockholder wealth. The Stanley and Block study [19] of the *Fortune* 1,000 companies in the 1980s found the top three

Table 5. Year-end 2003 ratio of net income to stockholders' equity of survey participants

	Median (%)	1st Decile (%)	10th Decile (%)
Energy (19)	28.2	49.1	10.2
Technology (53)	21.7	38.8	– 1.7
Manufacturing (70)	11.2	24.1	3.8
Retail (68)	12.1	25.5	4.1
Finance (34) 17.8	17.8	31.2	5.5
Healthcare (27)	24.1	44.2	3.8
Utilities (19)	13.5	19.6	6.5
Transportation (12)	6.0	30.2	– 11.7

choices of management were to maximize return on equity (29%), maximize growth in earnings per share (26%), and maximize stockholder wealth (21%).

It is interesting that in the two cited studies only 11% and 21%, respectively, chose maximization of stockholder wealth as the predominant goal of financial management when virtually every textbook in finances (then and now) lists it as the primary objective. In the current study taking place in the 2003–2004 time period, the results are somewhat more encouraging. Fifty-six percent chose stockholder wealth maximization as the primary goal of the firm, 28% opted for growth in earnings per share, and 16% selected return on stockholders' equity.

However, the results were not consistent across industries as reported in Table 6. Over 83 of the technology firms choose stockholder wealth maximization as their primary goal. This is reflective of the continuing need of many technology firms to raise equity capital due to investor resistance to their debt issues as covered in Pinches [14]. The low emphasis on growth in earnings per share (3.1%) is consistent with the fact that many firms in the technology sector do not have positive earnings per share and rely on other metrics such as EBITA or revenue to market capitalization to measure their performance.

Healthcare is another industry that places a high premium on stockholder wealth maximization, with 71.6% of the respondents listing it as their primary goal. The discovery of a blockbuster drug by Merck or Pfizer may have little impact on earnings per share or return on stockholders' equity but a major impact on the market value of the firm. One respondent provided the comment that "quarterly earnings could be on the decline, but stock value rapidly increasing if a major breakthrough for its eye care products was on the horizon."

Table 6. Primary goal of the firm as broken down by industry

	Stockholder wealth maximization (%)	Growth in earnings per share (%)	Return on stockholders' equity (%)
Energy	57.6	24.3	18.1
Technology	83.2	3.1	13.7
Manufacturing	53.3	27.2	19.5
Retail	20.7	66.8	12.5
Finance	49.9	28.4	21.7
Healthcare	71.6	18.6	9.8
Utilities	24.2	16.5	59.3
Transportation	55.8	30.8	13.4

On the other end of the spectrum, firms in the retailing industry chose growth in earnings per share as their primary goal by a margin of 66.8%. One might speculate that in some competitive retail sectors, growth in EPS serves as a surrogate for capturing greater market share.

In the public utilities sector, return on stockholders' equity is the primary motivating factor (59.3%). In an industry that is still highly regulated at the state level, firms are very sensitive to how much they are allowed (and able) to earn on stockholders' equity.

To further assess the importance of industry classification on goal setting (as well as other variables), a series of chi-square tests are presented in Appendix A. In Part 1, the null hypothesis that goal setting is independent of industry classification can be rejected at a .05 level of significance. Thus it appears that industry classification has a significant effect on the goals that firms wish to follow.

SELECTION OF HURDLE RATE

The evidence of the increasing adoption of discounted cash flow techniques by large corporations is abundant. For example, Klammer [9] shows use of discounted cash flow among large corporations going from 16.7 to 33.7% in the 1960s and expanding to 43% in 1970. Studies throughout the 1970s and 1980s showed levels of discounted cash flow usage steadily increasing to the 60–80% range among larger firms.

In the 1990s, the use of cash flow analysis has continued to increase [15]. During the last four decades, less sophisticated methods such as the payback period and accounting rate of return have practically disappeared as the primary method of evaluation for large corporations and have either been subverted to a secondary role or abandoned altogether.

Although discounted cash flow methods (based on NPV or IRR) are almost universal, the same cannot be said for the discount rate. Two hundred twenty-five respondents (74.5%) use weighted average cost of capital as the cut-off point, but 77 (25.5%) use alternative metrics such as the desired return on stockholders' equity, the required growth in earnings per share, or other metrics. The results are shown in Table 7.

The main exception to using the weighted average as the primary metric is in the public utility industry, where the return on stockholders' equity is favored (52.6% versus 47.4%). Once again, the heavy regulatory emphasis on allowable return to stockholders plays an important role. One respondent indicated, "WACC was very important to engineers and financial analysts doing day-to-day analysis, but top management placed a strong emphasis on the required level of return on invested capital."

Table 7. The primary metric used as the required rate of return (hurdle rate)

	Weighted avg. cost of capital (%)	Return on stockholders' equity (%)	Required rate in EPS (%)	Other (%)
Energy	94.7	5.32	—	—
Technology	98.2	—	1.8	—
Manufacturing	78.9	11.6	9.5	—
Retail	68.7	6.7	23.1	1.5
Finance	70.6	19.6	6.9	2.9
Healthcare	75.4	12.8	8.1	3.7
Utilities	47.4	52.6	—	—
Transportation	77.2	14.1	8.7	—

As shown in Part 2 of Appendix A, a null hypothesis of no relationship between industry classification and the required rate of return metric can be rejected at a .10 level of significance.

DIVISIONAL COST OF CAPITAL

Divisional cost of capital may be every bit as important as the overall corporate required rate of return. As pointed out by Pinches [14], Van Horne [20], Harris, O'Brien, and Wakeman [7], Block [1] and others, failure to consider divisional cost of capital may lead to suboptimal decisions.

To the extent that divisions in a corporation have degrees of risk and financial characteristics that are different from the parent corporation, using the overall corporate hurdle rate leads to incorrect decisions and failure to maximize stockholder wealth. The major consequence of using a single cut-off criterion for all projects is an intrafirm misallocation of capital since projects that are initiated by high-risk divisions are more likely to be accepted because of their potentially higher return. A similar bias works against lower-risk divisions in that they may lack capital because their relatively low returns do not match up to the corporate cost of capital, which is based on normal risk. In a typical risk-averse environment, these lower-risk projects may be rejected in spite of the fact that on a risk-adjusted basis they might be quite acceptable. Management may, in fact, have capital budgeting procedures that work against its own objective.

In the current study, divisional cost of capital was used by 51.3% of the respondents. The breakdown by industry is shown in Table 8. A chi-square test of independence between industry classification and divisional cost of capital (item 3 of Appendix A) indicates no statistical significance between the two classification systems. Apparently the use of divisional

Table 8. The use of divisional cost of capital as analyzed by industry

	Use divisional cost of capital (%)	Use corporate-wide measure (%)
Energy	56.2	43.8
Technology	44.1	56.9
Manufacturing	60.2	39.8
Retail	39.9	60.0
Finance	55.7	44.3
Healthcare	56.2	43.8
Utilities	51.1	48.8
Transportation	47.2	52.7

cost of capital is more a function of the centralized versus decentralized nature of the firm than the industry it is in.

RISK ADJUSTMENT

There are a number of approaches for adjusting for risk as indicated by the research of Gitman and Forrester [5], Klammer [9], Petry [12], and others. The most common is to adjust the discount rate for risk as shown in a hypothetical example in Table 9. Low-risk projects are assigned the minimum discount rate and high-risk projects the maximum rate.

Other firms might choose to use a consistent discount rate, such as the weighted average cost of capital, but adjust or modify inflows for lack of certainty as discussed in Pinches [14]. The adjustment tends to be most severe for inflows far into the future. For some firms inflows after a certain time period, such as 10 years, may be ignored altogether. This overall approach is referred to as the certainty equivalent approach.

Finally, other firms consider risk to be a concept that cannot be appropriately quantified and simply use a subjective approach. After information has been analyzed and the NPV and IRR computed, management makes a

Table 9. Examples of risk-adjusted discount rates related to risk

Type of Investment	Discount Rate (%)
Low or no risk (equipment replacement)	6
Moderate risk (new equipment)	8
Normal risk (addition to normal products)	10
Risky (new product in related market)	12
High risk (completely new product)	16
Highest risk (new product in foreign market)	20

Table 10. Risk-adjustment procedures as related to industry classification

	Risk-adjusted discount rate (%)	Certainty equivalent approach (units of 1)	Subjective decision making (%)
Energy	72.7	—	27.3
Technology	77.9	1.8	20.3
Manufacturing	69.9	1.4	28.7
Retail	65.7	—	34.3
Finance	80.1	2.9	17.0
Healthcare	82.1	3.7	14.2
Utilities	71.3	5.2	23.4
Transportation	81.5	—	18.5

subjective call about whether the firm should go forward with the project. Under this third approach it is entirely possible that a project with a positive NPV may be delayed or rejected because management has an uneasy feeling about the numbers. An industry-by-industry breakdown on the use of the three approaches is presented in Table 10.

As reported in Part 4 of Appendix A, the chi-square test of independence indicates there is no statistically significant relationship between industry classification and risk-adjustment procedure.

THE PORTFOLIO EFFECT

A potential fault of top management is to look at project risk in isolation without considering the portfolio effect. The later concept considers how investments interact with each other. A high-risk oil-drilling project may actually reduce the overall risk of the firm if the company is in an industry that is highly dependent on energy (such as the airlines).

The portfolio effect consideration is particularly important for firms that are involved in global businesses. As expressed by Shapiro [18], "To the extent that foreign cash flows are not perfectly correlated with domestic investments, the total risk (systematic and unsystematic) associated with variation of cash flows appears to be reduced, not increased by foreign investment."

In light of the quote above and portfolio considerations in general, tying the discount rate to project-specific risk can be misleading. For example, the last line of Table 9 calls for a discount rate of 20% for a new product in a foreign market. However, if the investment provides international or product diversification, a lower discount rate than the cost of capital may be justified.

Table 11. The use of portfolio considerations in analyzing individual investments

	Applied (%)	Not applied (%)
Energy	58.6	41.4
Technology	29.9	70.1
Manufacturing	72.7	27.3
Retail	15.4	84.6
Finance	22.8	71.2
Healthcare	50.2	49.8
Utilities	80.1	19.9
Transportation	59.8	40.2

In spite of its obvious importance to capital budgeting, the portfolio effect is not universally applied as a decision making metric. Only 54.6% of the respondents explicitly include the portfolio effect as a key parameter in analyzing an individual decision. However, there is a great deal of variation between industries, as indicated in Table 11.

Public utility and manufacturing firms are strong users of portfolio considerations, while companies in the retail and finance sectors tend to ignore them. It should be noted that utilities and manufacturing have the heaviest commitment to fixed assets as a percentage of total assets as reported in Table 4. Firms that are heavily involved in making "fixed asset related" capital budgeting decisions may be more sensitive to the effect one investment decision has on other investments.

A null hypothesis of no relationship between industry classification and use of portfolio considerations can be rejected at a level of significance of .05 as shown in Part 5 of Appendix A. Clearly, certain industries are more sensitive (or sophisticated) in their analysis of the correlation between investments.

SUMMARY AND CONCLUSION

The general statement that more sophisticated capital budgeting methods have been adopted by large corporations leaves some questions unanswered. If the analyst is doing a study within the context of a particular industry, he must be aware of the norms for analysis within that industry.

In this study of eight major industrial classifications covering 302 *Fortune* 1,000 companies, five key areas related to capital budgeting were covered. In each case, a statistical test was employed to determine whether there was a difference in methodology between industries.

Chi-square independence of classification tests produced statistically significant results between industries for goal setting, determining the required rate of return, and utilizing portfolio effect considerations.

For example, in goal-setting procedures, firms in the technology area tended to emphasize stockholder wealth maximization. For some firms, this may be consistent with the need to raise equity capital. However, firms in retailing appeared to be more concerned with growth in earnings per share, perhaps reflecting an emphasis on capturing market share from competitors. Public utilities went in a different direction, emphasizing return on stockholders' equity as their primary focus, reflecting the regulatory pressure they are under. As a result of these and other considerations, a null hypothesis of no relationship between industry classification and goal setting could be rejected at a .05 level of significance.

Similar industry-impacted decisions could also be statistically validated for determining rates of return and utilizing portfolio theory. In the former case, regulatory considerations were present, and in the latter case, industries with a heavy commitment to fixed assets tended to be more sensitive to the interaction between investments and their effect on the entire portfolio.

Overall, this study shows that, just as industry characteristics often affect the financing patterns of firms (debt versus equity), they also affect the asset deployment decisions. This study brings the left-hand side of the balance sheet up to the level of the right-hand side in terms of industry analysis.

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Appendix A. Chi-square independence of classification tests

Null Hypothesis	χ^2	D.F.	Alpha .01	Alpha .05	Alpha .10	Conclusion
Goal setting is independent of industry classification.	25.763	14	29.141	23.685	21.064	Reject the hypothesis at .05 level of significance. Industry classification has a significant relationship to goal setting.
The metric for required rate of return is independent of industry classification.	30.397	21	38.932	32.671	29.615	Reject the hypothesis at .10 level of significance. Industry classification has a significant relationship to the metric for required rate of return.
The use of divisional cost of capital is independent of industry classification.	9.233	7	18.475	14.067	12.017	Accept the hypothesis. Industry classification has no significant relationship to the use of divisional cost of capital.
Risk-adjustment procedure is independent of industry classification.	7.619	14	29.141	23.685	21.064	Accept the hypothesis. Industry classification has no significant relationship to risk-adjustment procedure.
Portfolio considerations vin analyzing investments are independent of industry classification.	17.167	7	18.475	14.067	12.017	Reject the hypothesis at .05 level of significance. Industry classification has a significant relationship to portfolio considerations in analyzing investments.

BIOGRAPHICAL SKETCH

Stanley Block, Ph.D., C.F.A., is professor of finance and holder of the Stanley Block Endowed Chair of Finance at Texas Christian University, Fort Worth. He is the coauthor, with Geoffrey Hirt, of numerous books in finance including *Foundations in Financial Management* and *Fundamentals of Investment Management*. The first text has sold over a million copies. He has published approximately 50 articles in such journals as *Financial Management, The Journal of Financial Services Research, Journal of Portfolio Management, The Journal of Accountancy, The Financial Analysts Journal, The Engineering Economist*, and the *Journal of Finance*. He is past president of the Southwestern Finance Association and a former director of the Financial Management Association. He serves as consultant to a number of companies throughout the world and has held board of director positions with three publicly traded companies. At TCU he has twice won the award as the outstanding instructor in the MBA program.

COST OF CAPITAL PRACTICES IN INDIA

Anand, Manoj “Corporate Finance Practices in India: A Survey”, Vikalpa, Vol. 27, No. 4, Oct-Dec 2002, and Jain, P.K., and Surendra S Yadav, “Financial Management Practices in India, Singapore and Thailand – A Comparison”, Management & Accounting Research, Vol 3, No. 4, April – June 2002.

COST OF CAPITAL PRACTICES IN INDIA

- ✓ The most frequently used (67%) discount rate to evaluate capital budgeting decision is based on overall cost of capital (WACC).
- ✓ CAPM is the most popular method of estimating cost of equity capital (54%) followed by Gordon's Dividend Model (52%).
- ✓ CAPM – Large Corporates.
- ✓ Dividend Discount Model – Small Firms.
- ✓ GOI 10 year bonds are the most widely used risk-free rate to compute cost of capital using CAPM Approach.

