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Charles Priester
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Financial Strategies for the Manager

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With 35 figures

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Foreword

This book was written well before the worldwide financial crisis of 2008 that plunged the world into a major economic recession. Yet the key messages, conclusions, suggestions and recommendations that are embodied in this book remain valid today.

The fundamental and essential contributing factor that led to this crisis was the excessive reliance on debt financing on the part of individuals, banks and certain governments.

There was a widely held belief that economic growth would continue in most countries and thereby support the strongly rising values of real estate, energy and most industrial resources.

Banks and home owners felt confident that property values would continue to rise, so little thought was given to the possibility of default of property loans. Unfortunately the boom in property, energy and industrial materials prices came to an end and their prices plunged rapidly which in turn led to the worldwide financial crisis with which we are all so familiar.

A major consequence of the financial crisis was that individuals and some banks were forced into a wrenching "financial de-levering" process in which their reliance on borrowed money was reduced significantly. This produced painful consequences, as their balance sheets shrank like snow in the sun, often resulting in bankruptcy.

A by-product of the financial crisis is the serious erosion of trust between debtors and creditors. Trust is a necessary and crucial ingredient that is required if financial and commercial markets are to function smoothly and that trust has been damaged severely by the crisis.

The result has been that seekers of credit have found it very difficult to find it and when found, it comes with far more strings attached – and usually for lesser amounts.

Another financial sector that has been hard hit by the crisis is that sector where Mergers and Acquisitions were being facilitated, particularly those that were initiated by private equity players (see unit eleven).

The main focus of this book has been the financial management of small to medium sized companies whose shares are often privately held and are not publicly traded on exchanges. There is no doubt that conditions for success, and even survival of such companies, have become far more difficult. Not only do they face a market where it has become far more difficult to generate sales, but their bank loans and trade credits (accounts payable) terms and conditions have become more onerous and difficult to obtain.

The same often applies to a company's ability to raise equity capital from external sources. In short, external financing has become much harder to find. This means that companies need to rely more on internally generated funds, which in turn means that very close attention must be paid to their operational efficiency and profit margins.

In addition, policies that emphasize sales growth at the expense of profit margins need to be re-examined (see unit three and five).

Focusing on the company's assets, the manager needs to question constantly the justification of the company owning its assets. "Can the company do without?" should be a constantly asked question.

In particular, a clear understanding of the lessons of Economic Value Added (EVA) analysis will prove particularly useful in trying to survive in these difficult times (see unit ten).

While this book cannot guarantee a company's success, especially in uncertain times like these, it can help managers improve the performance of their company, which will put the company in a stronger position than those that do not and help it weather the tide of tight markets and difficult financial times.

Preface

The book has been written for those who wish to achieve a basic understanding of financial management at either undergraduate or postgraduate. It is aimed primarily at students who are not majoring in financial management but who, nevertheless, are studying introductory-level financial management as part of their course in business, management, economics, computing, engineering or some other area. Students who are majoring in financial management should also find the book useful as an introduction to the main principles which can serve as a foundation for further study. In addition, the book should also give managers of smaller enterprises who do not have a background in Finance a better understanding of the financial strategies and give them the practical tools that can be used to improve the performance of their companies.

The book clearly explains the story that is told by a company's Balance Sheet, its Income Statement and its Flow of Funds Statement. This in turn allows the reader to determine the financial "health", pinpoint the underlying weaknesses and discover the potential strengths of the company that are revealed by those numbers. The book also explains the advantages and disadvantages of various strategies that can be used to improve a company's performance. Attention is given to liquidity management, asset productivity, margin analysis and the dangers and benefits of leverage. Since managing working capital are daily concerns of most managers particular attention is paid to operating cash, receivables, inventory and payables management. Several strategies to maximize their benefits and minimize their costs are described. The threat of liquidity problems, which often plague rapidly growing enterprises, receives specieal attention and strategies to minimize their occurrence are introduced. Calculating the benefits and costs of purchased and/or leased capital assets is made simple through the use of example spreadsheets. Particular attention is paid to the Powerful analytical tool of "economic value added" or EVA. This technique allows managers to maximize the operational and financial performance of the company or assets for which they are responsible.

The book is written in a concise and accessible style by which you are introduced to each topic carefully and there is a gradual building of knowledge, minimizing the use of technical jargon. Where technical terminology is unavoidable, we try to provide clear explanations. All these key terms are listed alphabetically with a concise definition in the glossary towards the end of the book. In addition, mathematical formulae have been kept to a minimum. Through the use of numerous examples, exercises and solved case studies the reader will develop a good grasp of the material as well as learn how to apply the lessons learned.

The author's Banking background sharpened his ability to evaluate companies' strengths, weaknesses and potentials for future success and this is a major focus of this book. His subsequent career in post secondary and graduate management education gave him the skill to share his practical business experience with his students and now with the readers of this book.

Contents

1 Goals of Financial Management

Unit Objective: To understand why a grasp of fundamental financial strategies is important to your employer as well as to yourself. To learn the twin goals of financial management.

Key Words: Assets, Liabilities, Equity, Balance sheet, Income Statement, Flow of Funds Statement

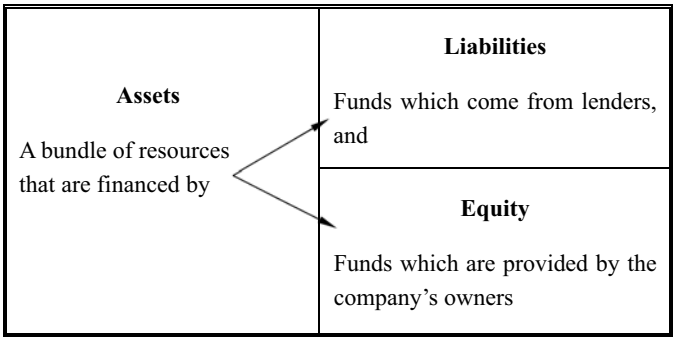
1.1 Introduction

In Finance, we look at a company as a bundle of resources (tools, you may say), whose purpose is to generate income.

These resources are bought with funds from *two* sources—money from *lenders* and *owners*—who in turn demand a "rent" from the company for the use of their money.

This situation is clearly visualized in the Balance Sheet of the company.

A Company's Balance Sheet



Left Side Total	=	Right Side Total
A Company can earn Revenues by putting its Assets to good use. In this process it also incurs Expenses.		A Company must pay rent for the use of these funds.

Financial management is divided into two tasks, each associated with one of the two sides of the Balance Sheet.

C. Priester et al. (eds.), *Financial Strategies for the Manager*

Task 1: To generate as much income (or benefits, productivity, profitability, yield) as possible from a company's assets, with due regard for the risks involved (left side of the Balance Sheet).

Task 2: To obtain the most economical supply of funds from lenders and owners, with due regard for the risks involved (right side of the Balance Sheet).

The bigger the difference between the "yield percentage earned in Task 1" and the "rent percentage incurred in Task 2," the better the financial performance of the company, as long as that difference is positive, i.e,. greater than zero.

A brief example may clarify this statement. Let us compare two companies, Company x and Company y.

Company x Balance Sheet

Its assets yield a return of 18%, which produces an income of $1.8 million.

Assets $10 million	**Liabilities** $4 million
	Equity $6 million

Its liabilities and equity require an average rent of 15%. This is called Average Cost of Capital.

Company y Balance Sheet

This Company's Asset Yield is 20%, (produces an income of $2 million).

Assets $10 million	**Liabilities** $4 million
	Equity $6 million

This Company's Average Cost of Capital is 12%.

We note that the difference between the "Asset Yield" and the "Average Cost of Capital" of Company y is 20% – 12% = 8% and of Company x is 18% – 15% = 3%. Other values being equal, *and this is an important proviso*, we can conclude that Company Y's financial performance is better than Company x.

Task 1

Let us return to Task 1 and look at the performance of Company x. Remember that its assets generated an income of $1.8 million. Suppose that this company, through superior asset management (for instance, by getting its assets to work harder, by getting rid of unnecessary assets, and/or by smarter asset utilization), succeeds to earn the *same* income of $1.8 million, but at the same time manages to *reduce* its assets from $10 million to $8 million. This would raise the asset yield to ($1.8 mil/$8mil) 22.5% from the original 18%, and the *difference* between "Asset Yield" and "Average Cost of Capital" would rise from the original 3% to a new higher value of (22.5% – 15% =) 7.5%.

Furthermore, the $2 million reduction in assets would enable the company to do several things; it could reduce the right side of its Balance Sheet by lowering liabilities and/or equities, or it could invest the $2 million in more productive and profitable new assets that promise to generate even higher asset yields than the 22.5% produced now.

This, in a nutshell, is the aim of financial management—*improve asset yield and minimize the cost of capital in the long run.*

Observation: Let us look again at the underperforming Company x. Assume that the managers improve the Asset Yield (A.Y.%) and Average Cost of Capital (ACC%) by 5%. This would raise A.Y.% to $1.05\% \times 18\% = 18.9\%$ and lower ACC% to $0.95 \times 15\% = 14.25\%$. Notice that the new, improved difference between A.Y.% and ACC% is now $18.9\% - 14.25\% = 4.65\%$ compared to the original difference of 3%. We can see that the company's overall financial performance has increased dramatically by $(4.65/3) - 1 = 55\%$.

Conclusion: Small improvements in A.Y.% and ACC% can significantly improve overall performance.

Exercise #1A

Z Corporation has $9 million in Assets and $9 million in Liabilities and Equity. Its Assets generate an operating income of $1.44 million and the company's Cost of Capital is 15%.

Suppose that through better Asset utilization and operational efficiencies, the company manages to reduce its need for Assets by $1 million without affecting its operating income.

The management decides to reinvest the $1 million into a new venture that generates $200 k in operating profits.

Required: What is the effect of these events on the company's overall financial performance? (See Appendix A for solutions of all exercises)

FINALLY: It should be noted that this whole process also works in reverse. In the event that Asset Yields decline, their effect on the company's overall performance also gets magnified.

Exercise #1B

A company's Asset Yield is 17.5% and its Cost of Capital 14.9%

- Suppose the Asset Yield improves by 8% and the Cost of Capital improves (i.e., falls) by 5%. Calculate the percentage change in the company's overall performance (i.e., the difference between Asset Yield % and Cost of Capital %).
- Do the same if Asset Yield worsens by 10% and Cost of Capital worsens by 5% (based on the original scenario).
- Do the same if Asset Yield worsens by 4% and the Cost of Capital worsens by 10%.

So far we have focused only on Task 1.

1.2 Getting More Mileage Out of a Company's Assets

This will be the major focus of this course because you, as a manager of your company's resources (i.e. Assets), can influence their productivity and thereby affect the yield that these assets produce.

Let us now focus on the right side of the Balance Sheet, i.e., the source of funds with which these assets were obtained. Remember that on page 1 – 2 we said that the second aspect of Financial Management is the task of trying to *minimize the cost of capital in the long run*. This will be the *minor* focus of this course because most line managers usually do not involve themselves *directly* with this task. Of course, *indirectly* you can have a tremendous impact on this task if you, as a manager, can *reduce* your need for assets while maintaining the "output" for which you are responsible.

1.2.1 Important Observation

Maximizing Asset Productivity And Profitability

The search for a higher Asset Yield (doing more with less) is a universal phenomenon. It has made the world of business increasingly less hospitable to the average company.

In the nobler past, a moderately well-run company, whose Asset Yield was steady and comfortably exceeded its Cost of Capital, could happily survive for years.

In today's demanding and relentless business climate, such companies do not survive. You either continuously improve your Asset Yield, just to keep up with your competitors, or you go under. The winners in this new, tough business climate are the companies that manage to produce a growth rate in Asset Yield that is faster than their competitor's growth rate. This new reality pervades the entire industrial world, and today's business entity has to do well in this new reality.

One final observation about Asset Yield and Cost of Capital: the world's financial markets decide what a particular company's Cost of Capital will be. Successful companies are popular with investors and lenders, and as a result they enjoy lower costs of capital. Unsuccessful companies are punished by disappointed investors and lenders with higher costs of capital. This is the cruel reality of the market place—learn to perform well or else!

The good aspect of trying to maximize the difference between Asset Yield and Cost of Capital is that even small improvements in these two percentages are magnified and result in much bigger improvements in the difference between the two percentages.

Readers who are familiar with accounting may safely ignore the material starting with 1.3 up to and including exercise 1D.

1.3 What Information Do the Financial Statements Convey to the Manager

Unit Objective: To be able to interpret the essential information conveyed by a company's Financial Statements so that informed decisions can be made.

1.3.1 A Close-Up of the Financial Statements

Broadly speaking, the purpose of Accounting is:

"To portray the financial course of events of a company and its financial status from time to time."

This portrayal has two aspects:

1. *The recording of economic events as they occur*—basically the function of keeping the books. *There are eight types of economic events*. They are:

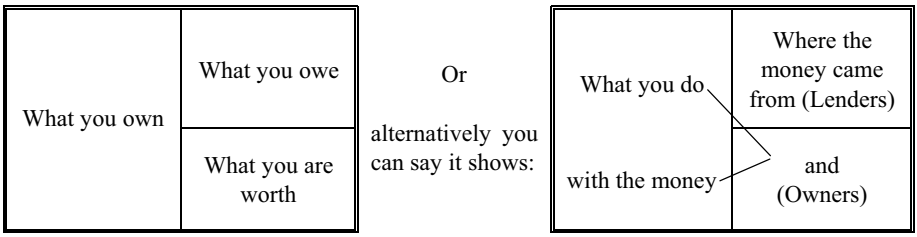
(a) The Earning of Revenues,
(b) Incurring of Expenses,
(c) Acquiring of Assets,
(d) Disposing of Assets,
(e) Incurring Debts,
(f) Repaying Debts,
(g) Raising Share Owners' Equity, and
(h) Lowering Share Owners' Equity.

Periodically the cumulative totals from events (a) and (b) are transferred (closed out) to the Owners Equity section of the Balance Sheet. This is called "closing the books."

2. The preparation of financial statements (the Balance Sheet, Income Statement and Flow of Funds Statement).

1.3.1.1 The Balance Sheet

Let us begin by focusing on the Balance Sheet. This statement gives you the state of affairs at a *moment* in time. It freezes the action, so to speak. It shows you:



To use more common accounting terminology, the Balance Sheet portrays a company's:

Those things that a company owns in order to conduct its business

Assets	**Liabilities**
	Equity

Money ***lent*** to you by Creditors

Money ***invested*** in the company by the Owners

A brief aside:

The "Rent" for the use of those two "pools of money" provided by creditors and investors (interest and dividends respectively) are treated totally differently by the Tax Man.

Interest: is a tax deductible expense to the party paying it, whereas

Dividends: are not tax deductible to the payer. The company must pay dividends out of its after tax profit. *This different tax treatment has very important consequences*; more about this later.

Let us return to the Balance Sheet.

Assets are usually portrayed in order of liquidity. A common sequence used is:

Current Assets:
Cash,
Short Term Investments,
Receivables,
Inventories,
Other Current Assets,
such as prepaid expenses.

In a merchandising or manufacturing company, these current assets reflect the transformation of the resources that result in the sale of goods.

Fixed or Capital Assets:
Furniture, Fixtures,
Rolling Stock,
Equipment,
Buildings,
Land.

These are the assets that *enable* you to conduct your business. They are not sold but used.

And

Intangibles: (such as Goodwill, Copyrights, Trademarks, etc.)

On the right side of the Balance Sheet we find:

Liabilities: (shown in order of maturity)
Short-Term Debt
Medium-Term Debt

Long-Term Debt
Deferred Taxes
Note: Any prepayments of revenues you receive are also liabilities.

And

Equity: (i.e. that portion of the right side of the Balance Sheet that shows the "Owners'" funds.) The equity portion of the Balance Sheet is laid out differently for incorporated and non-incorporated businesses.
If the company is a sole ownership or partnership, equity shows the owners' "stake" in their business. (It, or a separate statement, shows the drawings and/or investments that the owners have made during the past year.)
If the company is a *Limited Company*, equity shows two things:
Contributed Capital—Money that the Owners invested in their company, and
Retained Earnings—Profits earned in the past which have been reinvested in the business on behalf of the owners.

To demonstrate the significance of the two quantities "Contributed Capital" and "Retained Earnings", consider the following two corporations of similar size. Let us assume that both companies are of equal age, i.e., they are both 10 years old.