COST OF CAPITAL PRACTICES IN INDIA

- ✓ The industry average beta is the most popular measure of systematic risk used by the corporates.
- ✓ Large and highly profitable corporates – Self-calculated beta.
- ✓ Small and Low profitable concerns – Published sources of beta.
- ✓ The majority of corporates (2/3) considers the last 5-year monthly share price data to estimate the equity beta.
- ✓ The average market risk premium is the most widely used measure by the corporates.

COST OF CAPITAL PRACTICES IN INDIA

- ✓ The most widely used method for estimating cost of debt is the interest tax shield.
- ✓ Most corporates revise cost of capital annually. Some corporates revise it with every investment.
- ✓ One-tenth of corporates do not attach any cost to equity capital.
- ✓ About one-fifth of the sample corporates consider retained earnings as a cost-free source of finance. 75 per cent of the sample regard cost of retained earnings either as equivalent to opportunity cost of using these funds by the corporate / equity holders or equal to the cost of equity capital.

HOW DO CFOs MAKE CAPITAL BUDGETING AND CAPITAL STRUCTURE DECISIONS?

*by John Graham and Campbell Harvey, Duke University**

We recently conducted a comprehensive survey that analyzed the current practice of corporate finance, with particular focus on the areas of capital budgeting and capital structure. The survey results enabled us to identify aspects of corporate practice that are consistent with finance theory, as well as aspects that are hard to reconcile with what we teach in our business schools today. In presenting these results, we hope that some practitioners will find it worthwhile to observe how other companies operate and perhaps modify their own practices. It may also be useful for finance academics to consider differences between theory and practice as a reason to revisit the theory.

We solicited responses from approximately 4,440 companies and received 392 completed surveys, representing a wide variety of firms and industries.[1] The survey contained nearly 100 questions and explored both capital budgeting and capital structure decisions in depth. The responses to these questions enabled us to explore whether and how these corporate policies are interrelated. For example, we investigated whether companies that made more aggressive use of debt financing also tended to use more sophisticated capital budgeting techniques, perhaps because of their greater need for discipline and precision in the corporate investment process.

More generally, the design of our survey allowed for a richer understanding of corporate decision-making by analyzing the CFOs' responses in the context of various company characteristics, such as size, P/E ratio, leverage, credit rating, dividend policy, and industry. We also looked for systematic relationships between corporate financial choices and managerial factors, such as the extent of top management's stock ownership, and the age, tenure, and education of the CEO. By testing whether the responses

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*This paper is a compressed version of our paper that was first published as "The Theory and Practice of Corporate Finance: Evidence from the Field" in the *Journal of Financial Economics*, Vol. 60 (2001), and which won the Jensen prize for the best *JFE* paper in corporate finance in 2001. This research is partially sponsored by the Financial Executives International (FEI) but the opinions expressed herein do not necessarily represent the views of FEI. We thank the FEI executives who responded to the survey. Graham acknowledges financial support from the Alfred P. Sloan Research Foundation.

1. In the original *JFE* version of this paper, we show that our sample of respondents is representative of the overall population of 4,400 firms, is fairly representative of Compustat firms, and is not adversely affected by nonresponse bias. The next largest survey that we know of studies 298 large firms and is presented in J. Moore and A. Reichert, "An Analysis of the Financial Management Techniques Currently Employed by Large U.S. Corporations," *Journal of Business Finance and Accounting*, Vol. 10 (1983), pp. 623-645.

varied systematically with these characteristics, we were able to shed light on the implications of various corporate finance theories that focus on variables such as a company's size, risk, investment opportunities, and managerial incentives.

The results of our survey were reassuring in some respects and surprising in others. With respect to capital budgeting, most companies follow academic theory and use discounted cash flow (DCF) and net present value (NPV) techniques to evaluate new projects. But when it comes to making capital structure decisions, corporations appear to pay less attention to finance theory and rely instead on practical, informal rules of thumb. According to our survey, the main objective of CFOs in setting debt policy was not to minimize the firm's weighted average cost of capital, but rather to preserve "financial flexibility"—a goal that tended to be associated with maintaining a targeted credit rating. And consistent with the emphasis on flexibility, most CFOs also expressed considerable reluctance to issue common equity unless their stock prices were at "high" levels, mainly because of their concern about dilution of EPS. (As we shall argue later, although such reluctance to issue equity is likely to be consistent with finance theory's emphasis on the costs associated with "information asymmetry," the extent of CFOs' preoccupation with EPS effects seems to contradict the theory.)

The survey also provided clear evidence that firm size significantly affects the practice of corporate finance. For example, large companies were much more likely to use net present value techniques, while small firms tended to rely on the payback criterion. And, providing some encouragement to proponents of academics' trade-off model of capital structure (discussed in more detail later), a majority of large companies said they had "strict" or "somewhat strict" target debt ratios, whereas only a third of small firms claimed to have such targets.

In the next section, we briefly discuss the design of the survey and our sampling techniques (with more details provided in the Appendix). Then we review our findings, first on capital budgeting policy and next on capital structure decisions.

SURVEY TECHNIQUES AND SAMPLE CHARACTERISTICS

Perhaps the most important part of survey research is designing a survey instrument that asks clear and pertinent questions. We took several steps to achieve this end. After spending months developing a draft survey, we circulated the draft to a group of academics and practitioners and incorporated their suggestions into a revised version. Then, after getting the advice of marketing research experts on both the survey's design and execution, we made changes to the format of the questions and to the overall design in order to minimize biases induced by the questionnaire and maximize the response rate. The final survey was three pages long and took approximately 15 minutes to complete.

We mailed the survey to the CFOs of all (1998) Fortune 500 companies and also faxed surveys to 4,440 firms with officers who are members of the Financial Executives Institute (313 of the Fortune 500 CFOs are also FEI members).[2] The 392 returned surveys represented a response rate of nearly 9%. Given the length and scope of our survey, this response rate compared favorably to the response rate for other recent academic surveys.[3] We received responses from CFOs representing a wide variety of companies, ranging from very small (26% of the sample firms had sales of less than $100 million) to very large (42% had sales of at least $1 billion). Forty percent of the firms were manufacturers, and the remaining firms were evenly spread across other industries, including financial (15%), transportation and energy (13%), retail and wholesale sales (11%), and high-tech (9%). Sixty percent of the respondents had price-earnings ratios of 15 or greater (a group we refer to later as "growth firms" when we analyze the effect of investment opportunities on corporate behavior).

The distribution of debt levels was fairly uniform. Approximately one-third of the sample companies had debt-to-asset ratios (expressed in book values) below 20%, another third had debt ratios between 20% and 40%, and the remaining firms had debt ratios greater than 40. We refer to companies with debt ratios greater than 30% as "highly levered."

2. FEI has approximately 14,000 members that hold policy-making positions as CFOs, treasurers, and controllers at 8,000 companies throughout the U.S. and Canada. Every quarter, Duke University and FEI poll these financial officers with a one-page survey on important topical issues. See http://www.duke.edu/~jgraham under "FEI Survey." The usual response rate for the quarterly survey is 8-10%.

3. See, for example, E. Trahan and L. Gitman, "Bridging the Theory-Practice Gap in Corporate Finance: A Survey of Chief Financial Officers," *Quarterly Review of Economics and Finance*, Vol. 35 (1995), pp. 73-87; the authors obtained a 12% response rate in a survey mailed to 700 CFOs. The response rate also compared favorably to the response rate for the quarterly FEI-Duke survey, which usually runs around 8-10%.

The creditworthiness of the sample also showed broad variation. Twenty percent of the companies had credit ratings of AA or AAA, 32% had an A rating, and 27% were rated BBB. The remaining 21% had speculative debt with ratings of BB or lower.

Though our survey respondents were CFOs, we asked a number of questions about the characteristics of the chief executive officers. We assumed that CEOs are the ultimate decision-makers and that CFOs act as agents for the CEOs. Nearly half of the CEOs for the responding firms were between 50 and 59 years old. Another 23% were over age 59, and 28% were between the ages of 40 and 49. The survey revealed that executives change jobs frequently. Nearly 40% of the CEOs had been in their jobs less than four years, and another 26% had been in their jobs between four and nine years. We defined the 34% who had been in their jobs more than nine years as having "long tenure." Forty-one percent of the CEOs had an undergraduate degree as their highest level of education. Another 38% had MBAs and 8% had non-MBA masters degrees; 13% had gone beyond the masters level. Finally, the top three executives owned at least 5% of the common stock in 44% of the companies.

These CEO and firm characteristics allowed us to examine whether managerial incentives or entrenchment affected the survey responses. We also studied whether having an MBA affected the choices made by corporate executives. All in all, the variation in executive and company characteristics permitted a rich description of the practice of corporate finance, and allowed us to make a number of inferences about the extent to which corporate actions are consistent with academic theories. Our survey differed from previous work in several ways. The most obvious difference is that previous work has almost exclusively focused on the largest firms. Second, because our sample is larger than previous surveys, we were able to control for many different firm characteristics. As with all survey research, however, it's important to keep in mind that survey results represent CFO beliefs or opinions. We have no way of verifying that such beliefs account for (or are even consistent with) their actions. What's more, in some cases, corporate executives might be influenced by a theory without knowing it. In this sense, as Keynes once wrote, "practical men...are usually the slaves of some defunct economist."

CAPITAL BUDGETING DECISIONS

It is a major tenet of modern finance theory that the value of an asset (or an entire company) equals the discounted present value of its expected future cash flows. Hence, companies contemplating investments in capital projects should use the net present value *rule*: that is, take the project if the NPV is positive (or zero); reject if NPV is negative.

But if NPV has been the dominant method taught in business schools, past surveys have suggested that internal rate of return (IRR) was for long the primary corporate criterion for evaluating investment projects. For example, a 1977 survey of 103 large companies reported that fewer than 10% of the firms relied on NPV as their primary method, while over 50% said they relied mainly on IRR.[4] Although the two measures are similar in several respects (and will lead to the same "go-no go" decision if the same hurdle rates are used), the critical difference is that IRR is a ratio while NPV is a dollar measure of value added. The main problem with using the former is that, in some cases, managers intent on maximizing IRR may actually reduce value by rejecting positive-NPV projects.

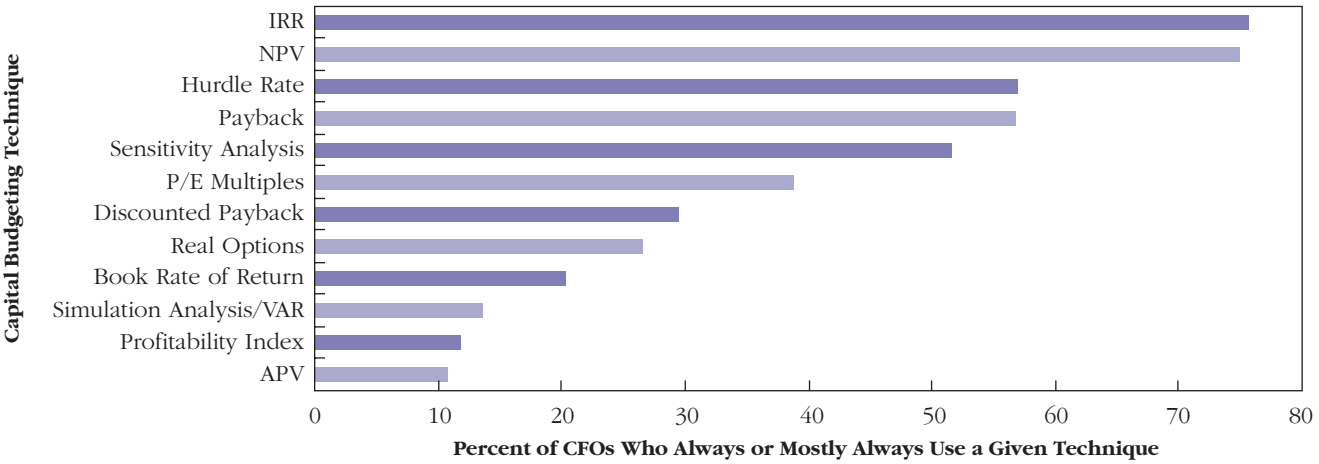
Our survey went beyond NPV vs. IRR analysis and asked whether companies used any or all of the following evaluation techniques: adjusted present value, payback period, discounted payback period, profitability index, and accounting rate of return. We inquired whether firms ignore discounting techniques and simply use earnings multiples. (A price-earnings multiple can be thought of as measuring the number of years it takes for the investment to be paid for by earnings, and so can be interpreted as a version of the payback method.) We were also interested in whether companies use other kinds of analysis that are taught in many MBA programs, including value at risk (VaR) and real options.

We asked CFOs to rate how frequently they used different capital budgeting techniques on a scale of 0 to 4 (with 0 meaning "never," 1 "almost never," 2 "sometimes," 3 "almost always," and 4 "always"). We report the results (see Figure 1) by summarizing the percentage of CFOs who said that they always or almost always used a particular evaluation technique (that is, the percentage who answered either "3" or "4").

4. L. Gitman and J. Forrester, Jr., "A Survey of Capital Budgeting Techniques Used by Major U.S. Firms," *Financial Management*, Vol. 6 (1977), pp. 66-71.

By testing whether the survey responses varied systematically with company characteristics such as size, P/E ratio, leverage, credit rating, dividend policy, and industry, we were able to shed light on the implications of various corporate finance theories and provide a richer understanding of corporate financial decision-making.

FIGURE 1 ■ SURVEY EVIDENCE ON THE POPULARITY OF DIFFERENT CAPITAL BUDGETING METHODS*



*We report the percentage of CFOs who always or almost always use a particular technique. IRR represents Internal Rate of Return, NPV is Net Present Value, P/E is the Price to Earnings ratio,VAR is Value At Risk, and APV is Adjusted Present Value. The survey is based on the responses of 392 CFOs, as are the rest of the figures in this paper.

As shown in Figure 1, most respondents cited net present value and internal rate of return as their most frequently used capital budgeting techniques; 74.9% of CFOs always or almost always used NPV and 75.7% always or almost always used IRR. As noted earlier, however, large companies were significantly more likely to use NPV than were small firms.[5] Moreover, highly leveraged firms were significantly more likely (across all size categories) to use NPV and IRR than firms with low debt ratios—a finding that is consistent with Michael Jensen's argument that debt financing exerts a discipline on corporate investment decisions that is often lacking in underleveraged companies with substantial "free cash flow."[6] And as in the case of highly leveraged companies, companies that pay dividends (which tend to have higher leverage ratios than non-dividend payers) were also significantly more likely to use NPV and IRR than firms that do not pay dividends, again regardless of firm size. At the same time, the lesser use of NPV by non-dividend-paying companies may reflect the fact that many are high-growth firms whose investment opportunities tend to be more difficult to quantify with NPV—in part because the expected cash inflows from their investments are often not expected to materialize for years.

Highly levered firms were also more likely to use sensitivity and simulation analysis, in part to assess (and limit to acceptable levels) the probability of financial distress. Utilities, too, perhaps because of regulatory requirements, were also more likely to use IRR and NPV and to perform sensitivity and simulation analyses. We also found that companies whose CEOs had MBAs were more likely to use NPV than firms whose CEOs did not. Finally, public companies were significantly more likely to use NPV and IRR than were private corporations.

Other than NPV and IRR (and the hurdle rate), the payback period was the most frequently used capital budgeting technique (56.7% always or almost always used it). This result is surprising in the sense that financial textbooks have stressed the shortcomings of the payback criterion for decades: it ignores the time value of money and the value of cash flows beyond the cutoff date, and the cutoff is usually arbitrary. Small firms used

5. Here and throughout the paper, when we refer to results conditional on firm or CEO characteristic, to save space and keep the text flowing, we do not present percentages. Also, we only report these results when they are statistically significant. Interested readers can consult the *Journal of Financial Economics* version of the paper for details (cite information in first footnote).

6. "Free cash flow," as defined by Jensen, is a company's operating cash flow in excess of the amount that can be profitably reinvested in the business. In Jensen's theory, mature companies with substantial free cash flow can often add significant value for shareholders by increasing their leverage. The pressure to make periodic interest and principal payments strengthens managers' commitment to invest only in positive-NPV projects. And the same effect can be achieved by increasing dividends or buying back stock.

the payback period almost as frequently as they used NPV or IRR. We also found that, among small firms, older CEOs with long tenures and without MBAs were more likely to use the payback criterion. Few companies used the discounted payback, a method that accounts for the time value of money and thereby eliminates one of the payback criterion's deficiencies.

How do we explain the persistence of the payback method? The simplicity of the method, combined in some cases with top management's lack of familiarity with more sophisticated techniques, undoubtedly plays some role in the popularity of the payback criterion. But it's also important to recognize that the payback approach may provide useful information, especially for severely capital-constrained firms. If an investment project does not pay positive cash flows early on, the company may go out of business before the expected future cash flows materialize. And even if the firm survives, it may not have the resources to pursue other promising investments during the next few years.[7] Moreover, as a number of finance scholars have pointed out, the answers provided by crude rules of thumb such as payback often resemble the solutions produced by optimal decision rules that account for the option-like features of many investments, particularly in the evaluation of highly uncertain investments. And, to the extent small firms have more unpredictable projects than do large companies, this could explain why small firms tend to favor ad hoc decision rules.[8]

Reflecting companies' preoccupation with reported earnings (a theme we return to later), a sizeable percentage of companies (38%) said they always or almost always used the earnings multiple approach (which, again, is essentially another variant of the payback method) for project evaluation. But the other capital budgeting techniques were used less frequently. For example, only about 20% of the companies said they used accounting rate of return; 14% always or almost always used value at risk or some other form of simulation, 12% used a profitability index, and 11% used adjusted present value (APV).

Somewhat surprisingly, more than one-fourth of the companies claimed to be using real options (RO) evaluation techniques. This was surprising not only because the RO methodology is fairly new, but because quantitative applications of RO models tend to become quite complicated (though the dominant corporate use of real options probably remains as a qualitative strategic planning tool rather than a valuation technique).[9] In comparison, it is also surprising that only 11% of firms used APV since the method is fairly easy to use while at the same time flexible enough to handle a wide variety of project evaluation situations.[10]

Cost of Capital

Closely related to the question of the valuation method is the discount rate. Our results indicated that the Capital Asset Pricing Model (CAPM) was by far the most popular method of estimating the cost of equity capital: 73.5% of respondents always or almost always used it. The second and third most popular methods were average stock returns and a multi-factor CAPM, respectively. Few firms used a dividend discount model to back out the cost of equity. As we saw in the case of DCF and NPV analysis, large companies were much more likely to use the CAPM; small firms, by contrast, were more inclined to use a cost of equity determined by "what investors tell us they require." Consistent with this finding, public firms were more likely to use the CAPM than were private firms, which makes sense in light of the fact that "beta" is far more readily calculated by analyzing comparable publicly traded firms.

Finally, we asked more specific questions about how the cost of equity models were used. A majority (in fact, nearly 60%) of the companies said they would use a single company-wide discount rate to evaluate a new investment project, even though different projects are likely to have different risk characteristics. Nevertheless, 51% said they would always or almost always use a risk-matched discount rate (suggesting that some companies evaluate projects with *both* company-wide and risk-matched

7. However, we find no direct evidence that companies are more likely to use payback when they are capital-constrained or financially distressed, so this logic does not appear to explain the widespread use of payback by our sample firms.

8. See, for example, R. McDonald, "Real Options and Rules of Thumb in Capital Budgeting," in *Innovation, Infrastructure, and Strategic Options*, edited by M. Brennan and L. Trigeorgis (London: Oxford University Press, 1998).

9. In his article in Vol. 14, No. 2 (Summer 2001) of this journal, "Real Options: State of the Practice," Alex Triantis's survey of some 35 companies that use real options suggests that only about a third of them have reached the point where they are attempting to use the models to achieve precise calculations of value.

10. For an account of the practical difficulties that arise in applying APV, see the article by Laurence Booth in this issue.

The survey provided clear evidence that firm size significantly affects the practice of corporate finance—large companies were much more likely to use net present value techniques and to have "strict" or "somewhat strict" target debt ratios.

rates)—and larger companies were significantly more likely to use a risk-matched discount rate than small firms.[11]

CAPITAL STRUCTURE DECISIONS

There are two main theories of capital structure choice. The trade-off theory says that companies have optimal debt-equity ratios, which they determine by trading off the benefits of debt against its costs. In the original form of the model, the chief benefit of debt is the tax advantage of interest deductibility.[12] More recent versions of the model[13] also attempt to incorporate Jensen's "free cash flow" argument, in which debt plays a potentially valuable role in mature companies by curbing a managerial tendency to overinvest. The primary costs of debt financing are those associated with financial distress, particularly in the form of corporate underinvestment and defections by customers and suppliers.

According to the trade-off theory (at least in this expanded form), large, mature companies with stable cash flows and limited opportunities for investment should have higher leverage ratios, both to take advantage of the tax deductibility of debt and because of their lower financial distress costs. At the other end of the spectrum, smaller companies with significant growth opportunities should make limited use of debt to preserve their continuing ability to undertake positive-NPV projects. Indeed, high-tech or start-up firms often have "negative leverage," or cash balances that exceed any debt outstanding.

The main contender to the trade-off theory, which is known as the "pecking-order" theory, suggests that actual corporate leverage ratios typically do not reflect capital structure targets, but rather the widely observed corporate practice of financing new investments with internal funds when possible and issuing debt rather than equity if external funds are required.[14] In the pecking-order model, an equity offering is typically regarded as a very expensive last resort. The theory is based on the premise that managers avoid issuing securities, particularly equity, when the company is undervalued. And even if the company's stock is currently fairly valued, the market reaction to the announcement of a new equity offering is expected to cause the company's stock price to fall below fair value. What is the reason for the market's negative response? According to the pecking-order model, management is reluctant to issue underpriced equity (though often willing to issue fairly priced or overpriced equity). Investors thus rationally interpret most management decisions to raise equity as a sign that the firm is overvalued—at least based on management's view of the future—and the stock price falls. For those companies that are in fact overvalued when the new equity issue is announced, the drop in price (provided it is not too large) is more of a correction in value than a real economic cost to shareholders. But for those companies that are fairly valued (or even undervalued) at the time of the announcement, the negative market reaction and resulting undervaluation will cause the existing shareholders to experience a dilution of value (as distinguished from the dilution of earnings per share we discuss later) that we henceforth refer to as "information costs." As we also discuss later, such negative market reactions and the associated information costs are likely to be largest when the "information gap" between management and investors is greatest—that is, in circumstances when investors have the greatest uncertainty about either the firm's prospects and, perhaps even more important, what management intends to do with the capital.

Our survey findings, as summarized in Figure 2, may shed some light on which theory, the trade-off model or the pecking order, plays a greater role in corporate decision-making. As in the case of our capital budgeting questions, we asked CFOs to rank—again, on a scale of 0 ("completely irrelevant") to 4 ("very important")—a number of factors that might affect how they choose the appropriate amount of debt for their companies.

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11. But very few companies of any size reported using different discount rates to evaluate different cash flows within the same project, as some academics suggest they should for cash flows such as depreciation. See, for example, R. Brealey and S. Myers, *Principles of Corporate Finance*, 5th edition (New York: McGraw-Hill, 1996).

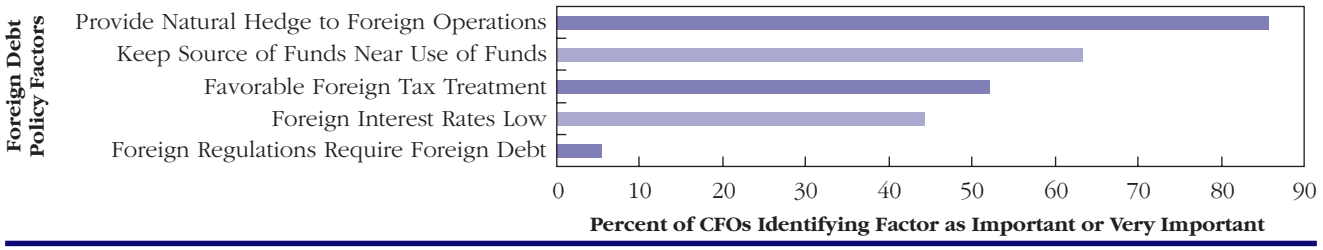
12. See, for example, F. Modigliani and M. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, Vol. 53 (1963), pp. 433-443, and M. Miller, "Debt and Taxes," *Journal of Finance*, Vol. 32 (1977), pp. 261-275.

13. See, for example, M. Barclay and C. Smith, "Another Look at the Capital Structure Puzzle: Some New Evidence," *Journal of Applied Corporate Finance*, Vol. 13 No. 1 (Spring 2000).

14. See S. Myers, "The Capital Structure Puzzle," *Journal of Finance*, Vol. 39 (1984), pp. 575-592, and S. Myers and N. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics*, Vol. 13 (1984), pp. 187-224.

FIGURE 2 ■ SURVEY EVIDENCE ON SOME OF THE FACTORS THAT AFFECT THE DECISION TO ISSUE DEBT

FIGURE 3 ■ SURVEY EVIDENCE ON SOME OF THE FACTORS THAT AFFECT THE DECISION TO ISSUE FOREIGN DEBT



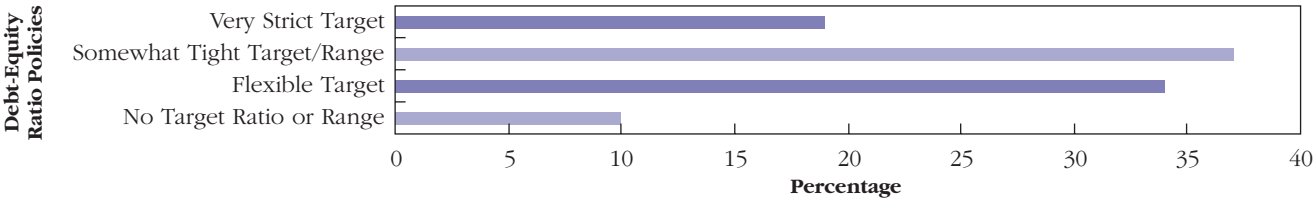
As shown in Figure 2, the corporate tax advantage of debt was moderately important in capital structure decisions, with almost 45% of the companies describing it as either "important" or "very important." As expected, the tax advantage was most important for large, higher-leveraged, lower-risk, manufacturing, regulated, and dividend-paying firms—in short, companies that are likely to have high marginal corporate tax rates and therefore stronger tax incentives to use debt.

When we also asked CFOs whether firms issued debt when foreign tax treatment is favorable relative to the U.S., 52.3% said favorable foreign tax treatment is important or very important (see Figure 3). And the fact that large companies with significant foreign exposures were more likely to identify foreign tax treatment as an important factor suggests that a certain level of sophistication (not to mention the exposure itself) is a requirement for international tax planning.

According to finance theory, the tax advantage of debt relative to equity depends on investor tax rates as well as effective corporate marginal tax rates. But we found very little evidence that firms directly consider investors' taxes when deciding on debt policy; only 4.5% said personal taxes were important or very

The main objective of CFOs in setting debt policy was not to minimize the firm's weighted average cost of capital, but rather to preserve "financial flexibility"—a goal that tended to be associated with maintaining a targeted debt rating.

FIGURE 4 ■ SURVEY EVIDENCE ON WHETHER FIRMS HAVE OPTIMAL OR TARGET DEBT-EQUITY RATIOS



important in debt decisions, and only 5% said so for equity decisions (see Figure 2). So, from what the executives told us, they do not make capital structure decisions based on the perceived tax preferences of a "clientele" of investors who own the firm's securities. (But this finding does not seem all that surprising, since such tax preferences cannot be observed directly; and because such tax effects are effectively "embedded" in the company's stock prices and the interest rates on its debt, CFOs may in fact be responding to such tax preferences without knowing it.)

When we asked CFOs directly about whether potential costs of financial distress affected their debt decisions, only 21.4% indicated that distress costs were important or very important (see Figure 2). Nevertheless, the fact that almost 60% cited financial flexibility and credit ratings as important or very important suggests that avoiding distress is a major—and in fact possibly the *most* important—consideration in corporate debt policy. By maintaining flexibility, most companies mean preserving unused debt capacity. It's also interesting to note that although many companies say their excess debt capacity is intended mainly to finance possible future expansions and acquisitions, such firms also seem intent on retaining much of that unused debt capacity even after expanding.[15] And, as suggested earlier, such flexibility tends to be associated with maintaining a target credit rating. Among utilities and companies with investment-grade debt (a group that accounted for just under half of our sample), credit ratings were a very important determinant of debt policy. And given that size is a major factor in securing (at least) an investment-grade rating, we were not surprised to find that credit ratings are also especially important for large, Fortune 500 companies. Finally, a large number of CFOs (48%) said that earnings volatility was an important consideration in making debt decisions, which is consistent with the trade-off theory's prediction that companies use less debt when the probability of bankruptcy is higher.

We also asked CFOs whether their companies have an optimal or "target" debt-equity ratio. As shown in Figure 4, only 19% of the firms said they did not have a target debt ratio or target range. Another 37% said they had "flexible" targets, and 44% had "strict" or "somewhat strict" targets or ranges. Although these overall numbers provide mixed support for the argument that companies trade off costs and benefits to derive an optimal debt ratio, larger companies (55%) were considerably more likely than small firms (36%) to have at least somewhat strict target debt ratios. Moreover, such targets were more common among investment-grade (64%) than speculative companies (41%), and among regulated (67%) than unregulated firms (43%). And to the extent that large investment-grade companies represent the bulk of the U.S. economy, this indicates fairly strong support for the trade-off theory. Debt targets were also more important in companies where the CEO was younger or newer, and when the top three officers owned less than 5% of the firm.