All figures in millions of $

Company x Balance Sheet			
Assets	100	Liabilities	40
		Contributed Capital	10
		Retained Earnings	50
TOTAL	100	TOTAL	100

Company y Balance Sheet			
Assets	100	Liabilities	40
		Contributed Capital	55
		Retained Earnings	5
TOTAL	100	TOTAL	100

Note that the only differences between the two Balance Sheets are in the amounts of Contributed Capital and Retained Earnings. While there are several reasons that may have caused the differences to occur, consider the following possible scenarios:

Company x was started with an initial capital of $10 million and Company y with $55 million. Company x proved to be very successful and managed to reinvest $50 million of its profits to help finance its asset growth. Company y struggled during its existence and only managed to reinvest $5 million of its profits. Of course, other explanations and scenarios could account for the differences. Dividend Payout Policies, for example, impact the level of Retained Earnings.

The point, however, is that the relative amounts in the two accounts should be observed by the Analyst, and the reasons for their differences investigated.

Exercise #1C

Required:

From the alphabetical list below, construct a Balance Sheet in the framework provided.

	$
Accounts Payable	2
Cash and Securities	1
Contributed Capital	6
Deferred Taxes	1
Furniture and Fixtures	1
Goodwill	2
Inventories	3
Mortgage Loan (15 Years)	6
Plant and Equipment	7
Prepaid Expenses	1
Receivables	2
Retained Earnings	4
Truck Fleet	2

Balance Sheet

$	$
$	$
$	$
$	$
Total Current Assets	Total Liabilities
$	$
$	$
$	$
$	$
Total Fixed Assets	Total Equity
$	$

Total Assets $ = Total Liability & Equity $

1.3.1.2 Permanent vs. Temporary Accounts

All the assets, liabilities and equity numbers (or accounts) of the Balance Sheet are *permanent or real* accounts. They remain open or are in use as long as the

company has the particular asset, debt or investment that the account represents.

This brings us to the *temporary accounts* of a business. These we find in the Income Statement, i.e., the Revenue accounts and Expense accounts. These are temporary gathering places in which we keep track of a year's worth of Revenues and Expenditures in order to enable us to calculate at the end of the year how well we did. If we did well, the end result, NIAT (Net Income After Tax), will increase our worth (shown in the equity portion of our Balance Sheet). If we did not do well, the reverse will occur.

Similarly, if we give the owners of the business a reward (or a dividend) for their investment, it will reduce the "worth" of the company.

Let us consider a simple example of how "Permanent" Balance Sheet accounts and "Temporary" Income Statements accounts interact and influence one another.

Exercise #1D

Part Ⅰ

This exercise refers to the eight economic events described earlier. Note that every transaction causes two or more economic events to occur; for example:

a. A company pays for a newspaper advertisement on the day the advertisement is run.
   This would cause the following two events:
   (a) Incur an expense, (b) Disposing of Assets (cash).
b. A company receives cash from a shareowner as an additional investment in the business.
   This would cause what two events?
c. A company pays a creditor a partial payment on a loan by cheque.
   This would cause what two events?
d. A company receives cash from a customer as partial payment for goods ordered and delivered today.
   This would cause what two events?
e. A company billed a customer for goods ordered and delivered today.
   This would cause what two events?
f. A company paid office rent for the coming month by issuing a cheque.
   This would cause what two events?
g. A company paid the owner his usual monthly withdrawal for personal use.
   This would cause what two events?

While doing the next few exercises, it is useful to consider the following equation:

$	Old equity balance (at the end of the previous period)	
	+	
$	Revenues for the period	}
	−	} $ Income/Loss for the Period
$	Expenses for the period	}
	+	

$	Additional Investments by Shareowners
	–
$	Payment of Dividends to Shareowners
	=
$	New Equity Balance (at the end of the current period)

Part Ⅱ (Use the above equation for Parts Ⅱ and Ⅲ)

Four companies have the same Balance Sheet numbers, they are:

As on January 1st

		Liabilities	180 k
Assets	425 k	Equity	245 k

As on December 31st

		Liabilities	225 k
Assets	570 k	Equity	345 k

ABC Company: The owners did not withdraw nor did they invest any funds during the year.

BCD Company: The owners withdrew $35 k during the year.

CDE Company: The owners invested an additional $110 k during the year.

DEF Company: The owners withdrew $60 k and invested $15 k during the year.

Required: Calculate the net income or loss of each company for the year.

Part Ⅲ

One item is missing from each of the following companies' financial data:

EFG Company
Balance Sheet
As on January 1st

		Liabilities	260 k
Assets	370 k	Equity	110 k

EFG Company
Balance Sheet
As on December 31st

		Liabilities	165 k
Assets	355 k	Equity	190 k

During the year the following occurred:

Owners withdrew:	30 k	Revenues:	98 k
Owners Additional Investments:	?	Expenses:	73 k

Required: Calculate the missing number.

FGH Company
Balance Sheet
As on January 1st

		Liabilities	45 k
Assets	95 k	Equity	50 k

FGH Company
Balance Sheet
As on December 31st

		Liabilities	35 k
Assets	125 k	Equity	90 k

During the year the following occurred:

Owners withdrew:	8 k	Revenues:	?
Owners Additional Investments:	22 k	Expenses:	52 k

Required: Calculate the missing number.

1.3.2 An Important Observation about the Balance Sheet and the Income Statement

It is possible for a particular company to have a "strong/healthy" Balance Sheet and a "terrible/poor" Income Statement and vice versa, although, *in the long run, healthy Income Statements tend to produce healthy Balance Sheets and poor Income Statements will cause the deterioration of healthy Balance Sheets.*

Example:

GHI Company is a 30 year old, well established company whose competitive position has weakened steadily during the last few years.

Balance Sheet

Current Assets	50 M	Liabilities	60 M
		Equity	180 M
Capital Assets	150 M	This yr's loss	(40) M
Total	**200 M**	**Total**	**200 M**

HIJ Company is a 2 year old "young upstart" that has witnessed rapid growth, which of course brought growing pains with it.

Balance Sheet

Current Assets	2 M	Liabilities	12 M
		Equity	4 M
Capital Assets	18 M	This yr's profit	4 M
Total	**20 M**	**Total**	**20 M**

Income Statement	
Revenues	200 M
Expenses	240 M
Loss	(40) M

Income Statement	
Revenues	40 M
Expenses	36 M
Profit	4 M

There is little doubt that GHI's Balance Sheet is "stronger" than HIJ's. Its assets are only 30% financed with debt compared to (12/20) = 60% for HIJ. Yet, GHI's latest year's Income Statement eliminated (40/180) or more than 22% of its equity base, whereas HIJ's equity base was boosted by (4/4) = 100% in a single year as a result of a strong Income Statement.

1.4 Income Statement

The *Income Statement* portrays how well we have done during a given *period* (usually a year). This is quite different from the Balance Sheet, which is like a snapshot and reflects a *moment* in time.

Here is a simple yet useful metaphor:

Income Statements can be seen as a "score sheet" in which expenses are seen as "goals against" and revenues as "goals in favour." When a company "wins the game of business" (so to speak), its revenues must be larger than its expenses; this will produce a profit.

If it is the other way around and the company loses the game, it is because revenues minus expenses have produced a loss.

Just like on a scoreboard, while the game is in progress, we keep track of the *cumulative* totals of revenues and expenses. The scoreboard is set back at the end of the year to read "zero to zero" by closing the books and transferring the end result to our Balance Sheet in the retained earnings account.

Here is an example of a merchandising business Income Statement. In financial jargon, the following three amounts are called the: Top Line, the Middle Line, and the Bottom Line as indicated below to the left.

Dividends Paid and the amount transferred to Retained Earnings are usually not shown in the Income Statement, but are displayed in a separate statement.

Note: The existence of a Cost of Goods Sold line and the Gross Profit line in the Income Statement indicates that we are dealing with a merchandising company (i.e., it sells physical goods). A company that sells services does not have these two accounts in the Income Statement.

The separation of operating expenses into fixed and variable is for conceptual purposes only. For good reasons, financial statements do not show such a differentiation. We shall discuss the importance of Fixed vs. Variable Expenses later.

The Top Line		Sales or Revenues	$1,000 k
	(less)	* Cost of Goods Sold	– 600 k
		* Gross Profits (or Gross Margin)	400 k
	(less)	Operating Expenses (variable)	– 200 k
		Operating Expenses (fixed)	– 100 k
The Middle Line		Operating Income	
		Earnings Before Interest and Taxes (EBIT)	100 k
	(less)	Interest Expense	– 36 k
		Net Income Before Taxes (NIBT)	64 k
	(less)	Taxes (assume 40%)	– 25.6 k
The Bottom Line		Net Income After Taxes (NIAT)	38.4 k
	(less)	Dividends Paid	– 20 k
		Transferred to Retained Earnings (which is in the Balance Sheet)	18.4 k

1.5 Flow of Funds Statement

Now we introduce the *third* of the three statements, namely, the *Flow of Funds Statement* (preferably calculated on a *Cash* basis rather than on a working capital basis). This is the last, but certainly not the least, of the three statements used for analytical purposes in finance.

1.5.1 Example of a Flow of Funds Statement

The Worksheet: Helps you create this statement from two Balance Sheets.

Start by placing two Balance Sheets of a company beside each other and calculate the differences between corresponding accounts and place those differences in the last two columns. (L&E means Liabilities and Equities.)

Proof: The totals in the last two columns of the TOTALS line should equal.

The “flow of funds” that influenced the company during the year appears in the last two columns. Note that Sources always equal USES of funds.

	1990 Balance Sheet	1989 Balance Sheet	Decrease Assets or Increase L&E Sources	Percentage	Increase Assets or Decrease L&E Uses	Percentage
Cash and Mkt. Secs	2	5	3	21%		
Receivables	10	6			4	28%
Inventories	7	8	1	7%		
Gross Plant/Equip	28	20			8	58%
Accum. Depr.	(8)	(6)	2	14%		
Total Assets	39	33	Do not total this row			
Short Term Debt	5	6			1	7%
Long Term Debt	10	7	3	21%		
Contributed Capital	7	5	2	14%		
* Retained Earnings	17	15	3	21%	1	7%
Totals	39	33	14	100%	14	100%

* 1990 Income is 3 million; 1 million was paid in dividends. Note that instead of placing the "difference," i.e., increase in Retained Earnings of $2 in the "Sources Column" it is far more revealing to enter the NIAT for the period in the sources column, and the Dividends Paid for the period in the uses column.

One useful technique in interpreting the Flow of Funds Statement is to *restate* the sources and uses of funds *dollar amounts* as *percentages of their totals* and categorize them as follows:

Sources of Funds Are	Uses of Funds Are
(a) caused by lower current assets (mainly Receivables and Inventory),	(a) caused by higher current assets (mainly Receivables and Inventory),
(b) caused by lower capital assets (i.e., Plant and Equipment),	(b) caused by higher capital assets (i.e., Plant and Equipment),
(c) caused by higher short term debt,	(c) caused by lower short term debt,
(d) caused by higher long term debt,	(d) caused by lower long term debt,
(e) caused by new equity investments,	(e) caused by equity withdrawals,
(f) caused by profits.	(f) caused by dividend payouts.

The next step is to look at the relative magnitudes (percentages) of the sources and uses of funds and seek answers to the following key questions:

- "How much did operations contribute to the total sources of funds and did this share change significantly from last year?"
- "Was there a significant change in reliance on long- vs. short-term sources of funds, debt vs equity?"

- "How large a proportion of funds usage was devoted to additional plant and equipment and to what extent was this financed with internally generated funds rather than being financed externally?"
- "Has the company's liquidity, i.e., ability to meet sudden cash demands, strengthened or weakened?"

"Flow of Funds" analysis can provide answers to these questions more easily than the Balance Sheet or Income Statement.

Exercise #1E

January 1, 1997

Joe lives in a small village and decides to start its first taxi company. He contributes his sedan, worth $10,000, to the new enterprise and starts his business with $500 in the bank.

During the year 1997, his taxi business generated $20,000 worth of annual Revenues, incurred $4,000 worth of fuel expenses and $2,000 repair and maintenance expenses. Joe pays himself $12,000 in salary and has $1,000 of telephone expenses. The depreciation expense on the car is $3,000.

During the year 1998, his taxi business generated $28,000 worth of annual Revenues, incurred $6,000 fuel expenses and $3,000 repair and maintenance expenses. Joe pays himself $12,000 in annual salary and has $1,000 of telephone expenses. The depreciation expense on the car is $2,100.

Required:

Prepare the company's financial statements as on:

- December 31, 1997, and
- December 31, 1998

Exercise #1F

A company's Balance Sheets as on December 31st of 1993 and 1998 are as follows:

	1998	1993
Assets	$65 M	$40 M
Liabilities	33 M	18 M
Contributed Capital	10 M	5 M
Retained Earnings	22 M	17 M

Required:

Determine what proportion of the company's asset growth during that period was financed with:

(a) Debt,
(b) Sale of Shares,
(c) Reinvested Profits.

Exercise #1G

Required:

Use the data from Case Study #1 and perform a flow of funds analysis as indicated.

Exercise #1H

Required:

Use the data from Case Study #4 and perform a flow of funds analysis as indicated.

2 Financial Statements Analysis

Unit Objective: To be able to evaluate a company's performance in terms of its liquidity, asset productivity, profitability, use of leverage, and its ability to satisfy investors.

Key Words: Profitability, Liquidity Ratio, Financial Leverage, Operating Cycle, Payable Cycle, DuPont Approach

The *three financial statements* discussed so far allow us to *measure* various aspects of the company and give us a chance to evaluate the company's performance.

2.1 Five Key Attributes of Performance

Just as there are various ways in which we can describe a person, i.e., by evaluating his/her qualities such as speed, strength, stamina, etc., we try to describe a company by evaluating its attributes in such areas as *Productivity, Leverage*, *Liquidity, Profitability,* and *Value.*

Together these five aspects can produce a fairly clear picture of the company's strengths and weaknesses. This exercise is relatively easy in simple *black* and *white* situations where the company is either in "deep trouble" or is "basking in the sunshine of success." However, the analysis requires more subtle evaluation and judgment when we examine a company that seems to "do fairly well" to the layman but where there are several less obvious difficulties developing that could put this company in deep trouble.

Alternatively, the company that seems to "do rather poorly" can, in fact, have several less obvious opportunities and strengths that will, in due time, make the company a winner, if we only emphasize these hidden strengths.

These *five attributes* may be described as follows:

Liquidity	The company's ability to meet sudden cash demands.
Productivity	The company's ability to put its assets to good use, i.e., it measures Asset Productivity.
Profitability	The company's ability to generate satisfactory profits.
Leverage	The company's reliance on fixed commitments that can help or hurt its profitability, and the degree to which the company is financed with borrowed money.

C. Priester et al. (eds.), *Financial Strategies for the Manager*

Valuation — The value investors assign to the company. It expresses the desirability of the company in the eyes of its owners. This last attribute can only be measured for publicly traded corporations. (Private limited companies and unincorporated companies do not have a value established by a securities market. Their shares may, of course, have very substantial value if they change hands.)

Two approaches to analysis are often used:

The Inward Approach — It examines the company's performance over time (trend analysis) against its past record.

The Outward Approach — It examines and compares the company's performance with other companies in the industry (it can also be done using trends and past records).

Of the two techniques, the *inward approach* is more fruitful. he outward approach is often seriously flawed. Strong regional differences, size differences, and poor category differentiation often cause us to compare "apples with oranges" and come to false conclusions.

Let us use the following example to make this point.

John, after completing Grade 10, moved with his family to a new city, where he enrolled in a high school in September to start Grade 11. At the start of the school year, a comprehensive test is administered to all students. This test is compared with the overall average class grades obtained at the end of the school year upon completing Grade 11. The following data apply:

	Test at the Start of the Year	Average Class Grade after Completing Grade 11
Class Average	69%	74%
John's Score	60%	72%

Using the Outward Approach one could conclude that John's performance is below average. Yet, we could also say the class performance improved by [74/69-1] just over 7%. Whereas, John's performance improved by 20%. It may well be that the early handicap of unfamiliar surroundings is almost overcome and John could well excel next year.

Obviously, one ought to use both an Inward and Outward Approach in evaluating a corporation's performance, but ultimately the inward approach, if good data is available, is more revealing.

2.2 Liquidity

(The ability to handle near-term or sudden demands for cash—"ability to pay your bills.")

There are two *Quantity* Ratios that measure a company's liquidity:

(a) The Current Ratio (Current Assets/Current Liabilities)

(b) The Quick Ratio (Current Assets less Inventory/Current Liabilities)

Two less known liquidity ratios can be used in special circumstances. They are particularly useful in trend analysis to measure a company's cash management:

(c) Cash/Annual Credit Sales

(d) Cash/Total Current Assets

In recent years, due to modern communication technology and the increased use of electronic funds transfer, we have seen the dramatic reduction of operating cash levels in many companies. Obviously, this indicates better cash management and better use of the company's resources. The analyst must determine whether the reduction in relative and/or absolute cash and liquidity levels is due to efficient cash management or a sign of liquidity shortage.

When calculating the Current Ratio and Quick Ratio, a rising trend of the former and a falling trend of the latter can be a sign of trouble; it can indicate rising inventory levels and/or slower inventory turnover.

There are various Quality Ratios that can be looked at in conjunction with the Quantity Ratios.

- They measure the "quality" of the components that make up the current assets and liabilities. We do this by using such activity ratios as receivables Turnover and Inventory Turnover. (More about this later.)
- These Quality Ratios can be used to modify the two Quantity Ratios of above (more detailed examples will be given later).

2.2.1 A Useful Analogy

One useful way to think about Liquidity, or more specifically about the right (optimum) level of Operating Cash that a company ought to maintain, is to think of it as lubricating oil in an engine. No rational person would try to operate an engine with significantly more or less oil than it was designed for. Having too little might cause damaging "friction." In the case of operating cash: expensive overdrafts, bouncing checks, irritated suppliers, etc. Having too much operating cash is a simple waste of assets, the yield on surplus cash is negligible.

While few managers need to be convinced of the importance of sufficient cash balances, it is surprising how many of them do not realize the waste of unnecessary cash balances.

The computerization of accounting and banking has allowed many corporations to operate sophisticated cash management systems which optimize their cash

balances and avoid serious shortages and surpluses.

2.3 The Broad Strategy of Managing a Company's Operational Cash Flows

Corporations receive a continuous inflow of cash form their clients i.e., those that buy the goods and services the company sells. The company's aim should be to shorten the time that it takes for payment to be authorized by the paying customer and the moment that the company deposits the received funds into its bank account. Let us call this "speeding up the dollar inflow."

The second aim, it is often said, should be to "slow down the speed of the dollar outflow." To achieve this, some corporations adopt payment systems that are designed to lengthen the time between the moment that the paying company authorizes payment and the moment the recipient of the payment deposits it in its bank account.

I believe that the negative P.R. that this causes among the company's suppliers usually outweigh the financial benefits that this "slow down approach" generates.

2.4 Analytical Framework for "Speeding up the Dollar Inflow"

Example:

Suppose that a company receives $250 million per year in payment from its customers. This works out to an average daily cash inflow of ($250 M/365 days) = $685 k, rounded to the nearest thousand dollars. The average size of cheque received is $1,250, this works out to ($250 M/$1,250) = 200,000 cheques per year. Suppose that a careful examination of the cheques received indicates that on an average seven days elapse between authorization of a payment and the moment the cheques are deposited in our bank account.

Our aim is to improve, speed-up, this dollar inflow.

Suppose that at a cost of 75 cents per cheque received, we can shorten the "transit time" of the cheques from seven days to four days. This means that the receiving company "lays its hands," obtains the use of:

3 days × $685 k daily inflow = $2.055 M of money not just for three days but permanently i.e., throughout the year.

Suppose that this company's before-tax-asset-yield is 15%. By giving the company $2.055 M of funds that can be invested in working assets, the before tax profits should increase by 15% × $2.055 M or $308.25 k per year. Of course, we should subtract the cost of speeding up the inflow, 75 cents × 200,000 cheques = $150 k. This produced a net gain of $158.25 k before taxes.

One final observation: The benefits of "speeding up the dollar inflow" are often subject to strongly diminishing returns. Consequently, using our previous example, should we try to shave off one more day from the transit time, the extra cost of doing this may easily exceed the benefit that this one day speed-up would produce, which would be 1 day × \$685 k × 15% = \$57.75 k per year.

In their eagerness to speed up the dollar inflow, many corporations have failed to analyze the benefits and costs sufficiently and in fact have gone beyond the point of diminishing returns. Quite often this is caused by service providers that are eager to sell their cash collection systems to companies that fail to do their homework.

Exercise #2A

A corporation has annual credit sales of \$84 mil. The average size of each cheque received in payment is \$575. This company enjoys an Asset Yield of 16% per year. The company's banker suggests a new procedure that promises to speed up the cheque processing system at a cost of 50 cents per cheque handled.

Required:

By how many days should the "transit float" be reduced to make this procedure attractive to our company?

Exercise #2B

Required:

Determine a company's liquidity position given the following financial data:

	1998	1997
Cash	\$ 12 k	\$ 10 k
Marketable Securities	5 k	15 k
Receivables	110 k	80 k
Inventories	40 k	26 k
Prepaid Expenses	10 k	6 k
Accounts Payable	30 k	20 k
Other Short Term Debt	90 k	60 k
Sales (All on Credit)	800 k	700 k
Cost of Goods Sold	440 k	390 k

Exercise #2C

A company's annual cheque receipts are \$185 million. The company's Asset Yield is 14%. An analysis indicates that a two day reduction in the transit time can be achieved at a cost of 50 cents per cheque processed. A more sophisticated

collection system promises a three day cut in transit time at a cost of 90 cents per cheque processed. The average size of cheques received is $850.

Required:

Should the basic or more advanced cash collection system be adopted?

Exercise #2D

A company's current ratio is 2.04. Its annual Credit Sales of $12 million and Costs of Goods Sold of $8 million have resulted in Average Receivables and Inventory Balances of $3 million and $2 million respectively. Other current assets i.e., mainly Cash and Marketable Securities, total $0.1 million.

The following industry standards prevail in this type of business.

Average length of time that the receivables are unpaid: 40 days.

Average length of time inventories are unsold: 45 days.

The Average Current Ratio prevailing in this industry is: 1.25 x.

Required:

If we assume that the level of Current Liabilities that our company has is "normal" and reflects industry standards, can we conclude that our company's Current Ratio of 2.04 x, compared to the industry average of 1.25 x, represents superior above average liquidity for our company? Use a 360 day year throughout the analysis.

One final observation about liquidity. Some companies have operational characteristics that generate a lot of cash. "Cash cows" or "money spinners" are labels that are sometimes given to such companies. The question is, what is the best way to use this surplus cash?

Obviously, external market characteristics play a big role in making the best decisions. Building a cash reserve to finance future expansion may be a good idea, but such a company, if publicly held, may itself become a take-over target if it holds very high cash balances. Increased dividend payouts and/or share buy-backs are two strategies widely used to bolster the value of the company's shares where the company is publicly traded.

One final note. Surplus liquidity should never be held in cash form, but in the form of high quality short-term debt instruments which can be easily converted back into cash without loss of principal.

2.5 Financial Leverage

It measures the degree to which a company's assets are financed by its owners vs. the lenders. Here too, there are two approaches in evaluating a company's reliance on debt financing.

(a) The quantity approach looks at the balance sheet numbers. Some frequently used ratios are:

- (Debt/Assets)
- (Assets/Equity)
- (Liability/Equity)

Note that it is not necessary to calculate all three leverage *Quantity* Ratios, since they all measure the same thing—the degree that a company's assets are financed with borrowed money. (Assets/Equity) is probably the most useful of the three, since we shall use this ratio in our modified DuPont analysis, to be introduced later.

(b) The ability to service the cost of debt approach looks at the income statement. Some frequently used ratios are:

- (EBIT/annual interest charges)—called the "times interest earned," or "banker's ratio" or "Interest coverage"
- (Income available for fixed financing charges/fixed financing charges)

This second ratio is useful if a lot of assets are leased or there are big debt repayments, because fixed financing charges include interest expenses, lease payments, current period loan principal repayments.

Why do we use two approaches in measuring leverage?

While knowing how much debt a company has is no doubt useful, perhaps more important is this question:

"Can the company afford to carry the burden of this debt?"

The answer to this question is found in the "ability to service debt" approach.

While a single year's figure can be informative, a trend analysis of the figures that indicates an improving or deteriorating situation is far more revealing.

Observation: It is quite possible for a strongly performing corporation that relies heavily on debt financing to have weak Quantity Ratios and strong Ability Ratios measuring Financial Leverage.

Of course, a conservatively financed corporation whose operations perform poorly could produce the opposite situation.

Consider the following example:

IJK Corporation Balance Sheet				JKL Corporation Balance Sheet			
Assets	100 M	Liabilities	30 M	Assets	100 M	Liabilities	70 M
		Equity	70 M			Equity	30 M
Total	100 M	Total	100 M	Total	100 M	Total	100 M

Assume both corporations have an average borrowing rate of 8%. IJK is poor performer producing a disappointing asset yield (i.e.: EBIT/Assets) of only 7%; and JKL generates an impressive asset yield of 20%. The (partial) Income Statements of the two companies would be as follows:

IJK Corporation		**JKL Corporation**	
EBIT	7% × $100 M = $7 M	EBIT	20% × $100 = $20 M
Interest Exp	8% × $30 M = $2.4 M	Interest Exp	8% × $70 = $5.6 M

Quantity Ratio

30/100 = 30% Low reliance on debt financing	(Debt/Assets)	70/100 = 70% High reliance on debt financing

Ability to Carry the Burden of Debt

$7/$2.4 = 2.92 x (Lower)	(EBIT/Interest Expense)	$20/$5.6 = 3.57 x (Higher)

Obviously both ratios must be looked at in judging whether a corporation relies excessively or moderately on debt financing.

A observer once said that the use of financial leverage is not unlike the use of steroids among body builders. When used responsibly it enables body builders and corporations to significantly enhance their performances.

When used excessively they can have serious destructive consequences for the health of the athlete and the corporation.

Example:

Consider two corporations: KLM Company and LMN Company. Both companies have the same asset base of $100 M and both are equally well managed, producing a respectable asset yield (EBIT/Assets) of 15%. But, KLM finances 70% of its assets with debt, whereas for LMN only 30% are financed with debt. We shall assume similar borrowing rates of 8% interest, although it could be argued that KLM may well enjoy lower interest rates due to lower risk to the lender. The partial Income Statements would look as follows: we assume a 40% tax rate.

	KLM Company	Income Statement	LMN Company	
15% × $100	$15	EBIT	$15	
8% × $70	− 5.6	Interest Expense	− $2.4	8% × $30
	$9.4	NIBT	$12.6	
	3.76	Taxes @ 40%	$5.04	
	$5.64	NIAT	$7.56	
($5.64/$30)	= 18.8%	Return on Equity NIAT/Equity	10.8%	($7.56/$70)

Note that KLM, with its heavy reliance on debt financing gives its shareowners a hefty 18.8% return while LMN shareowners earn a more modest 10.8%. While this may be true "while the sun is shining" so to speak, in less sunny conditions, when the asset yield falls from its current 15% level, the decrease in ROE (Return on Equity) is far more rapid for KLM shareowners than for LMN shareholders.

Observation: While it is obvious that ROE (NIAT/Equity) can be increased through the use of financial leverage, i.e., by using more debt, it should be clearly understood that this causes the company to be more vulnerable to adverse economic conditions, be they external or internal.

In fact, companies that enjoy a sufficiently strong asset yield (EBIT/Assets) to produce good Returns on Equity without having to rely on debt, use their strong Balance Sheets to grow and prosper during difficult economic times. As their more vulnerable competitors see their share prices fall, the company with the strong Balance Sheet can raise the funds to take over the weaker companies at bargain prices. A wise manager once said, "corporate debt is a powerful drug that should be used very carefully."

Exercise #2E

Required:

Calculate at what level of asset yield % (EBIT/Asset) the ROE of KLM becomes less than the ROE of LMN.

A simple algebraic equation should provide you with the answer.

Exercise #2F

Required:

Put into a few sentences, 50 words or less, the essence of the topic on financial leverage.

Exercise #2G

Required:

Determine a company's financial leverage position in 1994 and 1998 given the following financial data.

	1998	1994
Assets	$700 k	$400 k
Liabilities	340 k	150 k
Equity	360 k	250 k
EBIT (Operating Income)	154 k	64 k
Interest Expenses	47 k	20 k

2.6 Activity or Productivity of Assets

In measuring productivity, we try to learn how hard the assets of the company are working in generating useful activity, i.e., generating revenues. Note that the financial statements do not show the most crucial asset of any company—the human resources. Yet, the productivity or *activity ratios come closest* to expressing the relative productivity of the human resources in the company.

Keep in mind that the only reason a company ought to own an asset is because the asset helps generate revenues and therefore, hopefully, profits for the company. Assets that do not (either directly or indirectly) help generate revenues have no business being owned by the company. An exception could be made for assets that promise to generate substantial future capital gains because of the appreciation of their value.

Warning: A rigorous examination of such appreciating assets often reveals that the realized annual capital appreciation rate of such long held "investments" very often turn out to be less than a company's long term average asset yield.

Yet, this sub-optimal investment strategy often is not rigorously re-evaluated from time to time. Many healthy, well performing corporations obtain average asset yields of 15% over the long term or more, while, few of those long held investments in non-revenue producing assets obtain compound annual appreciation rates of 15% or more.

In using *Activity Ratios,* we try to compare the *sales* or *revenues* of a company with a particular *asset* of the company.

The best known ratios that measure the activity or productivity of a company's assets are:

Inventory Turnover:* $\dfrac{\text{Annual Costs of Good Sold}}{\text{Average Inventory}}$

Receivable Turnover: $\dfrac{\text{Annual Credit Sales}}{\text{Average Receivables}}$

Fixed Asset Turnover: $\dfrac{\text{Annual Sales}}{\text{Fixed Assets}}$

$$\text{Asset Turnover:} \quad \frac{\text{Annual Sales or Revenues}}{\text{Total Assets}}$$

$$\text{Payables Turnover:} \quad \frac{\text{Annual Purchases or Cost of Goods Sold}}{\text{Average Payables}}$$

* Note that inventory turnover is occasionally calculated as (Sales/Average Inventory) simply because *cost of goods sold* is often not known to "outsider" financial analysts. Obviously, the ratio based on *cost of goods sold* is superior to the one based on *sales*. In comparing "cost of goods sold" with Inventories, you are comparing two figures expressed in "cost dollars." If we compare *sales* and inventories, we are relating retail dollars to cost dollars — like comparing apples and oranges. By using the (Sales to Inventory) ratio, you make your inventory turnover (i.e., the average number of days that your inventory is unsold) look much better than it really is.

Remember that these "turnover" ratios can also tell you whether the company has too much or too little tied up in a particular asset by comparing them with industry averages. We referred to this briefly in our discussion on Liquidity.

In general, higher turnover ratios indicate a positive trend. However, excessively high turnover ratios can indicate "overtrading" or an insufficient investment in certain necessary assets to the detriment of the company's operations.

A turnover ratio can be converted into an equivalent number of days. For instance, an inventory ratio of six times per year (say Cost of Goods Sold of 12 million divided by an Average Inventory of 2 million) reflects the fact that on average your inventory remains unsold for (360 days/6) = 60 days.

Similarly, a receivables turnover of (Credit Sales of 20 million divided by average receivables of 2.5 million) = 8 times per year reflects the situation that on average the receivables remain outstanding for (360 days/8) = 45 days.

Note that depending on the characteristics of the company being analyzed, one can come up with scores of "variations on a theme," i.e., less common activity ratios that deal with particular characteristics of a company.

For instance:

(Trucking Revenue/Truck Fleet Investment)

(Outside Maintenance Cost Avoided/Cost of Running a Maintenance Department)

are just a few examples of less common turnover ratios that allow you to evaluate the productivity of a particular investment in assets, as it relates to a trucking company.

Note: To make it simple, in finance, we often express a year as only 360 days.

2.7 The Operating Cycle

Somewhat related to Activity Ratios is the concept of the "operating cycle." This is particularly important to merchandisers, i.e., companies that sell goods rather than services. The operating cycle, when expressed in days, measures the time

required for a "cost dollar" invested in working capital to return to the company as a "revenue dollar" of cash.