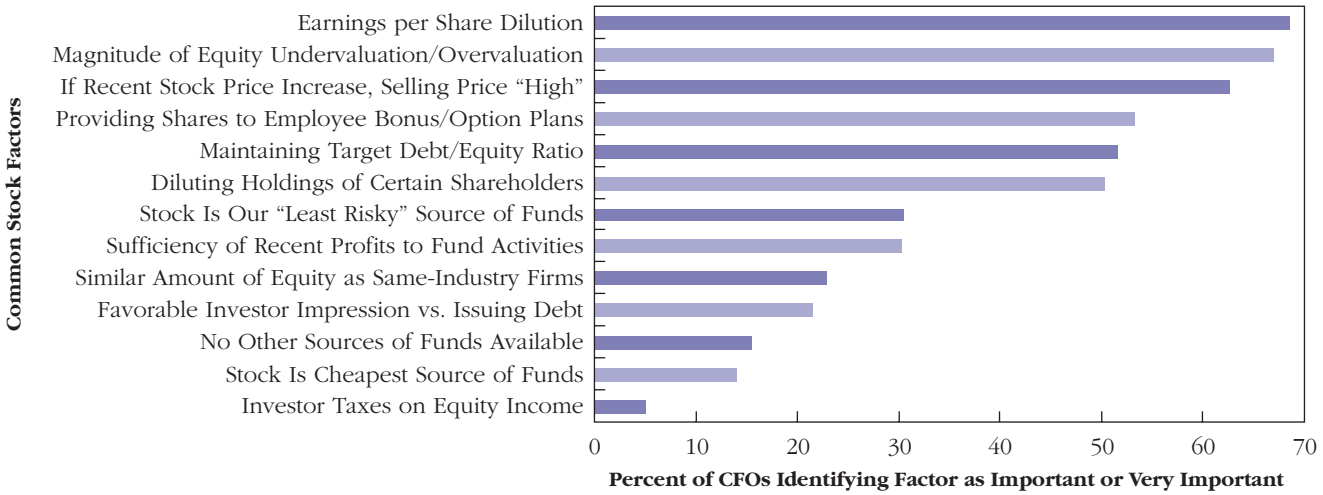
Finally, providing some additional support for the trade-off theory, of the 40% of CFOs who said their companies would seriously consider issuing equity, a slight majority (52%, as shown in Figure 5) said their companies would do so to maintain a target debt-equity ratio. Among the companies whose CFOs said yes to this question were disproportionate numbers of both highly leveraged companies and firms with widely dispersed ownership.

Explaining Deviations from Target Debt Ratios

One apparent source of conflict between the theory and practice of corporate capital structure comes from academics' insistence on calculating leverage as a percentage of the market value of the firm and not, as most companies and rating agencies

15. See J. Graham, "Estimating the Tax Benefits of Debt," *Journal of Applied Corporate Finance*, Vol. 14 (Spring 2001), pp. 42-54.

FIGURE 5 ■ SURVEY EVIDENCE ON SOME OF THE FACTORS THAT AFFECT THE DECISION TO ISSUE COMMON STOCK



do, as a percentage of the book value of assets.[16] As most practitioners will tell you, because the market values of debt and equity fluctuate daily, strict adherence to market-based debt targets would require frequent rebalancings of outstanding debt and equity—something we do not observe in practice. Only 16% of CFOs described changes in their company's stock price, or in the general level of the stock market, as important or very important to their debt decisions (see Figure 2).

Of course, one major reason to avoid such rebalancings are the transactions costs associated with issuing securities. For example, if a company faces high costs when issuing or retiring debt, it will rebalance only when its debt ratio crosses an upper or lower bound.[17] We found moderate evidence that firms consider transaction costs when making debt issuance decisions (33.5%, as reported in Figure 2). But, as one might expect, concern about transactions costs was especially evident in the responses of smaller-firm CFOs. Nevertheless, few CFOs said they would *delay* issuing debt (10.2%) or retiring debt (12.4%) just because of transactions costs.

Information Cost Explanations of Capital Structure

We asked a number of other questions designed to explore the extent to which the pecking-order model is reflected in corporate decision-making. For example, we asked if companies issued securities when internal funds were not sufficient to fund their activities, and, in a follow-up question, whether the company would issue equity if debt, convertibles, or other sources of financing were not available. We also inquired whether executives considered equity undervaluation when deciding which security to use, and if financial flexibility were an important factor in decisions to raise equity.

Having insufficient internal funds was a fairly important influence on the decision to issue debt (46.8%, as shown in Figure 2), which, although not especially revealing, is generally consistent with the pecking-order model. Smaller firms were more likely than large companies to raise debt when faced with insufficient internal funds—a finding also consistent with the pecking-order theory (to the extent that small firms confront a greater "information gap" when attempting to raise equity). As reported in Figure 5, about 30% of the CFOs said their firms issued equity because recent profits were insufficient to fund activities, and about 15% raised equity after exhausting their ability to issue debt or convertibles.

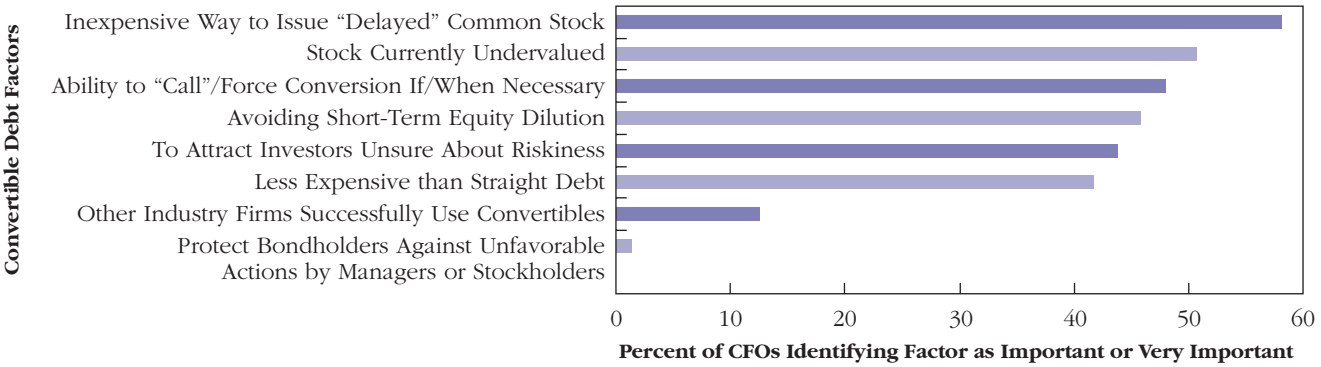
The above findings are generally consistent with equity functioning as a last resort for many companies. But our survey also provided more direct evidence that equity undervaluation and the fear of dilution lie behind the corporate reluctance to issue equity. Indeed, fully two thirds of the CFOs said they

16. F. Modigliani and M. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," *American Economic Review*, Vol. 48 (1958), pp. 261-297.

17. E. Fisher, R Heinkel, and J. Zechner, "Dynamic Capital Structure Choice: Theory and Tests," *Journal of Finance*, Vol. 44 (1989), pp. 19-40.

Most respondents cited net present value and internal rate of return as their most frequently used capital budgeting techniques. At the same time, the lesser use of NPV by non-dividend-paying companies may reflect the fact that many are high-growth firms whose investment opportunities tend to be more difficult to quantify with NPV.

FIGURE 6 ■ SURVEY EVIDENCE ON THE FACTORS THAT AFFECT THE DECISION TO ISSUE CONVERTIBLE DEBT



were reluctant to issue common stock when they thought that it was undervalued (with a rating of 66.9%, it was the second most important equity issuance factor in Figure 5). What's more, a separate survey conducted one month after ours (in the spring of 1999), when the Dow Jones 30 was approaching a new record of 10,000, found that more than two-thirds of FEI executives felt that their common equity was undervalued by the market—while just 3% of CFOs thought their stock was overvalued.[18] Taken together, these findings suggest that a large percentage of companies are hesitant to issue common equity because they feel their stock is undervalued.

Rather than issue equity, moreover, many companies choose instead to issue convertible debt, which has become especially popular among growth firms. Over half the CFOs (50.7%, as reported in Figure 6) cited equity undervaluation as a major reason to use convertibles.

But if the general reluctance to issue undervalued equity is consistent with the pecking-order model, we found at most limited support for the model when we tried to examine more precisely how equity undervaluation affects financing decisions. As mentioned earlier, the theory that underlies the pecking-order model suggests that the "information costs" that companies face when issuing (particularly) equity are expected to be largest for small, high-growth companies. But the smaller companies and non-dividend payers (a proxy for growth) in our survey did not place special emphasis on stock undervaluation as a factor in their financing decisions, and large dividend-paying companies were in fact more likely to say that their stock price was an important consideration in specific decisions to issue debt rather than equity.

What seems to emerge from our survey, then, is that information disparities and signaling effects do not play a major role in determining companies' capital structure targets. But, as the pecking-order story suggests, such information costs do appear to influence the form and timing of specific financing choices. As mentioned above (and discussed in more detail below), the issuance of convertibles seems motivated in part by the desire to avoid issuing undervalued equity. Moreover, almost two thirds of the CFOs (see Figure 5) cited recent stock price performance as an important factor in decisions to issue stock, with periods of stock price appreciation providing "windows of opportunity."[19] And although recent stock price performance was the third most popular factor affecting equity issuance decisions for the entire sample of companies, it was the factor most frequently cited by speculative-grade and non-dividend-paying firms—that is, precisely those companies likely to encounter the highest information costs when raising new securities.

Information Costs and Convertibles

Finance theorists have argued that the conversion feature of convertible debt makes its value relatively insensitive to information disparities (between management and investors) about the risk of

18. See J. Graham, "FEI survey" on http://www.duke.edu/~jgraham, March 29, 1999.

19. See T. Loughran and J. Ritter, "The New Issues Puzzle," *Journal of Finance*, Vol. 50 (1995), pp. 23-52. D. Lucas and R. McDonald, in "Equity Issues and Stock Price Dynamics," *Journal of Finance*, Vol. 45 (1990), pp. 1019-1043, put an information cost spin on the desire to issue equity after stock price increases: If a firm's stock price is undervalued due to information disparities between insiders and investors, the firm delays issuing until after an informational release (of good news) and the ensuing increase in stock price.

the firm.[20] Our survey provided moderate support for this argument, with 44% of the CFOs (see Figure 6) citing convertibles' role in attracting investors unsure about the riskiness of the issuer as important or very important. And the fact that this response was more likely to come from CFOs of smaller companies with large managerial ownership—firms where outside investors were likely to be at the greatest informational disadvantage—provided more supporting evidence.

As noted earlier, convertibles are issued by managers who think their stock is undervalued and want to avoid the larger dilution of value associated with equity issues.[21] At the same time, the conversion feature, by reducing the coupon rate the firm would be forced to pay on straight debt, minimizes the expected distress costs associated with a heavy debt load. In this sense, convertible debt functions as "delayed" common stock that can be seen as minimizing the sum of distress costs (from issuing straight debt) and dilution (from issuing undervalued equity). We found strong evidence consistent with this argument that convertibles are "back-door equity." Among the one-in-five companies in our survey that said they would seriously consider issuing convertible debt, the most commonly cited factor (mentioned by 58%) was that convertibles were an inexpensive way to issue delayed common stock.

Another recent explanation for the popularity of convertibles among high-growth companies is their ability to provide financial options that match the firms' real investment options. That is, for companies contemplating the possibility (but not the certainty) of major investments in the next few years, the conversion and call features of convertibles effectively give management the option to retire debt and get an infusion of equity just when the company needs it.[22]

Providing some support for this argument, 48% of the convertible issuers in our sample said they liked convertibles because of the ability they give management to call and/or force conversion of the bonds. In addition, 42% of CFOs indicated that they used convertible debt because it was "less expensive" than straight debt. And since finance professors are fond of exposing the fallacy that underlies this argument,[23] it was somewhat comforting for us to find that it was mainly companies run by executives over 59 that were more likely to characterize convertibles as "cheaper" than straight debt.

Timing Market Interest Rates

Although relatively few executives claimed to time their security issues to take advantage of expected changes in their credit ratings (about which they might reasonably have private information), we found clear indications that executives try to time the market in other ways. For example, our survey produced moderately strong evidence that executives (46.4%, as shown in Figure 2) attempted to time interest rates by issuing debt when they felt that market interest rates were particularly low. Market timing was especially important for large companies, implying that companies with large or sophisticated treasury departments were more likely to time interest rates. An alternative explanation, however, is that large companies simply have more flexibility in timing issues because of their larger cash reserves and greater access to markets.

We also found evidence that firms issued short-term debt in an effort to time market interest rates. CFOs borrowed short-term when they felt that short rates were low relative to long rates (36%, as shown in Figure 7) or when they expected long-term rates to decline (29%). Finally, we checked if companies issued foreign debt when foreign interest rates were lower than domestic rates, and 44% (Figure 3) of CFOs said that relatively low foreign interest rates were an important or very important factor in such decisions.[24]

The Corporate Underinvestment Problem

Stewart Myers has argued that corporate investment decisions can be affected by the presence of long-term debt in a firm's capital structure. More specifically, managers of highly leveraged companies have an incentive to "underinvest"—that is, to pass up positive-NPV projects—if they perceive that

20. M. Brennan and E. Schwartz, "The Case for Convertibles," *Journal of Applied Corporate Finance*, Vol. 1 No. 2 (Summer 1988), pp. 55-64.

21. J. Stein, "Convertible Bonds As Backdoor Equity Financing," *Journal of Financial Economics*, Vol. 32 (1992), pp. 3-21.

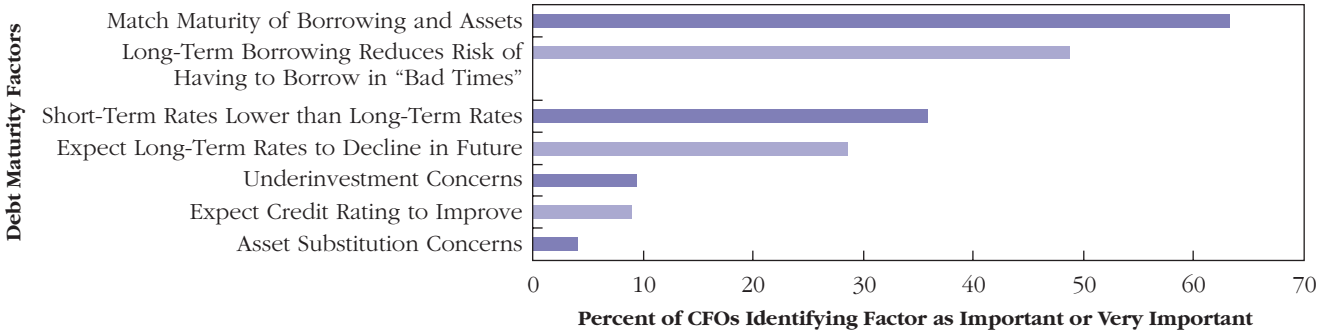
22. See David Mayers, "Convertible Bonds: Matching Financial with Real Options," *Journal of Applied Corporate Finance*, Vol. 14 No. 1 (Spring 2001).

23. Such analysis effectively treats the equity option built into the convertible as costless. In fact, the real economic cost of convertibles is higher than that of debt but lower than the cost of common equity. For a nice exposition of this fallacy, see Brennan and Schwartz (1988), cited earlier.

24. If covered interest rate parity holds, it is not clear to us why firms pursue this strategy.

Our results indicated that the Capital Asset Pricing Model was by far the most popular method of estimating the cost of equity capital. Still, a majority of the companies said they would use a single company-wide discount rate to evaluate a new investment project, even though different projects are likely to have different risk characteristics.