In contrast to the "operating cycle in days," we can calculate the company's *Trade Payables Turnover*, i.e., the average length of time that the company's Trade Payables remain unpaid. For instance, suppose that this company's cost of goods sold of 12 million produce average trade payables of 3 million, i.e., four times per year which is equivalent to (360 days/4) = 90 days, we can say that this company pays it suppliers in approximately 90 days. Knowing this, we can make some tentative conclusions about the cash flow from operations for this company, and its liquidity.

Note: We make the assumption that a company's Annual cost of goods sold roughly equals its Annual Purchases of Merchandise, which is correct if there are no significant changes in the level of Inventory during the period under examination.

Exercise #2H

Required:

What conclusion can you draw about a company's working capital management and operating cycle given the following financial data?

	1998	1993
Sales (all on credit)	$840 k	$600 k
Cost of Goods Sold	504 k	360 k
Average Receivables	105 k	100 k
Average Inventories	56 k	45 k
Average Trade Payables	42 k	40 k

2.8 Observations about the Operating Cycle and Payable Cycle

The smaller the gap between the operating cycle and the payable cycle, the more comfortable a company's operational liquidity cycle.

In fact, a common reason why companies often fall into liquidity shortages as their receivables turnover slows down, i.e., customers take longer to pay their bills, is the increase in the operating cycle and the bigger gap between it and the company's payable cycle.

What about reducing the gap, and thus improving liquidity, by trying to lengthen the payable cycle i.e., slowing down payables turnover by making your suppliers of goods and services wait longer to get paid?

First you should realize that this is a widely followed strategy which, needless to say, does very little for the company's popularity and rating among its suppliers.

And, while one may "excuse" such behaviour when done by a company in a "liquidity pinch," the reality is that this "slow pay policy" is often followed by companies not suffering from liquidity problems.

In particular, we see abuses of this strategy by powerful corporations who possess the "clout" to deliberately ignore late payment penalties that frustrated suppliers try to add to their unpaid bills. The effects of such an abusive strategy are obvious.

The powerful buyer of goods and services by deliberately slowing down its payable turnover succeeds in forcing its suppliers to grant it "interest free loans." —loans that such suppliers are often in no position to afford.

2.8.1 An Example

Gigantic Department Store has annual sales of $720 million which produce costs of goods sold of $360 million. Suppose the average credit terms under which this merchandise is bought from its suppliers is "net 45 days" which translates into a payable turnover of 8 x per year. Suppose Gigantic deliberately waits 90 days before paying its bills and let us assume that the company possesses the "economic clout" to get away with it while ignoring late payment penalties. This is not an unrealistic assumption.

2.8.2 The Effect of this Strategy

Gigantic's Average Payables Balance on its Balance Sheet if it paid on time i.e., after 45 days, would be:

$$\$360\ M/8\ x = \$45\ M$$

Gigantic's actual Average Payables Balance when paying in 90 days is:

$$\$360\ M/4\ x = \$90\ M$$

This gives Gigantic an interest free loan granted by its suppliers of the difference, i.e., $45 million.

Assuming an average borrowing rate of say 7% per year, this would result in an economic benefit to Gigantic of 7% × $45 M = $3.15 M and a burden of perhaps more than $3.15 M to the suppliers, since their borrowing rate may well be higher than 7% per year. Who says life has to be fair?

We should note, however, that many successful corporations follow deliberate policies of "extra fast payment" to suppliers and they have found that the benefits of such a policy, i.e., goodwill, better service, better deals, quite often outweigh the additional interest costs that such a policy brings to the corporation.

2.8.3 Another Example

Friendly Manufacturing Ltd. has nurtured good relations with its suppliers. This company has about $300 M in annual purchases. The norm among suppliers in this industry that sell goods to corporate buyers is to ship on terms of "net 40 days."

Friendly, as a policy matter, pays its bills in seven days instead. It discovered a long time ago that the goodwill it generated among its suppliers translated into better service, and better prices; the suppliers will go the extra mile to accommodate Friendly's needs. What would the cost of such a "fast-pay" policy be?

Average Accounts Payable balances if bills are paid in 40 days equals (40/360) × $300 M = $33.3 M.

Average Accounts Payable balances if bills are paid in seven days equals (7/360) × $300 M = $5.83 M.

The effect of this to Friendly is a *reduction* in free credit given by suppliers of ($33.3 M – $5.83 M) = $27.5 M.

If we assume that Friendly's Average Borrowing Rate is 8% per year this would work out to (8% × $27.5 M) = $2.2 M per year.

Certainly not an insignificant amount, this works out to ($2.2 M / $300 M) =0.73 of 1% of its annual purchases.

One further item of interest should be mentioned here. The $300 M of purchases from its suppliers found its way into $800 M worth of finished goods sales. Now the extra cost of $2.2 M represents only ($2.2 M/$800 M) =0.275 of 1% of annual sales.

Friendly's management believes that the "intangible" benefits received from its loyal suppliers clearly outweigh the $2.2 M extra cost incurred in adopting the fast-pay policy.

2.9 Profitability

Profitability of a company can be measured and expressed in several different ways. The *key ratio* which overshadows all others in importance is the profitability of the owners' investment in the business, Return on Equity, (which is NIAT available to *common shareholders / Equity which belongs to the common shareholders). Here are some other frequently used measures of profitability.

Name of Ratio	Ratio
Gross Profit Margin (GPM)	(Gross Profits/Sales)
Operating Profit Margin (OPM)	(EBIT/Sales)
Net Profit Margin (NPM)	(NIAT/Sales)
Asset Yield	(EBIT/Assets)
Return on Assets	(NIAT/Assets)
Return on Equity	(NIAT/Equity)

* The reference to common shareholder is made here in order to accommodate the situation where there are preferred shares. If not, the reference to common may be deleted.

As you can see, there are three "margin ratios" which compare two numbers from the Income Statements, and three "Return or Yield Ratios" which compare an Income Statement number with a Balance Sheet number.

A somewhat related ratio that measures a company's ability to control *operating efficiency* is:

(Operating Expenses/Operating Revenues or Sales)

Or

(Variable Operating Expenses/Operating Revenues or Sales)

Or

If you want to measure *departmental ability* to control operating efficiency,

(Controllable Departmental Operating Expenses/Departmental Output in dollars or units of work)

Obviously, when looking at a trend of the ratios and returns, one may safely say that in general the higher the value of the number, the better the performance. Of course, the opposite is true for the efficiency ratio; here we say the lower the number the better the performance.

The *Operating Profit Margin* (Operating Income or EBIT/Operating Revenues or Sales) is a useful yardstick in situations where a company has *other* sources of revenues and costs that reflect *sideline* activities not closely tied to the main activity of the company: for instance, property income and its related costs, earned by a merchandising company that happens to own some rental property. By ignoring these two items and looking at operating numbers only, you can *focus* on the *main activity* of the enterprise. It allows you to judge its performance unclouded by the sideline activities of the company.

Return on Equity (NIAT/Equity) is the key yardstick that ought to be used by the owners (investors of the company). It measures their reward (yield) earned on investments in the company.

Observation: A company's return on equity ought to *exceed* the "safe" returns available on government bonds by a sufficiently large margin to *reward* the investor for his risk exposure. Surprisingly, one occasionally finds investors patiently earning a return on equity far below zero risk after tax yields obtained from government bonds. In such circumstances, particularly if they prevail over extended periods, one is justified to ask, "Why do they bother?"

Exercise #2I

Required:

Calculate a company's Gross Profit Margin, Operating Efficiency Ratio, Operating Profit Margin and Net Profit Margin for the years 1989 and 1990, given the following data:

	1990	1989
Sales (all on credit)	$ 480 k	$ 420 k
Cost of Goods Sold	264 k	210 k
Gross Profits	216 k	210 k
Operating Expenses	182.4 k	176.4 k
EBIT	33.6 k	33.6 k
Interest Expenses	14.4 k	8.4 k
NIBT	19.2 k	25.2 k
Taxes	9.6 k	12.6 k
NIAT	9.6 k	12.6 k

Exercise #2J

Use the financial statements of electronic distributors (case study #4) and calculate the company's Gross Profit Margin, Operating Efficiency Ratio, Operating Profit Margin, also look at a New Ratio (Interest Expense/Sales) sometimes called the debt-burden, and finally the Net Profit Margin. Also calculate the relative size of the change in the ratio, both for 1993 and 1998 and draw some conclusions from the figures you obtain.

2.10 The DuPont Approach to Performance Analysis

The DuPont approach to performance analysis integrates the three attributes—*productivity, profitability* and *leverage*—in order to understand financial strategy.

The DuPont system shows that "the investors return on equity is influenced by *three aspects* of the company: *"Sales Volume in Relation to Assets," "Sales Profitability"* and the *"Financial Leverage Factor."*

Let us put it in another way. A company's *Return on Equity* is governed by three key factors:

(a) How many dollars of Sales does each dollar of Assets generate (i.e., the volume factor).

(b) How many cents of after tax profit does every dollar of Sales generate (i.e., the profit margin factor).

(c) How many dollars of Assets does the company have for every dollar of owners'/investors' money (i.e., the financial leverage factor).

Expressed as a formula, it reads:

$$\text{ROE} = \text{Return on Equity} = \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{NIAT}}{\text{Sales}} \times \frac{\text{Assets}}{\text{Equity}} = \frac{\text{NIAT}}{\text{Equity}}$$

The equation is far more than a simple mathematical trick of multiplying three ratios together to obtain a fourth ratio. *Understanding the interrelationship is fundamental to understanding financial strategy.*

In financial strategy, we are trying to maximize the ROE in the long run. To achieve this, we pursue various courses of action that enable us to raise one (or two) of the three ratios without too serious a decline in the others. This is easier said than done. Usually the attempt to raise one of the three ratios brings about a drop in the others. *Successful financial strategy* creates a favourable trade-off, whereby a 10% increase in asset turnover for instance is "bought" at a cost of only a 3% drop in sales profitability, resulting in a higher ROE.

As the three ratios of the DuPont system indicate, in financial strategy we can focus on the volume factor of a company (Sales/Assets) and pursue volume driven policies that cause the company's sales per dollar of assets to rise, while guarding against or minimizing the erosion in the net profit margin (NIAT/Sales) that these policies could cause.

The *reverse approach* is, of course, always possible. We can pursue policies that boost our net profit margin (NIAT/Sales) while trying to minimize the erosion in the volume factor (Sales/Assets) that these policies can cause.

Changes in the financial leverage factor of a company (Assets/Equity), particularly when they cause more reliance on debt, can negatively effect the net profit margin factor because of higher interest cost and can seriously affect a company's exposure to risk, particularly if a higher financial leverage multiplier causes the *interest rate of the company to rise* as lenders react negatively to the company's higher risk exposure.

The following schematic presentation shows how a company can pursue a "volume strategy," a "margin strategy" and a "leverage strategy", and provides some descriptions, observations and comments about these three strategies. Of course, it is rare that a company would pursue only one strategy; a combination of two or three strategies is always the result if a company decides on a significant change of direction to improve its performance.

Note: The following two pages should be read together.

Dupont System	The following table shows a schematic perspective of the modified DuPont system		
NIAT Equity	(Sales) × (Assets)	(NIAT) × (Sales)	(Assets) × (Equity)
Name of Ratio	Volume or Asset Turnover	Net Profit Margin	Financial Leverage
How to Improve (or Raise) the Ratio	• ↑ sales • ↓ assets	• ↑ sales, keep fixed costs constant • ↓ expenses, hold sales constant • ↓ sales of less profitable items • ↑ sales of more profitable items	• ↓ equity by replacing, i.e., with debt • ↓ assets (sell off) and use proceeds to retire equity • ↑ assets using high ratio of debt financing • ↑ debt financing
General Description of strategy	Marketing (↑ Sales) Approaches • ↑ unit of sales • increase prices • promotion, advertising programs • introduce new products or services ↓ Assets Approaches • ↓ (sell off) assets • use existing assets more efficiently • ↓ get rid of redundant or less efficient assets • ↓ amount of investment in new assets • focus on realizing economies of scale on existing assets	Marketing (↑ Sales) Approaches • Introduce new products where there is less competition (higher profit margins) • pricing, push items or ↑ prices of goods which are price inelastic • drop less profitable items, product lines or departments ↑ Net Income After Taxes (↓ Expenses) • ↓ discretionary spending • ↓ the slack in budgets • ↑ importance of budgeting • cut budgets • ↑ sales of items with low variable costs • contract out activities which have high fixed costs associated with them (unless realizing economies of scale)	↓ Equity Approach • buy back and retire common shares • sell off assets and use a high proportion of proceeds to retire common shares • pay large amounts of dividends, perhaps borrow funds to pay such dividends ↑ Debt Load (Relative to Equity) • issue debt and use funds to retire common shares • make all new investment in assets using a high ratio of debt financing

Continued

	Volume	Margin	Fin. Leverage
General Comments and Observations	• these strategies can focus on short (↑ sales) or long (↓ assets) term • strategies to increase the efficiency and utilization of assets are easier for managers to implement as they directly control the use of their assets • with increasing market/product specialization, marketing strategies must be continually updated and the market place is extremely dynamic	• budgeting remains the most effective strategy to improve profitability • budgeting can reduce the willingness of managers to take risks • effective budgeting requires a high degree of trust and cooperation; it is not a constructive exercise without changes in attitude • do not cut out or reduce expenses which may be vital to the organization's survival	• strategies in this area are long run in focus and cannot be easily reversed • strategies in this area affect the risk (possibility of financial difficulty) of the organization • strategies in this area are almost exclusively in the domain of the most senior/executive managers • ↑ The Degree of Leverage Leads to an ↑ In the Risk of the Business, Which Can Lead to a ↓ in The Price of Its Shares

Exercise #2K

Required:

Using the Modified DuPont Analysis, examine the financial performance of the following two companies whose financial data are as follows. All figures are in multiples of $1,000:

Scenario #1	Bishop & Co.	
	1990	1988
Revenues	$ 440 k	$ 350 k
Expenses	– 418 k	– 336 k
NIAT	22 k	14 k
Assets	480 k	250 k
Liabilities	270 k	130 k
Equity	210 k	120 k

During 1989 and 1990, total NIAT was $40 k; total dividends paid were 10 k; 60 k additional investment was made by shareowners.

Scenario #2	Cardinal & Co.	
	1990	1988
Revenues	$ 570 k	$ 280 k
Expenses	– 522 k	– 268 k
NIAT	18 k	12 k
Assets	216 k	230 k
Liabilities	96 k	125 k
Equity	120 k	105 k

During 1989 and 1990, total NIAT earned was 40 k; total dividends paid were 25 k.

3 A Systematic Approach to Financial Performance Appraisal of a Company Based on Trend Analysis

Unit Objective: To understand how to use a comprehensive and systematic method to perform a financial statement analysis of a company.

Key Words: Return on Equity (ROE), Price/Earning Ratio (P/E), Market Value/Book Value

3.1 Introduction

Using financial ratios in order to assess a corporation's "health" and "performance" is often done in a haphazard manner in which a clear view of these two aspects is often obscured. I believe that this systematic approach may bring some clarity to this activity and produce a better understanding of the key factors that govern corporate financial performance. Ideally, this ratio analysis should cover a period of at least three years, although useful insights can be gained for shorter periods too.

The overall criterion of performance that will be used is ROE (net income after tax available to common shareholders divided by common shareholders' equity). ROE is a function of the following three factors:

(a) The dollars of sales (revenues) generated by each single dollar of the company's assets.

(b) The cents of after tax profits common shareholders earn from each single dollar of the company's sales or revenues.

(c) The number of dollars of assets that each dollars of owner's equity controls.

In short:

$$\text{ROE} = (\text{NIAT/Equity}) = (\text{Sales/Assets}) \times (\text{NIAT/Sales}) \times (\text{Assets/Equity})$$

To make it simple, let us give each of the three factors a name:

(Sales/Assets)	=	Volume Factor
(NIAT/Sales)	=	Profit Margin Factor
(Assets/Equity)	=	Financial Leverage Factor or Financial Leverage Multiplier

For analytical purposes, when one tries to evaluate a company's performance, one ought to calculate the quantities of the three factors over a period of at least three to four years (if the data are available, of course).

C. Priester et al. (eds.), *Financial Strategies for the Manager*

3.2 This Systematic Approach Involves Four Stages and Is Best Explained By Using an Example

Suppose a company had the following performance during the years 1991, 1992, 1993, and 1994.

ROE	$=\left[\frac{\text{NIAT}}{Equity}\right]$	$=\left[\frac{Sales}{Assets}\right]\times\left[\frac{\text{NIAT}}{Sales}\right]$	$\times\left[\frac{Assets}{Equity}\right]$
1991	14.7%	$\frac{1.5\times 7\%}{10.5\%\text{ROA}}$	× 1.4
1992	15.3%	$\frac{1.6\times 6\%}{9.6\%\text{ROA}}$	× 1.6
1993	16.15%	$\frac{1.7\times 5\%}{8.5\%\text{ROA}}$	× 1.9
1994	15.84%	$\frac{1.8\times 4\%}{7.2\%\text{ROA}}$	× 2.2

Note: The ROA referred to in the above figures is the Return on Assets (NIAT/Assets) which is the product of $\left(\frac{Sales}{Assets}\right)\times\left(\frac{\text{NIAT}}{Sales}\right)$

3.2.1 Stage One

If we strictly focus on this company's ROE performance, we might be "fooled" in believing that this company's financial performance is quite satisfactory. Three years of satisfactory increases followed by a small drop of less than 0.3 of 1%. Closer examination of this company's performance, however, reveals that the *product* of the *first two* factors (the volume factor × net profit margin factor = NIAT/Assets = Return on Assets) has steadily weakened during the four years, from 10.5% to 9.6% to 8.5% to 7.2%, making it quite an unsatisfactory performance. The only thing that prevented this company's ROE from falling during those first three years was this company's steadily rising Financial Leverage Multiplier. That is, the company relied increasingly on Debt to finance its assets. But, even an increase in the Financial Leverage Multiplier in 1994 from 1.9 to 2.2 was not enough to prevent a drop in ROE from 16.15% to 15.84%.

This completes the first stage of the analysis. In this stage, we compare the "volume," "margin" and "leverage" factors that produce ROE and try to reach broad conclusions about each of these factors' behaviour *and* their relationship to

each other. In this case, we have determined that the company's *volume factor* improved, but this was probably "bought at the expense of" the company's weakening *profit margin factor.* The only thing that "saved" the company's ROE was the company's rising *Financial Leverage Multiplier* (at least during the first three years).

3.2.2 Stage Two

Here, we focus on the first of three key factors that govern ROE, namely the *volume* factor (Sales/Assets). To put it differently, "How many dollars of sales does each dollar of assets generate per year?"

The *volume factor* is strongly influenced by the speed of the company's operating cycle, which in a merchandising business is made up of the average number of days the company's inventory remains unsold added to the average number of days the company's receivables remain unpaid. The two numbers of days are calculated as follows:

$$\left[\frac{\text{Average Receivables}}{\text{Annual Credit Sales}}\right] \times 360 \text{ days} = X \text{ days}$$

X equals the average number of days receivables are unpaid.

$$\left[\frac{\text{Average Inventories}}{\text{Annual Cost of Goods Sold}}\right] \times 360 \text{ days} = Y \text{ days}$$

Y equals the average number of days inventories are unsold.

The length of a company's operating cycle is the sum of $X + Y$ days.

Obviously, the faster the operating cycle (the fewer number of days), the more sales are generated by the company's assets (the stronger the *volume* factor).

Another key ratio that influences the *volume factor* is the company's Fixed Asset Turnover (Sales or Revenues/Net Fixed Assets). It gives you a possible indication about *over* or *under* investment in the company's plant and equipment. Watch for the existence of *leased* fixed assets, their value should be imputed and added to *owned* fixed assets if it was not already done.

Another thing to keep in mind when evaluating a company's Fixed Asset Turnover, and thereby the productivity of the Fixed Assets to generate sales, is the fact that the annual depreciation charges steadily lower the value of the company's Net Fixed Assets. Due to this, even if the Sales remained unchanged, the Fixed Asset Turnover would increase suggesting improving productivity. Obviously, the analyst must keep this in mind and compensate for this.

Equally important is the fact that, if a company acquires new non-depreciated fixed assets, the resulting increase in the Net Fixed Assets would cause the Fixed

Asset Turnover to drop, unless the new acquisition caused an immediate increase in sales.

In Stage Two, it is also appropriate to examine the average length of time that the company's Trade Payables remain unpaid. For that we look at the relative levels of the company's Average Trade Payables and the company's Annual Purchases (or Annual Cost of Goods Sold if there are no dramatic changes in the company's inventory levels).

$$\left[\frac{\text{Average Trade Payables}}{\text{Annual Purchase of Merchandise}}\right] \times 360 \text{ days} = Z \text{ days}$$

where Z days is the average length of time the company's suppliers of merchandise remain unpaid.

A comparison of the length of time of the operating cycle (X days + Y days) with the level of Z days obviously allows us to make conclusions about a company's working capital management and its liquidity position, particularly if we have several year's worth of data.

This concludes Stage Two. By examining and comparing with past year's numbers, the company's operating cycle speed, the payable speed, and its fixed asset turnover, we can get an idea of the strengthening or weakening of the *volume* factor, and its underlying reasons therefore. Remember, often an *increase* in the volume factor is "bought with" a sacrificed or weakened *profit margin factor* (volume is bought with lower prices).

3.2.3 Stage Three

Here, we focus on the *second of the three* factors that govern ROE, namely, the *profit margin factor* (NIAT/Sales) or "How many cents after tax profit does each dollar of sales generate for the common shareholders?" Again, comparative analysis with past performance must be done. A number of ratios need to be examined. The first is the *gross profit margin*, (obviously, this *only* applies to companies that sell goods), (Gross Profit/Sales) which can give you an indication whether the company has deliberately changed its "*pricing strategy*," i.e. to higher *markups* perhaps, if the market allows it; or to lower markups perhaps, in the hope of boosting volume.

Another possibility that can be revealed by a changing Gross Profit Margin is the existence (or absence of) a "margin squeeze" that the company faces. This occurs if the competitive market conditions that the company faces do not allow it to pass on higher "costs of goods sold." If this is the case, falling gross profit margins are often the result. Industry price wars to obtain market share are often accompanied by margin squeezes.

The next ratio that bears watching is the *operational efficiency ratio* (Operating

Expenses/Sales or Revenues). It tells you, "How many cents of each sales dollar are used to pay for the operating costs of the company." It can be a powerful indicator of operational efficiency. Many companies have managed to compensate for lower gross profits by becoming more efficient in the running of their operations and this ratio can clearly indicate if the company can successfully overcome a margin squeeze through superior operating efficiency.

Obviously, after a look at the Gross Profit Margin and the Operational Efficiency Ratio the next logical ratio that becomes available is the Operating Profit Margin (i.e., Operating Income or EBIT/Sales or Revenues).

Any conclusions that you made by looking at the first two ratios will be confirmed by the (Ebit/Sales) ratios that you calculate. The ratio tells you how many "cents of operating income each dollar of sales" generates. Out of this number the company must pay interest expenses and taxes before there is anything left over for the shareholders.

A useful ratio is the (Interest Expense/Sales) ratio which is sometimes called the "interest burden", particularly when this ratio is looked at over a certain length of time.

It tells you the proportion, out of a dollar's worth of sales that is spent on interest expenses. This number can be quite revealing, particularly if the ratio is rising significantly during that period.

This leads us to the Net Profit Margin (Niat/Sales), that is, the cents of after tax income generated by a dollar's worth of sales. Remember, this was the second of the three DuPont ratios that we calculated in Stage One. This concludes Stage Three.

3.2.4 Stage Four

Stage Four examines the third of the three factors that govern ROE—the Financial Leverage Multiplier (Assets/Equity) or "How many dollars of assets does each dollar of owner's equity control?" Again, an analysis of past year's numbers is essential. Changes in (Assets/Equity) can come about either deliberately or as a result of good luck, or misfortune and trouble. If deliberate, we often have a situation in which a company's operating income/ratio (or Ebit/Assets) is quite high, i.e., the assets are producing a return that easily exceeds the company's pre-tax cost of debt and cost of capital. If this situation is accompanied by a steady *increase* in (Assets/Equity), we may assume that the owners *deliberately* want to revise the Financial Leverage Multiplier in order to raise the company's ROE.

Such owners may embrace more risk by using less of their own funds and using more borrowed funds. Confirmation of this policy may sometimes be found by a strong asset expansion that is largely financed by debt and/or rather

generous dividend payout ratios (Div.Paid/Niat). This would signal more reliance on debt financing and less reliance on internal financing. Such a policy is only justifiable if accompanied by a strong asset yield (i.e., Ebit/Assets).

If the situation of a satisfactory, pre-tax and pre-interest, Asset Yield (Ebit/Assets) is accompanied by a decrease in Financial Leverage (Assets/Equity) ratio, the owners deliberately choose to *lower* their Financial Leverage Multiplier. They are willing to sacrifice ROE for a reduction in risk by reducing their reliance on borrowed money. Low and even stingy dividend payout ratios, and marked reductions in total debt, would clearly signal such a policy. This is sometimes called Bullet-proofing the balance sheet.

What if the change in Financial Leverage (Assets/Equity) is not deliberate but instead the by-product of a company in trouble? Clearly the first thing to look for is in (Ebit/Assets) and or (NIAT/Assets). You may recall that in the beginning of this article, we portrayed example numbers that showed (NIAT/Assets) = Return on Assets, steadily weakening from 10.5% to 9.6% to 8.5% to 7.2%. While we did not give (Ebit/Assets) numbers, we may safely assume that that trend was likely downward too.

In that example, we had a situation where the company's increasing reliance on debt, i.e., rising Financial Leverage Multiplier, was brought about by the operational difficulties of the company. It pays in these circumstances to look at the (Interest Expense/Sales) ratio which will likely show increases, or alternatively look at the interest coverage ratio (Ebit/Interest EXP.) which also will likely indicate trouble with excessive debt. Such deterioration occurs for *two* reasons:

(a) Because of the rising amount of debt, and a worsening credit rating,

(b) Because of the rising *interest* rate.

The rising interest rate may reflect lenders discriminating against the company's rising probability to risk and vulnerability. Of course, external factors could also be a reason.

The other two ratios which can be useful in an evaluation of a company's reliance on debt financing are: the Average Before Tax Borrowing Rate or, (Interest Expense Per Year/Average Level of Total Debt). Particularly, when looked at over time, it can reveal significant trends, especially when the figures are corrected for changes in interest rates that occurred throughout the whole economy.

Another ratio examines the company's (*Short vs. Long Term Borrowing Mix*). A one year term differentiates one loan from the other. Generally speaking, short term financing is easier to obtain and carries a lower interest rate than long term debt, particularly in the case of maturity rates in excess of five years. Yet, in spite of this, if given the opportunity to obtain long term debt instead of short term financing, corporations should do so. Usually, the stability and certainty of long term debt financing are well worth the extra interest cost. Of course, exceptions can be made if it is certain that the need for financing is strictly temporary, in which case, short term debt financing should be used. However, experience has

shown that in many cases where it was thought that the need for financing was strictly short term, it turned out that the "strictly short term" period expanded significantly and the borrower had to "return to the well" repeatedly. No discussion of debt financing should fail to point out, however, that lack of access to long term debt is one of the biggest handicaps with which small to medium size corporations have to cope. *This concludes Stage Four.*

Stages two, three and four should have shed some light on the changes you observed in Stage One and hopefully allowed you to pinpoint factors that explain the reasons for the company's under or over performance in the three aspects: Volume, Margin and Financial Leverage.

The figure below portrays this four stage systematic approach in schematic form:

	STAGE Ⅱ	STAGE Ⅲ	STAGE Ⅳ	
STAGE Ⅰ	S/A	NIAT/S	A/E	= ROE
YR 1	__X	__%	__X	__%
YR 2	__X	__%	__X	__%
	Look at: Receivables Turnover Inventory Turnover Fixed Asset Turnover To determine: Asset Productivity	Look at: Gross Profit Margin Operating Profit Margin Operating Cost Efficiency Determine if there is a Pricing Margin Squeeze	Look at: Interest Coverage and Interest Cost +/OR Fixed Charge Coverage which includes Lease Payments + Principle Repayments, also Short-term Debt vs. Long-term Debt Mix	

FOR AN EXAMPLE OF A FOUR STAGE DUPONT ANALYSIS.

3.2.5 An Additional Analysis—Liquidity

One other contributing factor should be covered in the systematic analysis—*Liquidity*, i.e., the company's ability to meet immediate cash demands. While no specific liquidity ratios were mentioned in the previous four stages of analysis, a company's liquidity position obviously reflects the underlying strength and health of the company's financial and operational performance. The two standard, well known, and often used "yardsticks" of liquidity—the Current Ratio (Current Assets/Current Liabilities) and the Quick Ratio (Current Assets—Inventories/Current Liabilities)—ought to be calculated. They may give an immediate

impression of the company's liquidity position (i.e., a rising trend over time generally reflects stronger liquidity, but exclusive reliance on these two ratios can lead to two erroneous conclusions). Because these two ratios merely consider the size of current assets, (cash and receivables and inventories), and have little to say about the "quality" or "relative sizes" of these three assets, an analyst ought to *combine* the two liquidity ratios with the Receivables Turnover, Inventories Turnover, and Payables Turnover to get an idea of the "quality" of the accounts that make up for the company's working capital.

3.2.6 Valuation Ratios

Valuation Ratios are used to measure the degree to which investors value their investment in a publicly traded company. Two ratios, the "Price/Earnings Ratio" and the "per share *Market Value/Book Value*" serve to express the *investors' opinion* of the results portrayed by all the previous ratios combined.

These two Ratios reflect how desirable the company is in the eyes of the investors. Partially they reflect to a certain extent the historical performance of the company, but *mostly* they reflect shareholders *expectations* about the future performance of "their company."

$$\text{P/E Ratio} = \frac{\text{Market Value per Common Share}}{\text{Earnings Available per Common Share}^{*}}$$

$$\frac{\text{MV per Share}}{\text{BV per Share}} = \frac{\text{Market Value per Common Share}}{\text{Book Value per Common Share}^{**}}$$

(also known as the "Market to Book" ratio)

* Do not confuse earnings per share with dividends per share; dividends per share usually are less than half the earnings per share.

** Book Value is the so called "accounting value" of each common share outstanding.

Someone once labelled the P/E ratio a "popularity index"—it reflects the esteem and optimism (or lack of it) that investors have in their share investment of a company. A high P/E multiple, say 20 times, tells you that an investor is willing to pay $20 for $1 of the company's per share earnings.

Note the reference to the Common Share in these ratios. If a corporation has Preferred Shares outstanding, the claims of those preferred shareholders should be subtracted from both the company's Earnings and the Net Book Value of the company's equity.

An MV/BV per share ratio of more than 100% tells you that the investors assign a value to their share over and above its accounting value. This is usually caused by expectations of future earnings that the investors are hoping for.

An MV/BV per share of less than 100% reflects a poor investor's opinion,

perhaps over past performance, but more likely over the future prospects of the company. Should this latter situation be accompanied by a *Net Realizable Value* per share (NRV per share) that is considerably higher than the MV per share (a situation not unheard of in a severely depressed, oversold stock situation), we have a situation where the company is "worth more dead than alive," to the shareholder. A liquidating dividend would net him more than the shares' current value. Of course, this could be a temporary condition that may reverse itself.

Most often a company's P/E Ratio is compared with the P/E Ratios of *similar* companies prevailing today. (Average P/E Ratios of the *entire* stock market are a *less* desirable yardstick of comparison for obvious reasons). A company whose P/E is significantly *less* than its competitors in the industry has a share value that is "relatively cheap" compared with the other company's share prices. The analyst must then decide whether this "cheapness" represents a true bargain and therefore an opportunity for potential profit *OR* whether the cheapness reflects an inherent weakness in the company's ability to generate future profits in comparison with its competitors.

We deliberately avoid the whole issue of an entire stock market's average P/E level. This subject is best covered in a securities course. Suffice to say that a particular company's P/E ratio can be "swept-up" or "pushed-down" if there is a significant change of investor sentiment toward the stock market in general.

Exercise #3A

Required:

Fill in the blanks in the two columns below pertaining to Alpha Ltd. Alpha Ltd.'s shares trade on the stock exchange. Also assess the company's standing in the opinion of investors.