FIGURE 7 ■ SURVEY EVIDENCE ON THE FACTORS THAT AFFECT THE DEBT MATURITY DECISIONS



the profits, rather than accruing to shareholders, will be used to pay off existing debtholders. Such an underinvestment problem is likely to be most troublesome for smaller growth firms (because they have the projects that will need funding). And, for this reason, such companies are expected to make minimal use of debt (and to confine their limited use to short-term rather than long-term debt).[25]

Although the percentage of companies responding that their debt policy was affected by such underinvestment concerns was unremarkable (13%, Figure 2), the fact that smaller, high-growth firms with concentrated management ownership were far more likely to cite underinvestment as an important consideration is completely consistent with the theory. We found little support for the idea that short-term debt is used to address the underinvestment problem, with only 9.5% (Figure 7) indicating that underinvestment concerns are important or very important to debt maturity decisions. Finally, there was no difference between growth and non-growth firms (a somewhat surprising result that may well be attributed to high P/E ratios providing an unreliable proxy for growth opportunities).

Conflicts between Managers and Stockholders

As mentioned earlier, Michael Jensen and others have argued that when companies have ample "free cash flow"—that is, cash flow in excess of what is necessary to fund all their positive-NPV projects—their managers can destroy value by wasting the cash on corporate empire-building, consuming perks, pursuing overpriced acquisitions, or just failing to make necessary cutbacks to achieve effiency.[26] And according to Jensen's "free cash flow" theory, both higher dividends and high leverage have the potential to add value by forcing mature companies (that is, companies with limited growth opportunities) to pay out their excess cash.

Not surprisingly, we found very little evidence that CFOs think of debt as disciplining managers in this way (1.7%, Figure 2). But, as would be expected, highly leveraged companies were much more likely to cite this factor as a reason for issuing debt. (Moreover, it's also important to recognize that a major "free cash flow" effect on corporate financing choices is not likely to be detected by the direct questions posed in a survey.)

The market for corporate control is another source of managerial discipline. Managers who are destroying corporate value may find themselves the target of a takeover contest. Capital structure can be used to influence, or can be influenced by, corporate control contests and managerial share ownership.[27] We found evidence that companies would issue equity to dilute the stock holdings of certain shareholders, with 50% of CFOs (see Figure 5) citing this motive as important or very important. This tactic was especially popular among speculative-grade companies. But when we also asked if companies used

25. S. Myers, "Determinants of Corporate Borrowing," *Journal of Financial Economics,* Vol. 5 (1977), pp. 147-175. Others argue that firms can hedge or otherwise maintain financial flexibility to avoid these costs of underinvestment; see, e.g., K. Froot, D. Scharfstein, and J. Stein, "Risk Management: Coordinating Corporate Investment and Financing Policies," *Journal of Finance*, Vol. 48 (1993), pp. 1629-1658.

26. M. Jensen, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, Vol. 76 (1986), pp. 323-339.

27. M. Harris and A. Raviv, "Corporate Control Contests and Capital Structure," *Journal of Financial Economics*, Vol. 20 (1988), pp. 55-86, and R. Stulz, "Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control," *Journal of Financial Economics*, Vol. 20 (1988), pp. 25-54.

debt to reduce the likelihood that the firm would become a takeover target, we found little support (4.8%, Figure 2) for this hypothesis.

Product Market and Industry Factors

The extent of debt usage varies widely across industries. One explanation for this pattern is important differences in the product market environment or nature of competition in various industries. For example, customers might avoid purchasing a durable goods company's products if they think that the firm will go out of business (and therefore not stand behind its products), while continuing to buy perishables from financially troubled firms. To the extent this is so, durable goods companies are likely to use less debt.[28]

We found little evidence that product market factors broadly affected real world debt policy. Only 18.7% (Figure 2) of CFOs said that limiting debt to reassure their companies' customers or suppliers was an important or very important factor. Even more surprising, high-tech firms (which we assume produce durable and, indeed, unique products) were *less* likely than other firms to limit debt for this reason (such firms have other, presumably more important reasons, such as preserving their ability to make strategic investments). We did find that, in comparison to non-growth (lower P/E) firms, a higher percentage of growth firms claimed that customers might not purchase their products if they were worried that debt usage might cause the firm to go out of business.

To further investigate why debt ratios vary across industries, we asked executives whether their capital structure decisions were affected by the financing policy of other firms in their industries. Roughly one out of four CFOs said their companies' debt levels and equity issuance decisions were influenced by the behavior of their competitors (see Figures 2 and 5). We found even less evidence that companies used convertibles because other firms in their industry did so (12.5%, as reported in Figure 6). But if these responses provide fairly weak evidence that companies study their competitors' debt ratios before making their own debt decisions, it's important to keep in mind the central role of credit ratings in corporate debt decisions and the extent to which industry debt ratios determine such ratings.

Risk Management

Companies can structure their debt in a way that is designed to manage risk. For example, for companies with foreign revenues, foreign-denominated debt can act as a natural hedge and so eliminate the need to hedge with currency derivatives.[29] Among the 31% of respondents who seriously considered issuing foreign debt, 86% (Figure 3) cited its value as a natural hedge against foreign currency devaluation. Not surprisingly, such natural hedges were said to be particularly important for public companies with large foreign exposures. The second most important motive for using foreign debt was its role in keeping the source close to the use of funds (63.4%), a consideration that was especially important for smaller, manufacturing firms.

The desire to manage interest rate risk helps explain why companies match the maturity of assets and liabilities. If asset and liability durations are not aligned, interest rate fluctuations can affect the amount of funds available for investment and day-to-day operations. So, when we asked CFOs how they choose between short-term and long-term debt, we were not surprised to find that the most popular response (63.5%, as shown in Figure 7) was "to match debt maturity with asset life." Also not surprising, maturity matching was most important for small, private firms, which are likely to suffer the greatest losses in value (as a percentage of firm value) from interest rate risk.

Practical Cash Management Considerations

Although academics have not paid much attention to such issues, liquidity and cash management also affect corporate financial decisions. For example, many companies issue long-term debt to avoid having to refinance in "bad times"; 49% of CFOs, as reported in Figure 7, called this important or very important. One interpretation of this response is that it represents more evidence that management's views on interest rates play a major role in the timing of debt issues. Avoiding bad times was especially important for highly levered manufacturing firms, also suggesting that what may look like attempts to time the market—a strategy that academics tend to view as "speculative"—may actually be viewed by corporate management as a form of interest rate risk management. That is to say, by "locking

28. S. Titman, "The Effect of Capital Structure on a Firm's Liquidation Decision," *Journal of Financial Economics*, Vol. 13 (1984), pp. 137-151.

29. C. Géczy, B. Minton, and C. Schrand, "Why Firms Use Currency Derivatives," *Journal of Finance*, Vol. 52 (1997), pp. 1323-1354.

The fact that almost 60% of CFOs cited financial flexibility and credit ratings as important suggests that avoiding financial distress is a major—and in fact possibly the *most* important—consideration in corporate debt policy.

in" rates over a long horizon, managers effectively ensure that their operations and strategic investments will not be disrupted by a spike in rates or otherwise difficult market conditions.

Some responses that were handwritten on the surveys indicated that other practical considerations affected the maturity structure of borrowing. For example, consistent with the maturity-matching principle just described, four CFOs said that they tied their scheduled *principal* repayments to their projected ability to repay. Another six companies said they diversified the maturities of their debt to limit the size of their refinancing activity in any given year. Other firms borrowed for the length of time they thought they would need funds, or borrowed short-term until sufficient debt had accumulated to justify borrowing long-term.

Common Stock and EPS Dilution

Finally, we investigated the extent to which concern about earnings dilution influences decisions to issue equity. Depending on a number of variables such as the company's current P/E ratio, the size of the contemplated equity offering, and how much (and quickly) the new equity is expected to increase earnings, new stock offerings can be expected to reduce reported earnings per share, at least over the next year or so. The academic view is that this kind of earnings dilution should not affect the value of the firm and hence should not deter companies from issuing stock, provided two conditions are met: (1) the company is fairly valued (based on management's view of current prospects) at the time of the offering, and (2) management expects to earn the minimum required return on the new equity raised. But if the stock *is* undervalued (or is expected to become undervalued because of negative market reaction to announcement of the issue), then there is a "real" (as opposed to just an "accounting") dilution of value. And management must weigh the costs associated with such dilution against the costs associated with either raising some other form of capital or forgoing the new capital and its planned uses.

Or, to make the same point a bit differently, the academic view is that the EPS dilution recorded by accountants can be quite different from the real dilution of value from issuing undervalued stock. And, to the extent these two kinds of dilution diverge, managers should concern themselves mainly (if not exclusively) with the dilution of value. That is, a management that needs common equity to fund a highly profitable project should not be deterred by cosmetic accounting considerations.

But, of course, to the extent management is convinced that the market prices stocks mainly by applying a standard industry "multiple" to the company's reported EPS (or if managers' bonuses are tied to EPS), then accounting effects will certainly weigh in their decision-making. And our survey results provide little doubt that corporate executives are concerned about the EPS effects of stock issuance. For the 38% of companies in our sample that seriously considered issuing common equity during the sample period, earnings dilution was the most important factor affecting their decisions (as shown in Figure 5, 69% of CFOs said EPS dilution was important or very important). Concern about EPS dilution was particularly evident among regulated companies, and among larger and dividend-paying companies.

There seem to be two main ways of interpreting this response. On the one hand, it suggests that corporate managers focus too much attention on EPS and too little on economic value. And the fact that concern about EPS dilution was less important when the CEO had an MBA lends support to this view. On the other hand, it is possible that at least part of management's concern with EPS dilution is also a concern about issuing undervalued equity, and that it is often difficult to separate accounting from real dilution.

CONCLUSION

The findings of our survey on the practice of corporate finance are both reassuring and puzzling for those of us who teach finance in business schools. For example, it is encouraging that NPV is much more widely used as a project evaluation method than it was ten or 20 years ago. At the same time, our analysis of capital structure yielded the somewhat surprising result that "informal" criteria such as financial flexibility and credit ratings were the most important factors in setting debt policy—and that avoiding EPS dilution was the biggest reason for companies' reluctance to issue equity. Less surprising was our finding that the degree of stock undervaluation was also important to equity issuance—and we know from other surveys that many if not most executives feel their stock is undervalued.

We found moderate evidence that companies follow the trade-off theory of capital structure by setting and attempting to adhere to target debt ratios. But other results, such as the importance of equity undervaluation and financial flexibility mentioned above, were generally consistent with the pecking-order view that companies issue equity only as a last resort. However, the evidence in favor of both theories does not hold up as well under closer scrutiny. For example, although many companies appear to follow a financing pecking order, our survey produces little evidence that their financing choices are related to the information disparities emphasized by the model. We also find at best mixed evidence that companies' capital structure choices are influenced by transactions costs, product market concerns, or costs stemming from potential underinvestment and free cash flow problems.

There were, however, some fundamental differences between large and small companies that suggest that finance theory may be gaining ground faster among larger companies. Our research suggests that small firms are less sophisticated when it comes to evaluating risky projects. Small firms are significantly less likely to use the NPV criterion or the capital asset pricing model and its variants. And the fact that the majority of large companies (as compared to only a third of small firms) professed to adhere to target debt ratios also suggests the greater sophistication of the former (or that the theory simply doesn't "fit" small firms as well).

What does the future hold? On the one hand, we are likely to see greater acceptance of some aspects of the theory. But we are also likely to see further modifications and refinements of the theory to reflect what we observe about corporate practice. In particular, we are likely to see greater academic efforts to reconcile apparent conflicts between the trade-off and pecking-order theories, both of which appear consistent with different aspects of corporate behavior. And we will also probably see more work devoted to explaining the differences in practice between large and smaller companies.

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Our survey provided direct evidence that equity undervaluation and the fear of earnings dilution lie behind the corporate reluctance to issue equity. CFOs consider convertible debt as "delayed" common stock that can be seen as minimizing financial distress costs and dilution.

APPENDIX

Using the penultimate version of the survey, we conducted tests at both the Financial Executives Institute (FEI) and Duke University. This involved having graduating MBA students and financial executives fill out the survey, note the required time, and provide feedback. Our testers took, on average, 17 minutes to complete the survey. Based on this and other feedback, we made final changes to the wording on some questions. The final version of the survey contained 15 questions, most with subparts, and was three pages long. One section collected demographic information about the sample firms. The survey instrument appears on the Internet at the address http://www.duke.edu/~charvey/Research/indexr.htm.

We used two mechanisms to deliver the survey. We sent a mailing from Duke University on February 10, 1999 to each CFO in the 1998 Fortune 500 list. Independently, we faxed 4,440 surveys to FEI member firms on February 16, 1999. Three hundred thirteen of the Fortune 500 CFOs belong to the FEI, so these firms received both a fax and a mailed version. We requested that the surveys be returned by February 23, 1999. To encourage the executives to respond, we offered an advanced copy of the results to interested parties.

We employed a team of ten Fuqua School of Business MBA students to follow up on the mailing to the Fortune 500 firms with a phone call and possible faxing of a second copy of the survey. On February 23, we refaxed the survey to the 4,440 FEI corporations and remailed the survey to the Fortune 500 firms, with a new due date of February 26, 1999. This second stage was planned in advance and designed to maximize the response rate.

The executives returned their completed surveys by fax to a third-party data vendor. Using a third party ensures that the survey responses are anonymous. We felt that anonymity was important to obtain frank answers to some of the questions. Although we do not know the identity of the survey respondents, we obtained a number of firm-specific characteristics, as discussed in the article.

The Time Value of Money: Calculating the Real Value of Your Investment

EXCERPTED FROM

Finance for Managers

Harvard Business School Press
Boston, Massachusetts

ISBN-10: 1-4221-0586-5
ISBN-13: 978-1-4221-0586-3
5863BC

9 The Time Value of Money

Calculating the Real Value of Your Investment

Key Topics Covered in This Chapter

- *Present and future value*
- *Net present value*
- *Internal rate of return*
- *Hurdle rate, discount rate, and the cost of capital*
- *Economic value added*

In chapter 8, we examined return on investment (ROI) and payback period analysis—two tools that managers use to make decisions and assess performance. We noted, however, that these have one important weakness: They fail to account for the time value of money. That is, though they indicate (or estimate) inflows and outflows of cash, ROI and payback analysis fail to recognize *when* those cash flows take place. As we'll explain here, the timing of those cash flows matters, and should be factored into management decisions.

This chapter will introduce you to financial decision-making tools that account for time value: specifically, present and future value, net present value, and internal rate of return. You will also become acquainted with associated concepts that you're likely to encounter when management discusses serious long-term investments—hurdle rate, discount rate, and the company's cost of capital. The chapter also includes a discussion of sensitivity analysis, a method that increases the practicality of these time-value tools.

What Is Time Value?

The time value of money is a mathematically based recognition that money received today is worth more than an equal amount

of money received months or years in the future. If you have any doubts about this statement, consider the following example:

> *Your father-in-law takes you aside and says, "The grim reaper is going to catch up with me one of these days. And as much as I'd like to take all of my money with me, I've decided to give you youngsters a bundle of it before I go—say, three hundred thousand dollars."*

Naturally, you're pleased to learn of his generous intention. You are also eager to learn *when* the money will be coming your way. "I'm not sure when I'll give you the money," he continues. "It might be this year, next year, or five years down the road. But that shouldn't matter since it will be three hundred thousand in any case."

Your father-in-law got that last point dead wrong. *When* you receive the money does matter. Thanks to the effect of compounding interest, $300,000 put today into a bank CD or savings account with a 5 percent annual interest rate would be worth almost $383,000 five years from now—and slightly more than $483,000 if your investment compounded at a 10 percent annual rate! Let's look at how compounding works over time using the $300,000 in our example, with annual compound interest at 10 percent per year over five years (table 9-1).