	1996	1998
Assets (Book Values)	$6 M	$8 M
Liabilities	4 M	4.8 M
Equity	2 M	3.2 M
NIAT	$200 k	$480 k
Market Value per Share	1.40	3.68
No. of shares outstanding	1 M	1.2 M
Assets (net realized value)	6.5 M	8 M
BV per share	—	—
NRV per share	—	—
MV/BV per share	—	—
EPS	—	—
P/E Ratio	—	—
Industry P/E Ratio	9 x	8 x

3.3 An Example of Ratio Calculations

(Note: this example does NOT use the four stage approach)

BC Manufacturing Ltd. (BCM)

BCM was founded in 1960. Its senior management retired in 1985 and the son of the company's founder and its largest shareholder (20%) took over the president's position.

This individual has extensive interests and holdings in other businesses. BCM shares have not performed well over the last five years and there was considerable shareholder dissatisfaction at the last annual general meeting. In defence, the president pointed to improved profitability ratios, increased use of manufacturing equipment, and the company's much broader product line. He argued that investors had not grasped the significance of these developments and when they would, the stocks performance would show considerable improvement.

Required:

Analyze the 1985 and 1990 financial data. Briefly describe the various attributes of the company, such as liquidity, leverage, activity, profitability and growth as they changed during this period and explain the lacklustre performance of the company's share-price by using ratio analysis.

BC Manufacturing Ltd.
Financial Data

All numbers are multiples of $1 k

Note: All Income Statement numbers have been expressed as a percentage of the Topline (Sales or Revenues). This is called commonsize analysis.

	1990	As % of Sales	1985	As % of Sales
Sales (all on Credit)	7,350	100%	5,000	100%
Cost of Sales	4,040	55%	2,500	50%
Gross Profit	3,310	45%	2,500	50%
Fixed Operating Expenses	1,281	17.4%	860	17.4%
Variable Operating Expenses	900	12.2%	820	16.4%
Operating Income	1,129	15.4%	820	16.4%
Interest Expenses	415	5.6%	220	4.4%
Net Income Before Tax	714	9.7%	600	12%
Tax	357	4.9%	300	6%
Net Income After Tax	357	4.9%	300	6%
Dividends Paid	200	2.7%	150	3%
Transfer to RE	157	2.2%	150	3%

Balance Sheets

Note: In the Balance Sheet, common size analysis, all items are expressed as a percentage of total assets.

	1990	As % of Assets	1985	As % of Assets
Cash & Mkt. Secs.	$ 96	2.0%	$ 296	7.7%
Receivables	900	18.3%	400	10.4%
Inventories	330	6.7%	250	6.5%
Plant/Equipment	3,590	73.0%	2,900	75.4%
Total Assets	**4,916**	**100%**	**3,846**	**100%**
Short Term Debt	1,266	25.8%	518	13.4%
Long Term Debt	1,700	34.6%	1,500	39.0%
Contrib. Capital	1,500	30.5%	1,000	26.0%
Retained Earnings	450	9.2%	831	21.6%
Total Equities	**4,916**	**100%**	**3,846**	**100%**
Market Value per Share	$2.80		$3.00	
Industry P/E Ratio	10 x		9 x	
Company P/E Ratio	7.8 x		10 x	

Dupont Numbers

	Volume Factor (Sales/Assets)	×	Profit Margin Factor (NIAT/Sales)	×	Fin. Leverage Factor (Assets/Equity)	= ROE
1985	1.3 times		6%		2.1 times	16.4%
1990	1.49 times		4.86%		2.52 times	18.3%
% change	+15%		−19%		+20%	+12%

Note: The negative trade-off between “Volume” and “Margin” ROE’s 12% rise is due to higher reliance on debt (Fin Leverage Factor).

Ratio Analysis

	1990	1985	% Change
Receivables Unpaid (days)	45	29	54% slower
Inventories Unsold (days)	29	36	18% faster
Operating Cycle (days)	74	65	14% slower
Fixed Asset Turnover	2.05 times	1.72 times	19% faster
Current Ratio	1.05 times	1.84 times	43% lower
Quick Ratio	0.79 times	1.35 times	42% lower
Short Debt/Total Debt	42.7%	25.6%	67% higher
Oper. Exp./Sales	29.7%	33.6%	12% lower

Continued

	1990	1985	% Change
EBIT/Interest Expenses	2.72 times	3.73 times	27% lower
EBIT/Assets	23%	21.3%	8% higher
GPM (Gross Profit Margin)	45%	50%	10% lower
OPM (Oper. Profit Margin)	15.4%	16.4%	6% lower
NPM (Net Profit Margin)	4.9%	6%	18% lower
*Break-Even Sales	$5172	$3214	61% higher
Actual Sales/BE Sales	142%	156%	9% lower
EPS Earnings per Share	13 cents	30 cents	19% higher
Price Earnings Ratio	7.8 times	10 times	22% lower
MV per Share/BV per Share	394%	164%	12% lower

* The concept of Break-Even Sales will be covered shortly.

Explanation: Since the P/E = Market Price to Earnings per share is 9 x in 1985 and the Market Value per share is $3.00, the earnings per share (EPS) must be $3/10 = $0.30. Using the same method we find that 1990 EPS is $2.80/7.8 = $0.13. To calculate the number of shares outstanding, we divide the NIAT by the earnings per share or $300 k/$0.30 = 1 million shares in 1985 and $357 k/$0.13 = 2.746 million shares in 1990. Notice the significant increase; the company issued a lot more shares.

To calculate the Market Value of the company, we multiply the total number of shares by the market value per share or 1 million shares x $3.00 = $3 million in 1985 and 2.746,154 shares x $2.80 = $7.689 million in 1990.

To calculate the MV per share/BV per share (the market to book ratio), we divide the Market Value of the company's shares by the Book Value of the company's common shares. That is, the sum of the Contributed Capital and the Retained Earnings or $3 million/($100 k + $831 k) = 164% in 1985 and $7.689 million/(1500 k + $450 k) = 394% in 1990.

Analysis: The DuPont numbers point to a shift in strategy away from Margins toward Volume. While financial leverage has risen strongly, the ROE only rose modestly.

A look at the Asset Management shows a slower operating cycle but Fixed Asset turnover has improved in spite of an increase of $3,590 – $2,900 = $690 k in Plant and Equipment. One effect of this was a relative drop in Variable Operating Expenses from 16.4% to 12.2%. A look at Margins on the Income Statement shows that most Margins have worsened; the increase in the Debt Burden (Interest Expense/Sales) from 4.4% to 5.6% is notable.

A look at the Balance Sheet shows that the large increase of Receivables from 10.4% to 18.3% is a worrisome increase of short-term debt from 13.4% to 25.8%.

A favourable change is the increase in contributed Capital of half a million dollars, from $1,000 k to $1,500 k. However, this was offset by a significant drop in Retained Earnings, which could be caused by losses during the years 1986 to 1989.

The share price shows a drop in P/E Ration below industry average. However, the dramatic rise in the MV/BV Ratio can indicate that shareholders are optimistic about the future prospects for the firm.

4 Risk & Defensive Strategies

Unit Objective: To understand the effects that fixed and variable costs have on a company's performance and how such costs affect a company's flexibility to cope with adversity and change.

Key Words: Fixed Cost, Variable Cost, Operating Leverage, Financial Leverage, Combined Leverage, Break-even Level Safety Ratio

4.1 The Concept of Leverage in Business Finance

We are now broadening the Concept of Leverage—previously we have talked only of financial leverage, particularly as we dealt with financial strategy and the DuPont Analysis. In fact, there are three kinds of leverage:

(a) Operating Leverage
(b) Financial Leverage
(c) Combined Leverage

Operating Leverage relates to the relative amounts of fixed and variable *operating* costs of a company or department; whereas *financial leverage* deals with the degree to which a company's assets are financed with debt rather than equity capital and the relative amount of interest expenses in comparison to operating income.

(Line managers have more influence over the level of operational leverage of their area of responsibility while financial leverage is usually determined at the more senior level of management.)

By *leverage* we mean the phenomenon that a company's *operating income* (EBIT) and *net income* (NIAT) can fluctuate a lot more than a company's *Sales or Revenues.*

Leverage can be a good or bad feature for the owners of the company. For instance, a *rise* of 10% in *net income* that was caused by a 2% rise in *sales* is attractive, but remember, *leverage* works both ways. Decreases get magnified too!

Leverage is caused by the presence of *fixed costs* in the company's overall cost structure, i.e., the *higher* the proportion of *fixed costs* to *variable costs,* the higher the company's leverage.

Consider the following examples:

C. Priester et al. (eds.), *Financial Strategies for the Manager*

	NOP Company			OPQ Company		
Revenues	1,000	1,100	10%	1,000	1,100	10%
* Fixed Costs	– 300	300	0%	– 600	– 600	0%
** Variable Costs	– 600	660	10%	– 300	– 330	10%
Profits	100	140	**40%**	100	170	**70%**
	Before	After	% change	Before	After	% change

* Fixed Costs do not change in the short run when Revenues change.

** Variable Costs do change, more or less, proportionately with Revenues. Remember, in merchandising and manufacturing companies Cost of Goods Sold or Manufactured are defined as Variable Costs.

Look at the percentage change in the profits and note that the higher the proportion of fixed costs to total costs, the larger the change in profits when revenues change.

A word of warning about Fixed and Variable Costs in a business environment.

- In the long run there are no Fixed Costs, every fixed cost can be varied, modified or eliminated.
- The Variable Costs do not always vary in the same proportion as the change in Revenues.
- It is very difficult (some people claim virtually impossible) to neatly designate and calculate a company's total fixed and variable costs; estimates must be made.
- But, in spite of these facts, from a strategic point of view it is very important to understand the effects that a company's proportions of fixed vs. variable costs have on the variability of its profits.
- In fact, it can be argued that it is not necessary to know the exact quantities of fixed vs. variable costs to make meaningful strategic business decisions.

How can managers *use* leverage to the best of the owner's advantage? First a few general observations:

- Companies whose sales/revenues are *very stable* and *predictable* can use leverage as a method to raise net income.
- Companies whose sales/revenues are *strongly fluctuating* and/or *unpredictable* can get badly hurt by the presence of leverage.
- Some companies have operating characteristics that are such that they cannot help but have *large* portions of *fixed operating costs*. These companies should be very leery of embracing high financial leverage.
- Other companies have operating characteristics that produce only *small* proportions of *fixed operating cost*. In this situation high financial leverage is much more acceptable.
- Changing market conditions can change stable and predictable Revenue or Sales characteristics very quickly to volatile and unpredictable ones. High degrees of leverage can quickly cripple such companies if that happens.

For analytical purposes, we recognize *two* kinds of leverage in companies because we recognize *two* kinds of expenses in running a company:

(a) There are *operating* (fixed and variable) expenses which cause the company to have a Degree of Operating Leverage (DOL).

(b) There are *financial* (mainly fixed and some variable) expenses which cause the company to have a Degree of Financial Leverage (DFL).

When we combine the two kinds of leverage by multiplying them, we get the company's Degree of Combined Leverage, i.e.:

$$\text{DOL} \times \text{DFL} = \text{DCL}$$

For example: if DOL = 2 and DFL = 1.5 it produces a DCL of 3

What do we mean by DOL, DFL and DCL?

DOL is the *percentage change* in a company's operating income that is caused by a certain percentage *change* in its revenues or sales.

DFL is the *percentage change* in a company's after tax income that is caused by a certain percentage *change* in its operating income.

DCL is the *percentage change* in a company's after tax income that is caused by a certain percentage *change* in its revenues or sales.

Or symbolically:

$$\text{DOL} = \frac{\%\text{ change EBIT}}{\%\text{ change REV}} \qquad \text{DFL} = \frac{\%\text{ change NIAT}}{\%\text{ change EBIT}} \qquad \text{DCL} = \frac{\%\text{ change NIAT}}{\%\text{ change REV}}$$

Example:

Suppose that a company has a

$$\begin{Bmatrix}\text{DOL}\\ \text{of}\\ 2\end{Bmatrix} \text{ and a } \begin{Bmatrix}\text{DFL}\\ \text{of}\\ 1.5\end{Bmatrix} \text{ and therefore a } \begin{Bmatrix}\text{DFL}\\ \text{of}\\ 3\end{Bmatrix}$$

Observation: It is important to realize that it is very difficult to obtain exact figures on a company's Variable and Fixed Costs. t best, we can come up with estimates only. As a consequence the values we obtain when calculating values for DOL, DFL, DCL, Break-Even Levels and Safety Ratios can only be approximations. However, that does not diminish their importance in calculating a company's vulnerability to danger and unforeseen changes in the market. Now let us look at the Income Statement to calculate leverage values.

This typical layout of an *Income Statement* for financial analytical purposes helps us calculate the degrees of leverage.

Income Statement	
Revenues	$1,500 k
– Fixed Operating Expenses (FOE)	– 300 k
– Variable Operating Expenses (VOE)	– 900 k
EBIT or Operating Income	$ 300 k
* – Interest Expenses (Int. Exp.)	– 100 k
NIBT = Net Income Before Tax	$200 k
– Income Tax	– 80 k
NIAT = Net Income After Tax	$120 k

* Assumed to be largely fixed in nature.

The *actual formulas* for calculating a company's "degrees of leverage" are as follows:

$$\text{DOL} = \frac{\text{REV} - \text{VOE}}{\text{REV} - \text{VOE} - \text{FOE}} \quad \text{or} \quad \frac{\text{REV} - \text{VOE}}{\text{EBIT}} = \frac{600\text{ k}}{300\text{ k}} = 2$$

$$\text{DFL} = \frac{\text{REV} - \text{VOE} - \text{FOE}}{\text{EBIT} - \text{INT.EXP}} = \frac{\text{EBIT}}{\text{NIBT}} = \frac{300\text{ k}}{200\text{ k}} = 1.5$$

Multiplying the two gives you:

$$\text{DOL} \times \text{DFL} = \text{DCL} = (\text{REV} - \text{VOE}) / \text{NIBT}$$

$$2 \times 1.5 = 3\text{ x}$$

Remember we are dealing with *percentage* changes.

Letus use our example above. This company has a DCL = 3 and Revenues of $1,500 k and a NIAT of $120 k.

Suppose that this company's revenues change by 1% or $15 k. This will cause a change in its operating income of 2% or $6 k (remember its DOL was 2) and this will cause a change of 3% or $3.6 k (remember its DCL = 3) in its NIAT.

Important: Remember that the larger the *relative* size of the fixed expenses (i.e., FOE and Interest Expense), the higher the degrees of leverage and the more a company's profits will be levered upwards if its revenues rise. But, remember that the leverage effect also works downwards. Falls in Sales or Revenues will cause a disproportionately larger reduction in Operating and Net Profit margins.

An investment banker once said:

"The use of leverage in corporate strategy is like the use of steroids among athletes — it can produce incredible feats of profitability, but when used recklessly it can leave a company financially wrecked."

4.2 The Safety Ratio and a Company's Break-Even Level

Somewhat related to the issue of leverage is the "safety ratio," i.e., the comparison of a company's Actual Sales with its Break-Even Sales (Actual Sales/BE Sales). This ratio is usually expressed as a percentage. A 100% figure indicates that the company is breaking even.

In order to determine a company's safety ratio you must first calculate its break-even volume.

The easiest way to calculate break-even sales is through the formula:

$$\text{Break} - \text{Even Sales} = \frac{\text{Fixed Operating Expenses} + \text{Fixed Interest Expenses}}{1 - \dfrac{\text{Total Variable Costs}}{\text{Total Revenues}}}$$

and the Safety Ration = Actual Sales / BE Sales

Accurate estimates of fixed and variable costs are of course not available to outsiders; this analytical technique is mainly of use to insiders who have good access to a company's financial data. The analysis pre-supposes that the company's accountants have a fairly accurate idea of the magnitude of the company's fixed and variable costs levels. Break-Even analysis and safety ratios only deal with a relatively *short* time horizon because it is only in the short run that we can truly distinguish between *Fixed* and *Variable* Costs. In the medium to long run there are no Fixed Costs since all costs can be varied in response to changing Sales or Revenues.

Exercise #4A

Required:

Calculate the Break-Even Sales and the Safety Ratio using the Income Statement.

Exercise #4B

Required:

Determine the degrees of operational, financial and combined leverage of Beta Co. whose 1996 Income Statement appears below.

Also determine the effect of a $12 k drop in revenues on the company's bottom line using the DCL you have just calculated.

Finally, calculate the company's Break-Even Sales and Safety Ratio.

	1996
Revenues	$800 k
Variable Operating Expenses	512 k
Fixed Operating Expenses	– 128 k
EBIT	160 k
Interest Expenses (Fixed)	53 k
NIBT	107 k
Tax 50%	– 53 k
NIAT	$54 k

4.3 Defensive Strategies

A defensive strategy involves the shift from fixed to variable expenses within a company—it makes a company's profits less vulnerable to drops in revenues. Of course, the price one pays for this added safety is slower rising profits if revenues should rise. An aggressive strategy works in the opposite direction.

In addition, an examination of a company's *Safety Ratio* can tell you how vulnerable a company is to decreases in Sales Volume. It also enables you to understand "defensive and aggressive" strategies in corporate finance.

4.3.1 Example of Defensive Strategy

Assume that two companies, similar in all other respects, have the following characteristics:

Note the different levels of FOE, VOE and Interest Expenses.

(all figures in millions)

		PQR Company	QRS Company
*	**Revenues**	10 M	10 M
	FOE (Fixed Operating Expenses)	4.68	2.61
	VOE (Variable Operating Expenses)	4.0	6.15
	EBIT (Operating Income)	1.32	1.24
	Interest Expense (Fixed)	0.32	0.24
	Net Income Before Tax	1.0	1.0
	Tax 50%	0.5	0.5
*	**Net Income After Tax (NIAT)**	0.5	0.5
	Assets	7 M	6 M
	Liabilities (borrowed at 8%)	4	3
*	**Equity**	3	3

* In this example we have assumed equal levels of Revenues, NIAT and Equity.

These two companies would have the following Break-Even levels, Safety Ratios and DCL:

Break-Even Revenues (FOE + Inc. Exp.)/(1 – (VOE/Rev))	8.333 M	7.405 M
Safety Ratio (Actual Rev)/(BE Rev)	120%	135%
ROE (NIAT/EQUITY)	16.667%	16.667%
Degree of Combined Leverage (Rev – VOE)/NIBT	6 x	3.85 x

Note that QRS Company reaches a Break-Even Revenue $928.333 before PQR Company (difference between the 2 B.E. points) does.

QRS Sales are 35% above Break-Even while the owners earn the same ROE than PQR share owners.

And finally a 1% drop in Sales would cause QRS's NIAT to fall only 3.85% while PQR profits would fall by 6%.

The numbers above illustrate the effects that different proportions of *Fixed* vs. V*ariable* operating expenses and the different amounts of *Fixed* interest expenses have on *Break-Even* levels and thereby on the company's vulnerability to losses should its Revenues decline.

Obviously, QRS Company is in a much more comfortable position.

Company PQR has $1 million more Assets and Debt and consequently pays 0.08 million more Interest Expenses.

Company QRS has $1 million fewer Assets and debt and consequently pays 0.15 million less Interest Expenses. However, its combined (fixed + variable) operating expenses are 0.08 million higher because we assume that the *services* that are obtained form the $1 million additional assets *owned* by Company PQR are *purchased* by Company QRS from subcontractors.

The end result is an equal level of NIAT. Note the lower Break-Even level and higher Safety Ratio of Company QRS. This company is better situated to deal with a decline in Revenues. Its profits will fluctuate much less should Revenues vary strongly. Of course, the price paid for this higher degree of safety is less spectacular growth in profits should Revenues increase. This is shown by the lower Degree of Combined Leverage (DCL).

Conclusion: Higher leverages gives companies higher levels of financial performance when conditions are favourable, but cause larger declines in financial performance when conditions deteriorate.

4.4 An Example of a Systematic 4-stage Analysis of Case Study #10

RR Distributors

4.4.1 Stage Ⅰ

The relative changes suggest a failed margin strategy, the 36% increase in the NPM was "bought" with a 75% decrease in the volume factor. Not even a huge increase of 58% in the Financial Leverage Factor could prevent this company's ROE from falling by 35%. All in all, a rather negative trend. The company's 1998 Balance Sheet is considerably weaker than in 1993.

	Volume Factor (Sales/Assets)	Margin Factor (NIAT/Sales)	Fin. Leverage Factor (Assets/Equity)	ROE (NIAT/Equity)
1993	(120/25.7) 4.67 x	(3/120) 2.5%	(25.7/21.4) 1.20 x	(3/25.7) 11.7%
1998	(153/129.4) 1.18 x	(5.2/153) 3.4%	(129.4/68.1) 1.90 x	(5.2/68.1) 7.6%
%σ	75% ↓	36% ↑	58% ↑	35% ↓

This completes stage Ⅰ of the analysis.

4.4.2 Stage Ⅱ

We have a closer look at the Volume Factor which reflects the Asset Productivity of the company, and try to determine what caused it to decline by 75%.

Inventory Management

Average # days Inv. unsold (Av. Inv./C. of G. S.) × 360 days

1993 $(5.3/96) \times 360 \text{ days} = 20 \text{ days}$

1998 $(18/99.5) \times 360 \text{ days} = 65 \text{ days}$

225% slower

This suggests poor inventory management. Slow moving items likely. The net realization value of the inventory may not match its book value, regardless of accounting rules.

Average number of days receivables unpaid (Av. Receiv./Credit Sales) × 360 days

1993 $(10/120) \times 360 \text{ days} = 30 \text{ days}$

1998 $(23.4/153) \times 360 \text{ days} = 55 \text{ days}$

84% slower

This suggests poor receivables management, a lot of bad debts. Combining inventory & rec. data produces the operating cycle.

1993 $20 \text{ days} + 30 \text{ days} = 50 \text{ days}$

1998 $65 \text{ days} + 55 \text{ days} = 120 \text{ days}$

140% slower

It is not surprising that the worsening oper. cycle has its influence on the company's payable cycle. Average number of days payables unpaid (Acct. Pay. / C of GS) × 360 days

1993 $(1.9/96) \times 360$ days = 7 days 1998 $(18/99.5) \times 360$ days = 65 days	more than 8 x slower

The 1993 figure of seven days is unusually short, it may have been done deliberately to obtain advantages from suppliers or have been forced by the suppliers. The 1998 figure of 65 days suggests serious cash flow problems.

Fixed asset turnover (Sales/F.A./book value)
1993 ($120 k/8.4) = 14.3 x 1998 (153/87.4) = 1.75 x

This huge decrease reflects the net acquisition of (87.4 – 8.4)M = 79 M of fixed assets. While there is little evidence that this big acquisition has paid off in higher sales or superior asset productivity (op. exp./sales), note the huge percentage increase in the company's proportion of expenses which are fixed, from 30% to 70% (no doubt the big increase in fixed assets has a lot to do with this). This ends stage Ⅱ.

4.4.3 Stage Ⅲ

A closer look at the factors that caused the change in the Net Profit Margin of 36%.

	1993	1998	%σ
Gross Profit Margin (GP/S)	(24/120) 20%	(53.5/153) 35%	75% ↑
Oper. Efficiency (Op. Exp/S)	(18.7/120) 15.6%	(38.1/153) 24.9%	60% ↑
Oper. Profit Margin (EBIT/S)	(5.3/120) 4.4%	(15.4/153) 10.1%	129% ↑
Interest Burden (Int. Exp./S)	(0.3/120) 0.25%	(6.7/153) 4.4%	>17 x
Net Profit Margin (from Stage Ⅰ)	2.5%	3.4%	36% ↑

An Analysis of the Margins

The 75% rise in the gross profit margin suggests a big change in pricing strategy and/or product mix towards much higher profit margin products. It is not uncommon that in such situations the volume factor falls. And the fall in sales volume factor of 75% equals the increase in the gross profit margin of 75%.

But, of course, while a 75% rise in gross profit margin is good news, the worsening operating efficiency (by 60%) and an interest burden that became 17 x worse, saw to it that the net profit margin only rose by 36%. And, while this may

be impressive by itself when measured against the 75% drop in the volume factor, the result will be a much weaker ROA, i.e. (NIAT/Assets).

	Volume (S/A)	×	Margin (NIAT/S)	=	ROA
1993	4.67	×	2.5%	=	11.68%
1998	1.18	×	3.4%	=	4%

ROA fell by a horrible (4/11.68) – 1 = 66% ↓

This confirms our conclusion that this margin strategy was very unsuccessful. This ends stage Ⅲ.

4.4.4 Stage Ⅳ

In Stage Ⅳ we have a closer look at the effects of the 58% increase in the company's financial leverage multiplier (assets/equity) and examine other aspects of this company's rising reliance on debt financing.

Interest coverage (banker's ratio) EBIT/Int. Exp.

1993	1998	%σ
(5.3/0.3)	(15.4/6.7)	
17.67 x	2.3 x	87% ↓

A banker's ratio below 2 x is considered poor. While the ratio stays above that level, an 87% drop in this ratio will worry the company's lenders.

Average borrowing rate $\left(\frac{\text{Total Int. Exp.}}{\text{Total Debt}}\right)$

1993	1998	%σ
(0.3/4.3)	(6.7/61.3)	
7%	10.9%	56% ↑

While the 56% increase in the average borrowing rate could be due to external factors, we know that in the period 1993 to 1998 this did not occur. The higher cost reflected the company's worsening credit rating.

	1993	1998
Debt/Assets	(4.3/25.7)	(61.3/129.4)
	17%	47%

In 1993 only 17 cents of each asset dollar was financed with debt. This rose to 47%. While this is a big increase, this would by itself not be catastrophic if the

company's asset yield had improved. Unfortunately, a look at the asset yield reveals that this was not the case:

	1993	1998
Asset yield (EBIT/Assets)	(5.3/25.7)	(15.4/129.4)
	20.6%	11.9%

Asset yield declined by $(11.9/20.6) - 1 = 42\%$

A rather dismal picture.

During this five year period this company went through a big asset expansion from \$25.7 to \$129.4—that is more than 400% bigger. Yet the company's sales and profits rose by much smaller percentages. This ends stage Ⅳ.

4.4.5 Valuation Ratios

Finally, a look at the company's valuation ratios. (*Although this is usually not part of a 4-stage analysis, we include it for illustrative purposes.*)

First, we must calculate the number of shares outstanding. We know that NIAT is \$3 M and the earning per shares is 30 cents. Therefore, the number of shares outstanding is (\$3 M/30¢) = 10 M shares. Therefore, the book value per share equals

$$(\text{Total Equity}/10\text{ M shares}) = (10\text{ M} + 11.4\text{ M})/10\text{ M} = \$2.14$$

Therefore, the $\dfrac{\text{M.V.p.share(given)}}{\text{B.V.p.sh.}} = \dfrac{\$5.10}{\$2.14} = 238\%$ in 1993.

In 1998 the MV/BV ratio

#shares outstanding (NIAT/EPS) = $\dfrac{5.2\text{ M}}{52} = 10\text{ M}$ shares.

$$\text{B.V.psh} = \frac{46.1\text{ M} + 22\text{ M}}{10\text{ M}} = 6.81$$

$$\frac{\text{M.V.given}}{\text{B.V.p.sh.}} = \frac{\$4.68}{\$6.81} = 69\%$$

We see that the "Market to Book" ratio fell a significant amount from a premium level of 238% to a discount level of 69% (remember100% means the book and market values are the same). This is indeed a very long fall from grace in the eyes of the shareholders.

P/E Ratios	1993	1998
$\dfrac{\text{Mkt.Valuep.sh}}{\text{E.P.sh}}$	$\dfrac{\$5.10}{30} = 17$ x	$\dfrac{\$4.68}{52} = 9$ x
Industry P/E ratio	14 x	6 x

The shares of other corporations in this industry are selling at a higher multiple in 1998 than in 1993. This could reflect general market or industry specific conditions, but the trend is definitely up, i.e. positive. However, *our* company's P/E ratio has nearly halved, reflecting its poor performance.

This ends Stage Ⅴ analysis.

4.5 RR Distributors Analysis Continued

We continue our analysis of RR Distributors by looking at the company's Leverage, Break-even Analysis, and Safety Ratio.

	1993	1998
Total Operating Expenses	18.7 M	38.1 M
of which Fixed Op. Exp. are	(30% × 18.7 M) = $5.61 M	70% = $26.67 M
and Variable Op. Exp. + Cost of Goods Sold (they are also considered as Variable costs)	(70% × 18.7 M) + $90 M	30% = $11.43 +C of G.S. $99.5 M
Total Variable Op. Exp.	$109.09 M	$110.93 M

Therefore, the Degree of Operating Leverage = (%σEBIT/%σSales) = i.e. the change in EBIT caused by the change in sales is:

$$\left(\frac{\text{TREV} - \text{VOE}}{\text{EBIT}}\right) = \frac{\underline{1993}}{120 - 109.09} \quad \frac{\underline{1998}}{153 - 110.93}$$

$$\frac{}{5.3} \quad \frac{}{15.4}$$

DFL = 2.06 x 2.73 x

33% higher

And, the Degree of financial leverage = (%σNIAT/%σEBIT) = i.e. the change in NIAT caused by the change in EBIT Is:

		1993	1998
(EBIT/NIBT)	=	(5.3/5)	(15.4/8.7)
67% higher		1.06 x	1.77 x

Taking DOL and DFL together we can calculate the degree of combined leverage, which is the product of DOL and DFL.

DOL x DFL		1993	1998
%σ NIAT	=	2.18 x	4.83 x

This is an increase of 121%.

All three degrees of leverage have risen strongly. This is due to the big increases in fixed operating expenses (related to the big increases in fixed assets) *and* the large increases in interest expenses caused by massive rise in total debt from $4.3 M to $61.3 M. This will cause future profit levels to become far more volatile than in the past, small changes in sales will cause big changes in profit levels, thereby raising the risk factor of the company.

Of course, this will cause big increases in the company's break-even levels. The formula for break-even sales is:

$$\text{B.E. Sales} = \frac{\text{Fixed Op. Exp.} + \text{Int. Exp.}}{1 - \left(\frac{\text{Var. Op. Exp.}}{\text{Sales}}\right)}$$

1993	1998	
$\frac{\$5.61 + 0.3}{1 - \left(\frac{109.09}{120}\right)} = \$65\text{ M}$	$\frac{\$26.67 + 6.7}{1 - \left(\frac{110.93}{153}\right)} = \$121.4\text{ M}$	nearly twice as much

Knowing the B.E. Sales allows us to calculate the company's "Safety ratio", also known as the "comfort ratio".

Safety Ratio Formula

$$\left(\frac{\text{Actual Sales}}{\text{B.E.Sales}}\right) = \frac{120}{65} = 185\% \qquad \frac{153}{121.4} = 126\%$$

This "comfort" ratio has fallen from a comfortable 185% to a much less comfortable 126%.

5 Liquidity Management and Sales Growth

Unit Objective: To understand how Asset growth affects Liquidity and the need for external financing.
Key Words: Sales Growth, Liquidity Crisis, External Financing

5.1 Going Broke While Selling More Than Ever

Among the phenomena that puzzle non-financial people the most is the fact that some rapidly growing companies whose products are snapped up by a fast growing market occasionally fall victim to their own success and suddenly go under. This is particularly puzzling to marketing oriented people, for whom "higher sales" are virtually the gospel. To bankers and other practitioners of finance, this phenomenon is very well known and they are trained to look for early signs of this eventuality in order to prevent it from getting worse.

We are basically dealing with a liquidity crisis which is related to the company's operating cycle. You may recall that the company's operating cycle describes the path taken by the company's investment in current assets, where inventories (i.e., raw materials, goods in process, finished products) become receivables which in turn become cash. Rapidly growing sales can cause the company's investments in current assets to grow disproportionately. In addition, its capital assets, i.e., plant and equipment, often need to grow as well to accommodate the higher business volumes.

While higher purchases by such a company usually cause higher levels of spontaneous short term financing (through higher levels of trade payables), this source of funds is rarely sufficient to finance the asset growth needed to sustain the rapid growth in sales. There is, of course, another source of "spontaneous financing," namely the reinvested profits. This is that portion of after tax cash flow that is not distributed to share owners and is available for reinvestment in the company's assets (i.e. shown in the Retained Earnings on the Balance Sheet).

However, most often these sources of funds are insufficient to pay for the sales-induced asset expansion. The company is obliged to look for *external* sources of funds to help pay for this asset growth.