TABLE 9-1

Time Value of an Investment with 10 Percent Compounded Interest

Period	Beginning Value	Interest Earned	Ending Value
1	$300,000	+ $30,000	$330,000
2	$330,000	+ $33,000	$363,000
3	$363,000	+ $36,300	$399,300
4	$399,300	+ $39,930	$439,230
5	$439,230	+ $39,930	$483,153

This example demonstrates the importance of time in the receipt of cash amounts. If your father-in-law were to give you the $300,000 today, you'd be $183,153 better off (assuming a 10 percent compounded return) than if he delayed his gift to you by five years. (Note: This analysis assumes that you reinvest the interest you earn at the same rate.)

The example also introduces a number of important terms in the language of finance. The $300,000 is a present value (PV), that is, an amount received today. The $483,153 is a *future value* (FV)—the amount to which a present value, or series of payments, will increase over a specific period at a specific compounding rate. The number of periods (*n*) in this example is five years. And the rate (*i*) is 10 percent. Understand these terms, and you'll probably rise a notch or two in the estimation of your company's CFO.

Generations of business students have been forced to learn how to calculate time values using tables like the one in table 9-2. This table indicates the future value of $1, given various compounding rates and compounding periods. Each cell in the table is commonly referred to as a future value interest factor, or FVIF. Tables such as these are easy to use.

The table shows that the FVIF for five periods at 10 percent is 1.6105. Considering the example of the father-in-law's $300,000 gift, we can now find the future value of $300,000 after five years at a 10 percent annual interest rate. To do so, we follow this simple formula:

$$\text{Present Value} \times \text{FVIF} = \text{Future Value}$$

$$\$300{,}000 \times 1.6105 = \$483{,}150$$

This amount is the future value we found earlier using a long-handed method (with a slight difference due to rounding).

Every finance text has an appendix of tables that you can used to solve time-value problems. But thanks to today's preprogrammed business calculators and electronic spreadsheets, you don't need them. A business calculator like the ubiquitous Hewlett-Packard

TABLE 9-2

Future Value of $1 (FVIF)

Periods	8%	9%	10%	11%	12%
1	1.0800	1.0900	1.1000	1.1100	1.1200
2	1.1664	1.1881	1.2100	1.2321	1.2544
3	1.2597	1.2950	1.3310	1.3676	1.4049
4	1.3605	1.4116	1.4641	1.5181	1.5735
5	1.4693	1.5386	1.6105	1.6851	1.7623
6	1.5869	1.6771	1.7716	1.8704	1.9738
7	1.7138	1.8280	1.9487	2.0762	2.2107
8	1.8509	1.9926	2.1436	2.3045	2.4760
9	1.9990	2.1719	2.3579	2.5580	2.7731
10	2.1589	2.3674	2.5937	2.8394	3.1058
11	2.3316	2.5804	2.8531	3.1518	3.4786
12	2.5182	2.8127	3.1384	3.4985	3.8960

12C has several keys programmed to make these solutions simple. Its keyboard has keys for present value (PV), future value (FV), compounding rate (*i*), and number of compounding periods (*n*). If you know any three of these variables, the calculator will solve for the fourth. The instruction book explains the sequence to follow in entering the values and obtaining the solution. Likewise, PC spreadsheet programs such as Microsoft's Excel have built-in formulas that make time-value problems easy to solve.

Net Present Value

Future value is an easy idea to grasp, since most of us have been exposed to the principle of compound interest. Put money in an interest-bearing account, leave it alone, and it will grow to a larger

amount over time. The longer you leave it alone, or the higher the compounding rate, or both, the larger the future value. The idea of the present value of a future sum is less familiar and less intuitive, but financial people and other savvy managers use it all the time. You can too.

Present value is the monetary value today of a future payment discounted at some annual compound interest rate. To understand the concept of present value, let's go back to our initial example—the bequest from your father-in-law. In that example, the present value of $483,153 is $300,000. This is calculated through a process of discounting, or reverse compounding, at a rate of 10 percent per year over a period of five years. In the parlance of finance, 10 percent is the *discount rate.* If your father-in-law had said, "Look, I'm planning on giving you $483,153 five years from now, but if you'd rather have the money today I'm willing to give you $300,000," he'd be giving you an equivalent value, assuming you could invest it at 10 percent annually. In short, you would be indifferent between getting $300,000 now or $483,153 in five years—unless you worried about your father-in-law's not making good on his promise.

As with future value, tables are available for calculating the present value of $1 received in the future. Table 9-3 indicates the present-value interest factors (PVIFs) for $1 received in the future within a range of discount rates and discounting periods.

Note that the PVIF for five periods at 10 percent is 0.621. We can use this factor to calculate the present value of your father-in-law's $483,153 gift received five years in the future:

$$\text{Future Value} \times \text{PVIF} = \text{Present Value}$$

$$\$483{,}153 \times 0.621 = \$300{,}038$$

We're off by just a little as a result of rounding of the PVIF in the table.

The PVIF table clearly indicates how the present value of money received in the future shrinks with time. Scan any discount rate column in the PVIF table from top to bottom. The first number

TABLE 9-3

Present Value of $1 (PVIF)

Period	2%	4%	6%	8%	10%	12%
1	0.980	0.962	0.943	0.926	0.909	0.893
2	0.961	0.925	0.890	0.857	0.826	0.797
3	0.942	0.889	0.840	0.794	0.751	0.712
4	0.924	0.855	0.792	0.735	0.683	0.636
5	0.906	0.822	0.747	0.681	0.621	0.567
6	0.888	0.790	0.705	0.630	0.564	0.507
7	0.871	0.760	0.665	0.583	0.513	0.452
8	0.853	0.731	0.627	0.540	0.467	0.404
9	0.837	0.703	0.592	0.500	0.424	0.361
10	0.820	0.676	0.558	0.463	0.386	0.322

is the value of $1 received a year from now. In the 10 percent column, that value is $0.91. The same dollar is worth only $0.39 if you must wait ten years to get your hands on it. Strictly chump change. Notice, too, the role that the discount rate plays in shrinking future values over time. At 6 percent, $1 received ten years from now is worth $0.59. But at a discount rate of 12 percent, that same dollar is down to a mere $0.32! Thus, present value "shrinkage" has two sources: time and the discount rate. The greater the time and the higher the rate, the less your future cash flows will be worth.

Your financial calculator and PC spreadsheet can handle this same calculation. You simply enter the known values (future value, discount rate, and number of compounding periods) and solve for the unknown value, PV.

Now that you understand present value, let's move on to a typical business situation and see how time-value calculations can help your decision making. But first let's broaden the concept of present value to *net present value* (NPV), which is the present value of one or

more future cash flows *less* any initial investment costs. To illustrate this concept, let's say that Amalgamated Hat Rack expects its new product line to start generating $70,000 in annual profit (or, more specifically, net cash flows) beginning one year from now. For simplicity, we'll also say that this level of annual profit will continue for the succeeding five years (totaling $350,000). Bringing the product line on stream will require an up-front investment of $250,00. The questions for the company can thus be phrased as follows: Given this expected profit stream and the $250,000 up-front cost required to produce it, is a new line of coat racks the most productive way to invest that initial $250,000? Or would Amalgamated be better off investing it in something else?

A net-present-value calculation answers this question by recognizing that the $350,000 in profit that Amalgamated expects to receive over five years is not worth $350,000 in current dollars. Because of the time value of money, it is worth less than that. In other words, that future sum of $350,000 has to be discounted back into an equivalent of today's dollars. How much it is discounted depends on the rate of return Amalgamated could reasonably expect to receive had it chosen to put the initial $250,000 investment into something other than the line of coat racks (but similar in risk) for the same period. As explained earlier, this rate of return is often called the discount rate. We define the discount rate as the annual rate, expressed as a percentage, at which a future payment or series of payments is reduced to its present value. In our Amalgamated example, let's assume a discount rate of 10 percent. But before we describe the calculation, let's lay out the situation as follows, with the values in thousands of dollars:

Year	0	1	2	3	4	5
Cash flows	–250	+70	+70	+70	+70	+70

Here we see a negative cash flow of $250,000 in year zero, the starting point of our investment project. This is the cash outflow required to get the project off the ground. The company then experiences a positive cash flow of $70,000 *at the end* of each of the next five years.

Beginning or End of the Period

In solving for net present value and other time-value problems, it is important to know if the cash flows take place at the beginning or end of the period. The present value of a cash flow received in early January is worth more than the same amount received in late December of the same year. Your financial calculator and electronic spreadsheet are set up to accommodate this important difference.

To find the net present value of Amalgamated's stream of cash flows, we need to find the present value of each of the $70,000 cash flows, discounted at 10 percent for the appropriate number of years. If we add together the present values of the five annual inflows and then subtract the $250,000 initially invested, we will have the NPV of the investment. We can determine the NPV for this set of cash flows using our PVIF table in exhibit 9-4 and its present-value interest factors.[1]

Calculations such as this one can be laborious, but the financial calculators and computer spreadsheets now available make them faster and more accurate. All that you have to do is plug in the right

TABLE 9-4

Net Present Value of Amalgamated's Cash Flow

	Cash Flows (in $1,000)	PVIF	PV (in $1,000)
Year 0	– 250		– 250.00
Year 1	+ 70	0.909	+ 63.63
Year 2	+ 70	0.826	+ 57.82
Year 3	+ 70	0.751	+ 52.57
Year 4	+ 70	0.683	+ 47.81
Year 5	+ 70	0.621	+ 43.47
Total			+ 15.30

numbers in the right sequence. The NPV function on your calculator or spreadsheet takes into consideration your initial investment, each periodic cash flow, your discount rate, and the number of years over which you will receive the cash flows.

If the resulting NPV is a positive number, and no other investments are under consideration, then the investment should be pursued. In the Amalgamated case depicted in table 9-4, the NPV for the line of coat racks is a positive $15,300, which suggests that it would be an attractive investment for Amalgamated.[2] Its compound annual return is at least 10 percent.

But what about the other investment Amalgamated is considering, the $100,000 plastic extruder described in chapter 8? Let's reanalyze that investment option through the lens of NPV. As mentioned, the company was considering spending $100,000 to purchase and install a new extruder that, according to its best estimates, would save $18,000 each year over the seven-year lifetime of the machine. We can set up the problem as follows, with cash flows in thousands of dollars:

Year	0	1	2	3	4	5	6	7
Cash flows	−100	+18	+18	+18	+18	+18	+18	+18

At a discount rate of 10 percent, and using the PVIF table in table 9-2, we determine that the NPV of the extruder project is –$12,368. As a negative NPV, it probably shouldn't be pursued.

Here we should emphasize the effect that the discount rate has on NPV. The greater the discount rate, the lower the present value of future cash flows. Suppose that Amalgamated's discount rate were 6 percent instead of 10 percent. In that case, the NPV for the extruder would be slightly positive.

Notice something else about the NPV calculation for the extruder. Even with a 6 percent discount rate, the NPV is far less positive than the rosy 26 percent return on investment (ROI) we calculated in chapter 8. That ROI represented 26 per-cent over a seven-year period but failed to account for the time value of money. As a decision tool, ROI has very limited value. NPV analysis provides a more precise evaluation of investment opportunities.

Complications

Of course, business situations are almost always more complex than the conveniently simple ones we've contrived in the Amalgamated examples. Project investments are rarely made in a single lump sum at the very beginning, and cash flows are almost always irregular—some positive, others negative—over time. What's more, it is often difficult or impossible to accurately estimate what cash flows will look like far in the future, or when they will finally end. Some investments end abruptly with the sale of the product line or factory building—the net sale value of which must be entered as a terminal-value cash flow. Other investments may go on for decades and gradually fade to nothing.

With this complexity in mind, we will try to present a slightly more realistic picture of a business using NPV analysis. Let's deliberately make Amalgamated's new product line investment project slightly more complex. We'll do this in three ways and then show how you could assess the investment project through the same NVP analysis framework:

1. We'll spread the $250,000 investment over three periods instead of one. This is more typical of business practice in developing a new product line.

2. Cash flows will be made more irregular, with a loss in the first full year and growing profitability in later years.

3. We'll arbitrarily plan for Amalgamated to sell the product line at the end of five years for $170,000, and we'll treat the sale price as a terminal value.

Table 9-5 shows the results of these assumptions. Using 10 percent as the discount rate, we calculate a NPV of about $69,800 for this series of negative and positive cash flows. If 10 percent is the cost of capital to Amalgamated, we could say that this investment would (1) earn its cost of capital *and* (2) make a positive present-value contribution of $69,800.

TABLE 9-5

Net Present Value of Amalgamated's Cash Flow, with Complications (Values in Thousands)

	Year					
	0	1	2	3	4	5
Cash Investments	– 150	– 75	– 25	0	0	0
Cash Flow from Operations		– 15	+ 40	+ 80	+ 90	+ 100
Terminal Value						+ 170
Net Cash Flow	– 150	– 90	+ 15	+ 80	+ 90	+ 270
PVIF		0.909	0.826	0.751	0.683	0.621
PV	– 150	– 81.81	+ 12.39	+ 60.08	+ 61.47	+ 167.67
NPV	+ 69.80					

More Complications

Our presentation makes NPV analysis seem as straightforward as the mathematics on which it rests. It is straightforward, but the cash flows we use are, unfortunately, merely estimates. Consider Amalgamated's $250,000 investment. Where did that number come from? Chances are it is an agreed-upon estimate produced by people in Amalgamated's research and development and manufacturing units. Those people have experience in designing new products and setting up the manufacturing equipment needed to crank them out. But past experience is an uncertain guide to the future. The only thing that you can say with certainty is that the cost of the investment will be more or less than $250,000!

Estimates of the net cash flows from operations are bound to be even less certain. Consider how cash flow from operations is deter-

mined. The product line manager no doubt asks the marketing department three questions:

1. How many of these new products (in units) can your people sell in each of the next five years?
2. What would be our net revenues from each sale?
3. What level of marketing budget would you need to achieve those sales at those prices?

The manager would likewise get a unit production and labor and materials cost estimate from the manufacturing unit. In effect, the new-product manager would have to develop a detailed "mini" income statement similar to the enterprise income statement described in chapter 1. This statement would detail the revenues and costs (i.e., materials, labor, marketing, and all other costs) associated with the new product line over the five-year span of the analysis. The sum of the revenues and costs would be the cash flow from operations.

Taken together, these annual estimated cash flows from operations would be used in determining the NPV of the project. Obviously, there are lots of assumptions here, and plenty of room for error—especially as people attempt to forecast sales further and further into the future. There is even a chance that sales of the new product line will cannibalize the sales of existing product lines. As a consequence, opponents of the particular investment can usually find lots of opportunities to take potshots at the numbers, and experienced decision makers usually insist on fairly conservative sales forecasts and cost estimates.

Nevertheless, careful NPV analysis based on sound assumptions is an excellent decision-making tool—and it's certainly better than the alternatives. Its value can be improved if the NPV of an investment is presented in worst-case, most-likely-case, and best-case scenarios. This approach captures a broader range of opinions in the organization about future unit sales, various costs of production, and other assumptions.

Case Study: Beyond NVP

Farnsworth Dabble, vice president of product development for Amalgamated Hat Rack, was just wrapping up his presentation of the new-product-line proposal to senior management. He directed his audience's attention to the five-year series of cash flows that he and his colleagues anticipated from the proposed new product line. "And so you see that we anticipate negative cash flows in each of the first two years of the project, mostly due to R&D expenditures and production ramp-up. But over the next three years, we anticipate healthy cash flows, particularly if we sell the product line and its production facilities at the end of year five."

Dabble went on to explain the assumptions made in determining those cash flows, the internal debates underlying them, and his team's wish to err on the side of conservative projections. "As you can see," he concluded with satisfaction, "the proposed product line has a positive net present value."

The CFO was the first to respond. "So, what's the internal rate of return for this project?"

Dabble stiffened. Internal rate of return? He'd heard that term used before and had a sense of its meaning, but he was clueless about how to do the actual calculation or respond to the CFO's question. In the end, he was forced to utter the three dreaded words, hoping that none of his underlings were within earshot: "I don't know."

Internal Rate of Return

The *internal rate of return* (IRR) is another tool that managers can use to decide whether to commit to a particular investment opportunity, or to rank the desirability of various opportunities. IRR is defined as the discount rate at which the NPV of an investment equals zero. Let's consider what that means in terms of our more complicated version of Amalgamated's cash flow projection for its new product line:

Year	0	1	2	3	4	5
Net cash flow	–150	-90	+15	+80	+90	+270

As calculated earlier, the NPV of this stream of cash flows discounted at 10 percent was a positive $69,800. That told us that these numbers, if realized, would cover Amalgamated's cost of capital (10 percent) *and* contribute an additional present value of $69,800. IRR tells us something more. It captures the discount rate *and* the additional present value contribution in a single number. To calculate it, we need to determine the discount rate that would reduce NPV to exactly zero. IRR is that discount rate.

We know right off the bat that the IRR for our example must be greater than 10 percent since the cash flow discounted at 10 percent produced a positive NPV. But how much more? Well, if we had a few blackboards and several hours, we could calculate the IRR through an iterative process that used higher and higher discount rates. Eventually, we'd get to the one that produced an NPV of zero. But financial calculators and electronic spreadsheets again come to the rescue, making IRR calculations very easy. All we need to do is enter the values for each of the cash flows and solve for the discount rate (i). The IRR calculation is based on the same algebraic formula as the NPV calculation. With the NPV calculation, you know the discount rate, or the desired rate or return, and are solving the equation for the NPV of the future cash flows. In contrast, with IRR, the NPV is set at zero and the discount rate is unknown. The equation solves for the discount rate. For the Amalgamated project just described, the IRR is about 17.7 percent.

Typically, when the IRR is greater than the opportunity cost (the expected return on a comparable investment) of the capital required, the investment under consideration should be undertaken. You can use your company's *hurdle rate* as the IRR target. The CFO usually prescribes the hurdle rate. The hurdle rate is a minimal rate of return that all investments for a particular enterprise must achieve. The IRR of the investment under consideration must exceed the hurdle rate in order for the company to go forward with it.

Hurdle Rate and the Cost of Capital

We have defined the hurdle rate as the minimal rate of return that all investments for a particular enterprise must achieve. The firm's *cost of capital* is more specific. It is the weighted average cost of the organization's different sources of capital: both debt and equity.

Everyone understands that the debt capital employed by corporations has a cost—namely, the interest paid on bonds and other IOUs. But few nonfinancial people think of the capital contributed by owners as having a real cost. But it does. This cost is an opportunity cost—what the shareholders could earn on their capital if they invested in the next-best opportunity available to them at the same level of risk. For instance, if you had $100,000 of your money tied up in the shares of XYZ, Incorporated, a corporation whose share price fluctuates greatly, your opportunity cost for that capital might be 14 percent—the return you'd be able to obtain for an investment of equivalent risk. Thus, for a big, stable corporation, the shareholders' opportunity cost might be 10 percent; for a risky, high-tech company, the owners might expect an 18 percent return.

The methodology for calculating the cost of capital for an individual business or for business units is beyond the scope of this book. Put simply, however, the cost of capital is the weighted average cost of the organization's different sources of capital.

From a practical standpoint, you might equate your company's cost of capital with the hurdle rate mentioned in our discussion of NPV. The CFO can provide this number, but will likely adjust the hurdle rate upward for projects of increasing risk.

What's a reasonable hurdle rate for a business? It varies from company to company. Typically, the hurdle rate is set well above what could be obtained from a risk-free investment, such as a U.S. Treasury bond. You can, in fact, think of the hurdle rate as this:

Hurdle Rate = Risk-Free Rate + Premium That Reflects the Enterprise's Risk

Like any investor, a business entity expects to be rewarded for the uncertainty to which it is subjected. And new product lines and other such activities are, by nature, filled with uncertainty. For this reason, they demand that prospective projects show particularly good promise.

Some companies use different hurdle rates for different types of investments, with low-risk investments having to clear a lower hurdle than that imposed on the higher-risk type. For example, a company might require that replacement of an existing assembly line or a specialized piece of equipment use a hurdle rate of 8 percent, whereas the expansion of an existing product line would have a 12 percent hurdle rate. The development of a new product line, which is riskier still, might require a 15 percent hurdle rate.

Sensitivity Analysis

Every business forecast includes one or more assumptions. In proposing the company's new coat-rack line, Amalgamated managers no doubt assumed that its dealers would pay X dollars per unit, that materials costs would be Y dollars per unit, and that the investment needed to get the operation off the ground would be Z dollars. These are just a few of many assumptions.

What would happen if one or more of these assumptions failed to hold? Sensitivity analysis helps you to ask just that question and to see the ramifications of incremental changes in the assumptions that underlie a particular projection.

Amalgamated expects its new line of coat racks to generate $70,000 in annual cash flow beginning a year from initiation of the project. But what if some variable in the scenario changed—how would it affect the overall evaluation of the investment opportunity?

Charles Peabody, the vice president of Amalgamated's Moose Head division, is projecting $70,000 in annual cash flow for five years—as in our initial present-value example. Natasha Rubskaya, the company's CFO, is less optimistic. She believes that Peabody has drastically underestimated the marketing costs necessary to support the new line. She predicts an annual cash stream of $45,000. Then

there's Theodore Small, Amalgamated's senior vice president for new business development. Ever the optimist, he is convinced that the coat racks will practically sell themselves, producing an annual profit stream of $85,000 a year.

Amalgamated conducts a sensitivity analysis using the three profit scenarios. The NPV for Peabody's is $15,355. Rubskaya's is in negative territory at –$79,415. Small's scenario results in an NPV of $72,217.

If Rubskaya is right, the coat racks won't be worth the investment. If either of the other two is right, however, the investment will be worthwhile—and greatly worthwhile if Small's projections are on target. This is where judgment comes into play. If Natasha Rubskaya is the best estimator of the three, then Amalgamated's board of directors might prefer to take her estimate of the line's profit potential. Better still, the company should analyze its marketing costs in greater detail. Whichever route they take, sensitivity analysis will give the board of directors a more nuanced view of the investment and how it would be affected by various changes in assumptions. Other contingencies, or changes in other variables, could be mapped out just as easily.

The starting point for sensitivity analysis is in the underlying assumptions. If you are looking at breakeven analysis, take another look at your assumptions about each of the key critical components:

- **Fixed costs and variable costs.** Are you certain that your estimates for these costs are on target? Get the views of others on this, and try to establish a range of likely cost scenarios. Point estimates are almost always wrong.

- **Contribution.** The unit contribution is based on the selling price less the unit variable cost. Thus, if you're looking at a new product or service, chances are that the selling price is still to be tested. Question the validity of that assumption. If your product or service will be very similar to others already on the market, then the price that people are already paying may be a reliable guide. But if your product or service is "new to the world," then there may have been some guesswork involved in the determi-

nation of the selling price—even if your company conducted customer research. So again, it's a good idea to establish a range of likely selling prices for the new product or service.

You can perform the same type of sensitivity analysis on NPV calculations. In the Amalgamated case, for instance, you'd want to look more closely at the positive cash flows forecasted in years one through five. Most people cannot accurately forecast next year's cash flows, let alone those that occur many years in the future. So Charles Peabody's point forecast of $70,000 per year may not be reliable. Careful study may reveal a range of possible cash flows, with that range widening with each passing year, as shown here.

Year	0	1	2	3
Cash flow	–$250	+$68 to +$72	+$65 to +$75	+$62 to +$78

Year	4	5
Cash flow	$60 to +$80	+$58 to +$82

Again, you are much more likely to get it right if you forecast future cash flows as *ranges* of possible outcomes. Once you've determined them for your situation, calculate NPV for the best case, the worst case, and the most likely case. This will help your senior executives make a better decision. It will also help everyone understand which assumptions make or break the investment itself. These might be the selling price, the timing of the new product launch, or the cost of raw materials. Management can then focus its time and energy in making more accurate forecasts on those items, and once the project is in play, management will know that it must give those important points the greatest attention.

Economic Value Added

Our last tool is one that many corporations have adopted since the early 1990s. This tool gives shareholders and managers a better sense of business or business unit performance. Many use it as a metric for determining management bonuses. In many ways it is related to the

NPV and IRR concepts we've just covered. It's called *economic value added,* or EVA.

For many years, CEOs and unit managers would pat themselves on the back for producing income statement profits. "My company (unit) has produced yet another year of profitable operations," they would crow. They were big heroes. Financial consultants Joel Stern and Bennett Stewart blew the whistle on many of these executives in the late 1980s. Sure, these executives had produced accounting profits, but these were not *real* economic profits. And the reason for the discrepancy was a failure to recognize an important cost—the cost of the capital used in their operations.

Simply stated, EVA is net operating income after tax *less* the cost of the capital used to obtain it, or

EVA = Net Operating Profits after Taxes − (Capital Used × Cost of Capital)

By failing to account for the cost of capital, many businesses appear profitable even as they deplete shareholder wealth. But unless a business returns a profit greater than its cost of capital, it operates at a loss. It may pay taxes and report a profit on its income statement, but it destroys shareholder value if its gains are less than its cost of capital. And lots of seemingly profitable enterprises are doing just that. By taking all capital costs into account, including the cost of owners' equity, EVA calculates the monetary value that a business—or one of its operating units—creates or destroys in any given accounting period.

EVA is both a tool for evaluating new projects and a metric for gauging and rewarding managerial performance. In using it as an evaluation tool, we ask, "Will this project increase economic value?" By forecasting the impact of a new project or investment on net operating income after taxes (per our formula), and subtracting the cost of capital, we can determine its economic value added—or value lost. NPV does the same thing and, thanks to the discount rate, also recognizes the cost of capital. EVA is more effective, however, as a metric for measuring and rewarding management. It encourages

managers to look at how capital is employed in their units and to ask, "Is this or that particular application of capital really returning at least its full costs?" They begin to take a hard look at assets that everyone customarily thought of as free goods: freight trains, machinery, buildings, assembly lines, and so forth. And they often discover that the company would be better off liquidating those assets and redeploying the proceeds into activities with higher returns.

Summing Up

This chapter has presented what many consider to be the most valuable financial tools available to business managers and analysts: net present value, internal rate of return, economic value added, and their various related concepts. These tools are far superior to payback and return on investment, which fail to recognize either the timing of cash flows or the firm's cost of capital (or hurdle rate). In brief, their characteristics are as follows:

- Net present value (NPV) is the monetary value today of a future stream of positive and negative future cash flows discounted at some annual compound interest rate. You can use NPV analysis for any number of decision-making purposes.
- Internal rate of return (IRR) is another tool that you can use to decide whether to commit to a particular investment opportunity, or to rank the desirability of various opportunities. IRR is the discount rate at which the NPV of an investment equals zero.
- Economic value added (EVA) is net operating income after tax less the cost of the capital used to obtain it. Many companies use EVA as a discipline to evaluate operations, investments, and business performance. Like NPV, it forces managers to take account of the cost of capital used in their decisions.

Whether you're considering the development of a new product, the purchase of a new asset, or any other type of investment, time-

value tools can greatly enhance your decision-making ability. They can even help you determine the value of assets, a subject to which we turn next.

We've just skimmed the surface of this important subject in this chapter. If you wish to learn more about these topics, our advice is threefold: (1) read more about time-value concepts in any of the many corporate finance textbooks currently available; (2) learn how to use a financial calculator or financial spreadsheet programs; and (3) practice the application of these tools to business problems as you encounter them.

Notes

Chapter 9: The Time Value of Money

1. An NPV calculation determines the net present value of a series of cash flows according to the following algebraic formula:

$$\text{Net Present Value} = CF_0 + CF_1/(1 + i)^1 + CF_2/(1 + i)_2 + CF_n/(1 + i)^n$$

where each *CF* is a future cash flow, *n* is the number of years over which the profit stream is expected to occur, and *i* is the desired rate of return, or the discount rate. When you supply the values for each future cash flow, the discount rate, and the number of years, your spreadsheet or calculator will do the rest.

2. You'll get a slightly different number if you make the calculation on a financial calculator or spreadsheet program. The reason is a rounding error. Our PVIF goes to three decimal places, whereas calculators and spreadsheets generally go to higher decimal places.

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Case 1.2: Bharat Heavy Electricals Limited (BHEL)

BHEL is the largest engineering company in India. It provides total systems to the core sectors of the Indian economy – power, industry and transportation. About two-thirds of the company's business is in power sector. It is a technology-intensive company having collaborations with reputed international companies. It ranks among "Fortune 500" biggest industrial giants. Its operations are spread over 13 manufacturing plants and eight service centres in India. BHEL employs about 46,050 persons, including nearly 10,000 executives. The company was initially a totally public sector company. It has been partially privatised now.

The company is committed to quality. It receives orders from several countries for industrial equipments, including complete power stations, consultancy services and providing technical manpower. These countries include USA, UK, West Germany, Russia, New Zealand, Indonesia, Thailand, Malaysia, Saudi Arabia, Libya, and Turkey etc. BHEL is recognized in the world market as a renovation, services and maintenance expert. A number of old boilers and TG sets from renowned international suppliers are being entrusted to BHEL for renovation.

BHEL produces a wide variety of products in core sectors of the economy. The characteristics of those products vary significantly. A number of its products such as hydro and thermal sets, boilers, boiler auxiliaries, compressors, industrial turbo sets and oilrigs are long production cycles items. BHEL has defined its objectives as follows:

Growth To ensure a steady growth by enhancing the competitive edge of BHEL in existing business, new areas and international operations so as to fulfil national expectations for BHEL.

Profitability To provide a reasonable and adequate return on capital employed, primarily through improvements in operational efficiency, capacity utilisation and productivity, and generate adequate internal resources to finance the company's growth.

Customer focus To build a high degree of customer confidence by providing increased value for his money through international standards of product quality, performance and superior customer service.

People orientation To enable each employee to achieve his potential, improve his capabilities, perceive his role and responsibilities and participate and contribute positively to the growth and success of the company. To invest in human resources continuously and be alive to their needs

Technology To achieve technological excellence in operations by development of indigenous technologies and efficient absorption and adaptation of imported technologies to sustain needs and priorities, and provide a competitive advantage to the company.

Image To fulfil the expectations which shareholders like government as owner, employees, customers and the country at large have from BHEL.

Discussion Question

1. Critically evaluate BHEL's objectives from the perspectives of financial management, in general and shareholders in particular.

MINICASE I

As an investment advisor, you have been approached by a client called Ramesh, who wants some help in investment related matters.

Ramesh is currently 45 years old and has Rs 600,000 in the bank. He plans to work for 15 more years and retire at the age of 60. Ramesh's present salary is Rs 400,000 per year. He expects his salary to increase at the rate of 12 percent per year until his retirement.

Ramesh has decided to invest his bank balance and future savings in a portfolio in which stocks and bonds would be equally weighted. For the sake of simplicity, assume that these proportions will be maintained by him throughout. He also believes that bonds would provide a return of 7 percent and stocks a return of 13 percent. You concur with his assessment.

Once Ramesh retires at the age of 60 he would like to withdraw Rs 500,000 per year from his investments for the following 15 years as he expects to live upto the age of 75 years. He also wants to bequeath Rs 1,000,000 to his children at the end of his life. How much money would he need 15 years from now?

How much should Ramesh save each year for the next 15 years to be able to meet his investment objectives spelt out above? Assume that the savings will occur at the end of each year.

Suppose Ramesh wants to donate Rs 200,000 each year in the last three years of his life to a charitable cause. Each donation would he made at the beginning of the year. How much money would he need when he reaches the age of 60 to meet this specific need?

MINICASE

PTR is a venerable restaurant of Bangalore set up decades ago by Prakash Naik. Despite its phenomenal success, Prakash Naik was unwilling to set up branches because he was concerned about the dilution of quality. In the last decade, however, alluring business opportunities and competitive compulsions persuaded Prakash Naik to set up a few branches of PTR at select locations in Bangalore and Chennai. This initiative, financed mainly through internal accruals, turned out to be quite profitable. Buoyed by this success, the Naik family, which owns 100 percent equity of PTR Limited, has chalked up an ambitious plan to set up a nation-wide chain of PTR restaurants and to support this initiative it wants to raise Rs.100 crore through an initial public offering.

Prakash Naik has asked you to brief the family members on various issues associated with the move, by answering the following questions

(a) What are the pros of going public?
(b) What are the cons of going public?
(c) What conditions should a company satisfy to make an IPO?
(d) What is book building?
(e) What are the principal steps in an IPO?
(f) What role is played by the lead manager?
(g) What are the costs of a public issue?
(h) Can a company making a public issue freely price its shares?
(i) Why is under-pricing of IPOs a universal phenomenon?
(j) What is a rights issue?
(k) What are the different kinds of dilution?

MINICASE

Divya Electronics was promoted about twenty years by Dipankar Mitra, who continues to be the Executive Chairman of the firm. Initially, the firm employed a debt-equity ratio of 1.5:1 as the promoter had limited resources. While the firm had a few bad patches, it has performed fairly well and has been reasonably profitable. Over time, the proportion of debt in the capital structure diminished. The firm also issued bonus shares on two occasions once before making its IPO eight years ago and once subsequently.

The financial statements of the firm for the just concluded financial year are given below. The profit and loss account has been cast in the contribution format to facilitate the calculation of leverages.

Balance Sheet		*Profit and Loss Account*	
Sources of Funds	*Rs. in crore*		*Rs. in crore*
1. Shareholders' Funds		Revenues	800
▪ Paid-up equity capital (14 crore shares of Rs.10 each)	140	Variable costs	480
		Contribution margin	320
▪ Reserve and surplus	250	Fixed operating costs	180
2. Loan Funds	200	Profit before interest and taxes	140
	600	Interest	20
Application of Funds		Profit before tax	120
1. Net Fixed Assets	400	Tax	36
2. Net Current Assets	200	Profit after tax	84
	600		

The current market price per share is Rs.115, giving a retrospective PE ratio of 16.43, the highest in its history.

Dipankar Mitra and his family holds 4.5 crore shares of Divya Electronics. The rest is held more or less equally by institutional investors and retail investors.

The firm has an expansion project on hand that will require an outlay of Rs.200 crore which will be supported by external financing. The expansion project is expected to generate an annual revenue of Rs.240 crore. Its variable costs will be 60 percent of revenues and its fixed operating costs would be Rs.50 crore. The expansion can be completed quickly.

EMAN Consultants, the merchant bankers of Divya Electronics, believe that Divya Electronics can make a public issue of equity shares at Rs.106. The issue expenses, however, will be Rs.6 per share. The other option is to privately place debentures carrying an interest rate of 8 percent

The board of directors of Divya Electronics would be meeting shortly to decide on the means of financing to be adopted for the proposed expansion plan.

You have been requested to present an analysis of the two options. In particular, you have been asked to.

(a) Compute the EPS—PBIT indifference point for the two financing options.
(b) Calculate the EPS for the following year under the two financing options assuming that the expansion project would be fully operational.
(c) Show how the degree of total leverage will change under the two financing options.
(d) Highlight any other issues that you believe are important for taking the decision.

MINICASE

Suman Joshi, Managing Director of Omega Textiles, was reviewing two very different investment proposals. The first one is for expanding the capacity in the main line of business and the second one is for diversifying into a new line of business.

Suman Joshi asks for your help in estimating Omega's weighted average cost of capital which he believes is relevant for evaluating the expansion proposal. He also wants you to estimate the hurdle rate for the new line of business. To enable you to carry out your task, he has provided the following data.

- The latest balance sheet of Omega is given below

Rs.in million

Liabilities		*Assets*	
Equity capital	350	Fixed assets	700
Preference capital	100	Investments	100
Reserves and surplus	200	Current assets, loans and advances	400
Debentures	450		
Current liabilities & provisions	100		
	1200		1200

- Omega's target capital structure has 50 percent equity, 10 percent preference, and 40 percent debt
- Omega has Rs.100 par, 10 percent coupon, annual payment, noncallable debentures with 8 years to maturity. These debentures are selling currently at Rs.112.
- Omega has Rs. 100 par, 9 percent, annual dividend, preference shares with a residual maturity of 5 years. The market price of these preference shares is Rs. 106.
- Omega's equity stock is currently selling at Rs. 80 per share. Its last dividend was Rs.2.80 and the dividend per share is expected to grow at a rate of 10 percent in future.
- Omega's equity beta is 1.1, the risk-free rate is 7 percent, and the market risk premium is estimated to be 7 percent.
- Omega's tax rate is 30 percent.
- The new business that Omega is considering has different financial characteristics than Omega's existing business. Firms engaged purely in such business have, on average, the following characteristics: (i) Their capital structure has debt and equity in equal proportions. (ii) Their cost of debt is 11 percent. (iii) Their equity beta is 1.5.

(a) What sources of capital would you consider relevant for calculating the weighted average cost of capital?
(b) What is Omega's post-tax cost of debt?
(c) What is Omega's cost of preference?
(d) What is Omega's estimated cost of equity using the dividend discount model?
(e) What is Omega's estimated cost of equity using the capital asset pricing model?
(f) What is Omega's weighted average cost of capital using CAPM for the cost of equity.
(g) What would be your estimate for the cost of capital for the new business?
(h) What is the difference between company cost of capital and project cost of capital?

MINICASE

Aman Limited is a leading manufacturer of automotive components. It supplies to the original equipment manufacturers as well as the replacement market. Its projects typically have a short life as it introduces new models periodically.

You have recently joined Aman Limited as a financial analyst reporting to Ravi Sharma, the CFO of the company. He has provided you the following information about three projects, A, B, and C that are being considered by the Executive Committee of Aman Limited:

- Project A is an extension of an existing line. Its cash flow will decrease over time.
- Project B involves a new product. Building its market will take some time and hence its cash flow will increase over time.
- Project C is concerned with sponsoring a pavilion at a Trade Fair. It will entail a cost initially which will be followed by a huge benefit for one year. However, in the year following that some cost will be incurred to raze the pavilion.

The expected net cash flows of the three projects are as follows.

Year	*Project A (Rs.)*	*Project B (Rs.)*	*Project C (Rs.)*
0	(15,000)	(15,000)	(15,000)
1	11,000	3,500	42,000
2	7,000	8,000	(4,000)
3	4,800	13,000	–

Ravi Sharma believes that all the three projects have risk characteristics similar to the average risk of the firm and hence the firm's cost of capital, viz. 12 percent, will apply to them.

You have been asked to prepare a report for the executive committee, covering the following:

(a) What is payback period and discounted payback period? Find the payback period and the discounted payback period of Projects A and B.

(b) What is net present value (NPV)? What are the properties of NPV? Calculate the NPV of projects A, B, and C.

(c) What is internal rate of return (IRR)? What are the problems with IRR? Calculate the IRR for Projects A, B, and C.

(d) What is modified internal rate of return (MIRR)? What are the pros and cons of MIRR vis-à-vis IRR and NPV? Calculate the MIRR for Projects A, B, and C assuming that the intermediate cash flows can be reinvested at 12 percent rate of return.

MINICASE

1. Mr. Ramesh, the chief executive of Caltron Limited, has requested you to prepare a cash budget for the company for the period January 1, 20X1 through June 30, 20X1.

The following sales forecast has been provided by the marketing department of Caltron:

		(Rs. in million)
20X0	November	30
	December	40
20X1	January	40
	February	45
	March	50
	April	50
	May	55
	June	50
	July	45
	August	40

Caltron's credit policy (2/10, net 30) allows a 2 percent discount on payments made by the 10th day of sale-otherwise the full amount is due on the 30th day. It is expected that 40 percent of the customers will take the discount, 50 percent of the customers will pay the next month, 8 percent of the customers will pay in the second month after sales, and 2 percent of the customers will turn out to be bad debts. Assume that the collection pattern for the sales on which cash discount is taken is as follows: 70 percent during the month of sales and 30 percent during the following month.

The production process commences two months before the anticipated sales. The variable cost of production is 50 percent of the sales (40 percent represents material cost and 10 percent others). Materials are bought two months before expected sales. 50 percent of the purchase cost is paid for in one month of purchase and 50 percent in the following month. Other variable production costs are paid in the month of incurrence. Assume that the production costs are incurred immediately when the production process commences two months before the anticipated sales.

Fixed costs are paid for in the month during which they are incurred. The expected fixed costs during the period January through June 20X1 are as follows:

Factory overheads	:	Rs 1 million per month
Selling and administration expenses	:	Rs.2 million per month
Depreciation	:	Rs.2 million per month
Interest	:	Rs.9 million each in March and June

Caltron is planning to buy a new machine costing Rs. 30 million in April and pay Rs. 15 million as dividends in June.

As per the current projections, the firm will have a cash balance of Rs. 12 million as on 1.1.20X1 which also represents the minimum balance the company would like to maintain subsequently.

Required: Prepare the cash budget for the period 1.1.20X1 through 30.6.20X1.

MINICASE

Multitech Limited, set up by a few technocrats in the mid 1990s, enjoyed a fairly healthy growth rate till two years ago. Intense competition in the last few years has slowed down the growth rate considerably.

The present sales of Multitech is Rs. 800 million. In a recent executive committee meeting, Jeevan Reddy, the marketing director, argued for relaxing the credit policy of Multitech to stimulate sales increase. Gautam Singhvi, the finance director, promised to consider this request favourably, provided the relaxation in credit policy had a positive impact on residual income.

The present credit policies of Multitech are as follows:

Credit Standards Multitech classifies its customers into 4 categories, 1 through 4. Credit rating diminishes as one goes from category 1 to category 4. Customers in category 1 have the highest credit rating whereas customers in category 4 have the lowest credit rating. Currently Multitech extends unlimited credit to customers in categories 1 and 2, limited credit to customers in category 3, and no credit to customers in category 4.

Credit Period Multitech provides 30 days of credit to its customers who are deemed eligible for credit under its credit standards.

Cash Discount To induce its customers to pay early, Multitech offers cash discount. Its credit terms are 1/10, net 30.

You have recently joined Multitech as a financial analyst and Gautam Singhvi has asked you to examine the effect of relaxing credit standards, extending the credit period, and providing more generous cash discount.

After talking to executives in the marketing, production, and finance departments you have gathered the following information.

- Presently the proportion of credit sales and cash sales are 0.7 and 0.3 respectively .50 percent of the customers (by value) who are granted credit avail of cash discount.
- The contribution margin ratio for Multitech is 20 percent, the tax rate for Multitech is 30 percent, the post-tax cost of capital for Multitech is 12 percent, and the average collection period (ACP) on credit sales is 20 days.
- If the company extends unlimited credit to customers in category 3 and limited credit to customers in category 4, the sales of the company would increase by Rs. 50 million on which the bad debt losses would be 12 percent. The ACP, however, will remain unchanged at 20 days.
- If the company extends its credit period from 30 days to 60 days, its sales to customers who are granted credit will increase by Rs. 40 million. Further, the percentage of customers who will avail of cash discount will decrease to 20 percent. The ACP, as a result of the extension of the credit period, will increase to 50 days.
- If the company relaxes its discount terms to 2/10 net 30, its sales to customers who are granted credit will increase by Rs. 20 million. Further, the percentage of credit customers who will avail of cash discount will increase to 70 percent and the ACP will decrease to 16 days.

(a) What will be the effect of relaxing the credit standards on residual income?
(b) What will be the effect of extending the credit period on residual income?
(c) What will be the effect of relaxing the cash discount policy on residual income?

Examine the impact of these credit policy changes one at a time.

MINICASE

Kapil Sugars Limited was set up in 1985 in Uttar Pradesh by Varun Kapil, a sugar technologist. The company had a chequered history for a decade. Thereafter, it achieved a certain degree of stability. It has done particularly well in the last five years.

At present the company is managed by Satish Kapil and Arun Kapil, the two sons of Varun Kapil, who inherited the business from their father about eight years back.

Till recently the company was an unlisted company, wholly owned by the two brothers and their families. Last year, the company went public when the Kapil family offered 25 percent of its equity stake to the general investing public through an 'offer for sale'. The primary motivation for making the IPO was to create the option for raising money from the capital market because the brothers have very ambitious plans for expanding the business through organic growth and acquisitions.

The earnings and net investments (net capital expenditure and net increase in working capital) of Kapil Sugars Limited for the last five years have been as follows:

Rs. in million

	1	*2*	*3*	*4*	*5*
Earnings	96	108	84	115	147
Net investments	104	94	90	108	192

At present 21 million shares of Rs.10 par are outstanding. The reserves and surplus at the end of year 5 stood at Rs.560 million. The company has declared a dividend of Rs.2.00 per share for year 5 (the just concluded year)

As long as the company was wholly owned by the Kapil family, it followed a very *ad hoc* dividend policy. Now the board of directors has decided to develop a well thought out dividend policy

As an executive of MCI Investment Corporation, a merchant banking firm, you were involved in handling the IPO of Kapil Sugars Limited and interacted closely with Satish Kapil and Arun Kapil. Since the brothers have developed confidence in you, they have asked you to make a presentation to the board, covering various facets of dividend policy. In particular, they want you to discuss the following issues:

a. What are the plausible and dubious reasons for paying dividends?
b. What considerations are relevant for determining the dividend payout ratio?
c. If the debt-equity norm of the firm is 1:2, what should have been the dividend payment, year-by-year, for each of the five years under: (i) pure residual dividend policy, (ii) fixed dividend payout policy, and (iii) smoothed residual dividend policy. Assume that the firm has a dividend payout ratio target of 0.3.
d. The expected EPS for current year is Rs.9.0. What would be the DPS for the current year as per the Lintner model if the target payout ratio is 0.3 and the adjustment factor 0.6?
e. What is the difference between a bonus issue and a stock split? What are the pros and cons of bonus issues and stock splits?
f. What is the rationale for share buybacks?