The important thing to understand in this scenario is that the *need for external financing* grows *disproportionately faster* than the rate that the sales grow. In other words, a faster sales growth makes the liquidity crisis worse.

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5.1.1 Liquidity and Sales Growth—Is Rapid Growth in Sales Good News or Bad News

On the surface it would seem that if a company's sales grow very rapidly this ensure its future success. Yet, ironically certain companies have failed as a result of a severe liquidity crisis that was caused by too high sales growth. To understand the reasons for this, it is important to realize that often the size of certain assets and liabilities of a company are directly related to the level of that company's sales. Let us call these Variable Assets (VA) and Variable Liabilities (VL). Prime candidates for VA and VL are *Receivables, Inventories* and *Trade Payables*, although other assets and liabilities possess these characteristics as well.

Observation: Note that the words Variable Assets (V/A) and Variable Liabilities (V/L) are not accounting terms. They are used only in the subject of Finance. They refer to certain assets and liabilities whose levels vary more or less in direct proportion to Sales or Revenue Levels.

Example:

Let us suppose that a company sells largely on credit and its receivables and inventories turnover is slow, i.e., the company is plagued with a long operating cycle. To make matters worse, it is also burdened with a high payables turnover. That is, it is obliged to pay its suppliers rather quickly. Therefore, its average payables balance is relatively small.

Let us assume that the following numbers apply to this company's (condensed) Income Statement:

Sales	$1,200 k
Cost of Sales	$800 k
Other Costs	$340 k
NIAT	$60 k
Div. Paid	$20 k
Reinvested Profits	$40 k

Suppose that on the Balance Sheet the following averages apply:

Variable Assets:	Average Receivables $200 k	(i.e., Average 60 days unpaid)
	Average Inventories $200 k	(i.e., Average 90 days unsold)
Variable Liabilities:	Average Trade Payables $100 k	(i.e., Average 45 days unpaid)

Using Ratio analysis and the above figures, we obtain:

Net Profit Margin	= NPM = NIAT/Sales	= 60 k/1,200 k	= 5%
* Dividend Payout Ratio*	= DPR = Div. Paid/NIAT	= 20 k/60 k	= 1/3
* Profit Reinvestment Ratio*	= PRR = 1 – DPR	= 1 – 1/3	= 2/3

* These are two ratios that have not been mentioned before in this book.

$$(\text{Variable Assets}/\text{Sales})\text{Ratio} = \text{VA}/\text{S} = \frac{\text{Av. Rec.} + \text{Av. Inv.}}{\text{Sales}}$$

$$= \frac{200\text{ k} + 200\text{ k}}{1,200\text{ k}} = 1/3$$

$$(\text{Variable Liab}/\text{Sales})\text{Ratio} = \text{VL}/\text{S} = \frac{\text{Av. Trade Payables}}{\text{Sales}}$$

$$= \frac{100\text{ k}}{1,200\text{ k}} = 1/12$$

$$\text{therefore}\left(\frac{\text{VA}}{\text{S}} - \frac{\text{VL}}{\text{S}}\right) = \frac{1}{3} - \frac{1}{12} = \frac{1}{4} = 25\%$$

See previous page for the figures below

$$\left(\frac{\$200\text{ k}}{\$1,200\text{ k}}\right) \times 360 \text{ days} = 60 \text{ days}$$

$$\left(\frac{\$200\text{ k}}{\$800\text{ k}}\right) \times 360 \text{ days} = 90 \text{ days}$$

$$\left(\frac{\$100\text{ k}}{\$800\text{ k}}\right) \times 360 \text{ days} = 45 \text{ days}$$

A few more acronyms and symbols are needed:

EFN = External Financing Needed (to finance the sales induced asset growth)
SL = Surplus Liquidity (if the sales induced asset growth is less than the funds generated)
σS = Next year's increase over this year's sales= delta S
S = This year's sales
S_1 = Next year's sales

Therefore, $S + \sigma S = S_1$

The following formula will tie all the abbreviations together and predict if high sales growth will produce future liquidity shortages or high levels of cash:

$$(\text{VA/S} - \text{VL/S}) \times \text{delta S} - (\text{NPM} \times \text{PRR} \times \text{S1}) = \text{EFN}$$

if positive and SL if negative

Let us now manipulate the formula. Suppose the company's sales are expected to increase by \$300 k = σS. That will make next year's sales S1 = \$1,200 k + \$300 k = \$1,500 k

According to the formula:

$$(25\% \times \$300\text{ k}) - (5\% \times 2/3 \times 1{,}500\text{ k}) = 75\text{ k} - 50\text{ k} = \$25\text{ k}$$

This means that \$25 k of external financing must be found in order to finance this company's \$300 k increase in sales. The \$75 k increase in net variable assets, caused mainly by the higher levels of receivables and inventories, less the additional borrowing the company obtains from its suppliers through higher trade payables, *exceeds* the \$50 k of reinvested profits that the company's sales of \$1,500 k generated.

There are some important assumptions underlying this analysis—the company's receivables, inventories and payable turnover cycles and the net profit margin and profit reinvestment ratios remain unchanged. (This assumption may not always hold.)

In fact, there is often a *slowdown* in turnover ratios when sales rise rapidly (unless management effectively *controls* them). Profit erosion, i.e., smaller net profit margin is often a by-product of rapidly growing sales due to pressures and inefficiencies brought on by volume pressure. These trends can often make the situation *worse* than what is indicated by the formula.

In order to be able to afford the sales growth of \$300 k, this company will have to find \$25 k of external financing. Unless the company can find this amount, it will encounter liquidity problems.

What is worse, if we make the sales increase *larger*, i.e., \$500 k instead of \$300 k, we find that the amount of external financing needed becomes disproportionately larger; \$68.3 k instead of \$25 k.

$$\text{i.e. } (25\% \times \$500\text{ k}) - (5\% \times 2/3 \times \$1{,}700\text{ k}) = \$125\text{ k} - \$56.7\text{ k} = \$68.3\text{ k}$$

Conclusion: The faster your sales growth, the worse your liquidity crunch.

There is a variation of the formula that we can use.

It reads:

$$(\text{VA/S} - \text{VL/S}) - \left(\text{NPM} \times \text{PRR} \times \frac{1+g}{g}\right) =$$

This formula gives you the *proportion* of the Sales *increase* that must be financed with external funds.

In this formula "*g*" is the *percentage growth* in sales that is anticipated. (Here too a negative answer indicates surplus funds, and a positive answer the need for external financing.)

To give you a rough idea of average quantities involved, let us consider a recent study of the Canadian manufacturing industry which found the following approximate values:

$$VA/S = 60\%$$
$$VL/S = 10\%$$
$$NPM = 6\%$$
$$PRR = 60\%$$

Substituting these figures in the above formula and solving it for zero, we find the g-value (or the rate of self-financing, sales-growth) *of 6%. This is also known as the "balanced sales growth."*

At this rate of annual sales growth neither surplus liquidity (SL) *nor external financing needed* (EFN) *prevails. Practical reality, of course, dictates that this percentage can never be achieved exactly.*

Note to the student: Confirm this g = 6% number by performing this calculation yourself.

In this example an annual sales growth which is higher than 6% brings about the need for external financing; a slower growth produces surplus liquidity.

There is, of course, nothing wrong for a successful growing company to use increasing amounts of external financing. What is dangerous is a lack of awareness of the exponentially growing need for this money. Such ignorance can lead to dangerously "stretched" balance sheets and can place corporations in serious liquidity crises.

Of course, the ratios that are used in this model *need not be fixed quantities* and can be manipulated and changed by management action. It is important to grasp the policy directives that this model creates.

A high g-value gives a company far more marketing flexibility. Managers should try to pursue policies that raise a company's g-value.

In order to minimize the possibility of liquidity shortages that are due to rapidly rising sales, managers should pursue policies that achieve one or more of the following objectives:

Make VA/S smaller, i.e., shorten the operating cycle and raise fixed asset productivity.

Make VL/S larger, i.e., obtain more spontaneous financing from your suppliers. This is often easier said than done and most of the time involves hidden costs.

Make NPM larger, i.e., obtain higher profit margins, through better efficiency and perhaps price manipulation.

Make PRR larger, i.e., change the dividend policies of the company and conserve internally generated funds.

Make σS smaller by changing the product mix and relying more on higher profit items and less on lower profit items. Sell smarter rather than selling more.

Exercise #5A

Delta Co. has a Variable Assets to Sales Ratio of 40% and a Variable Liabilities to Sales Ratio of 8% (largely due to receivables, inventories and short term payables fluctuating proportionately with sales levels).

Its historical net profit margin of 8% and Dividend Payout Ratio of 40% are not expected to change.

Delta Co's 1998 sales were $1 million.

Required:

Calculate the company's "Surplus Liquidity" or "External Financing Needed" if 1999 sales are estimated to be $1.3 million. (Do the calculation again for estimated 1999 sales of $1.1 million.)

Determine the level of next year's sales (S_1) where the company achieves "balanced growth" (where there is no need for external financing or surplus liquidity produced).

What conclusion can you draw from your findings?

6 Working Capital Management

Key Words: Working Capital, Current Assets, Receivable Management, Inventory Management, Operational Cash Management, Accounts Payable Management

6.1 Introduction

Working capital is the difference between a company's current assets (mainly cash, receivables, inventories) and its short-term debt (accounts payable makes up a major part).

It has often been observed that *troubles with* and *shortages of* working capital take up 80% of the time and attention of financial managers. Lack of working capital (often called a liquidity shortage) plagues many companies. It is a major cause of company failures.

There are numerous examples of companies showing rising sales and profits while simultaneously going broke due to a liquidity shortage.

In examining the nature of working capital, we shall look at the following items:

- Current assets as a whole,
- Cash and liquidity management,
- Receivables management,
- Inventory management,
- Business intelligence—the key asset.

6.2 Modern Communication Technology and the Smaller Company

Probably the most powerful impact that modern communications technology has had on financial management is its effect on Working Capital Management. It has rewritten the rules of the management of current assets and current liabilities (working capital).

The explosive growth in communication technology has changed the world around us. It sounds almost trite to make this observation, but surprisingly, there are a significant number of businesses, mainly small to medium sized, who have not got the message.

Perhaps their owners and managers have heard the message, but too many of

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them dismiss it in the mistaken belief that modern communication techniques are not applicable in the running of *their* operations. This is unfortunate because it is quite possible that the benefits of modern communication technology are more important to the smaller company than to the large Corporation.

Historically, large corporations have had an advantage over their smaller competitors in that they could afford to do many things in-house. By doing more business tasks in-house, the large corporations could serve their customers better, and thereby dominate the smaller competitors. "Bigger is better" was a reality that prevailed until very recently.

The interesting by-product of modern communication technologies is that the impact of this "bigger is better" rule is greatly diminished for a significant number of sectors in the economy.

"Economies-of-scale", as economists labelled this phenomenon, are no longer the exclusive domain of large corporations with a large pool of assets and millions of customers. In more recent times, modern communication technologies have enabled many *smart, small and medium-sized* corporations to enjoy the fruits of economies-of-scale without the headaches that large size often brings.

It is perhaps useful to list some of the traditional difficulties that have plagued many small companies and which prevented them from competing effectively against their larger competitors.

Virtually all the handicaps that held smaller companies back were caused by the lack of capital needed to buy the assets (tools) to do more in order to meet customer needs. All these items were usually capital or fixed assets. Just a few examples of those resources that companies have traditionally relied upon are:

- plant and equipment to make product,
- buildings to house that plant and equipment,
- buildings to warehouse,
- raw material and/or finished goods and inventories,
- vehicles to transport inputs and outputs.

Some of the financial assets that companies use in daily operations are:

- cash and near-cash (marketable securities),
- receivables (money lent to customer to help sales).

Both large and small companies rely on the use and ownership of these assets or tools in order to do business. The difference between the large company and the small one is that the large company was better able to own these tools and, therefore, meet customer needs. While this situation is still true in several economic sectors, particularly in the capital-intensive ones, a revolution has taken place in other sectors. This revolution could only come about because of modern communication technology, which allows these companies to communicate with each other cheaply, rapidly and accurately.

Once this happened, there was no longer the same need to *own* business assets in order to enjoy the services that business assets produce. The result is a massive "unbundling" of business activities and an explosion in the number of specialized companies that focus on just a few business activities.

Business opportunities for companies that survive by selling these services have also "exploded." A few examples of those more specialized businesses include: warehousing, word-processing, payroll processing, delivering, shipping, record keeping, filing, credit analysis, credit management, software designing, and advertising.

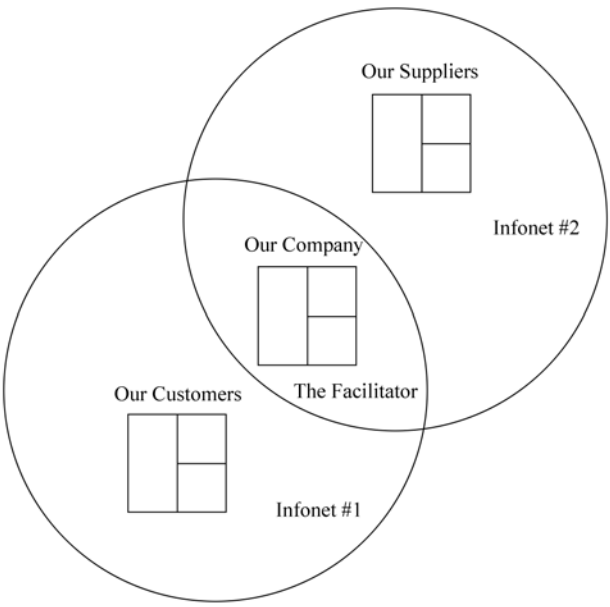
An interesting exercise is to compare the number of companies specializing in any of these activities in the Yellow Pages in 1987, 1997 and 2007. The growth in their number is remarkable.

How can we discover if a small to medium-sized corporation can benefit from modern communication technology? Probably the easiest way to start the analysis is to look at the company's financial statements (Balance Sheet and Income Statement) and carefully analyze which items on these two statements represent the largest numbers. By reducing the dollar amounts of the major items in our financial statements, we can likely bring about the biggest payoff. We start by looking at the largest amounts for *expenses* and *assets*. Those items will help us focus our search to do things differently.

Companies incur expenses to pay for assets, or the services that assets provide, interest on debt incurred to pay for assets and wages to perform certain tasks.

Another good approach to analyze the way a company can benefit from better communication technology is to visualize the company's relationship *vis-à-vis* its suppliers and customers, to redefine the role of the company in the middle, as a *facilitator*.

Among those three players (the suppliers, the company and the customers) in the game of business, there should exist two infonets carefully managed by *your* company—the facilitator—in the middle.



To start with, we can ask two fundamental questions:

(a) How can I better anticipate the ever-changing needs of my customers? *Anticipation* is the key word. The more quickly and accurately you know your customers' actual buying habits, the better you can be at anticipating your customers' future buying needs.

(b) How can I make life easier for my suppliers? The easier your supplier can fulfill your needs, the more favourable the terms on which you can buy. In order to do that, you must know your customers' actual buying habits (answer question a).

The payoff of finely-tuned infonets is a dramatic drop in inventories, receivables, and, hopefully, a significant drop in those tangible assets, such as warehousing. Another frequently observed benefit of these two operational improvements is much greater customer and supplier goodwill, which manifests itself in better profit margins, lower purchasing costs, and better sales growth.

We will now take a brief look back at some of the key concepts covered in Working Capital Management.

6.3 Current Assets

How necessary are cash, receivables and inventories to a company's survival?

A financial analyst once said that a useful way to look at *current assets* is to see them as *"necessary evils."* He pointed out that there are successful merchandisers who rely heavily on *credit sales* and who operate with virtually no *receivables*. There are successful manufacturers that operate with virtually no parts or raw material inventories.

The point that he was trying to make was that it may be possible at times to run a business with much lower levels of current assets than is generally assumed by most managers. In fact, many companies have discovered this, unfortunately, many others have not. We shall discover that the basic reason why operating with lower current asset levels has become easier to achieve is due to better communication technology.

6.4 Cash and Liquidity Management

Let us look at each of the current assets.

6.4.1 First Current Asset, Operating Cash

This asset is best seen as the "lubricating oil" in the working engine that makes up a company's operations. It is very necessary to prevent loss of opportunity, embarrassment and friction between the company and those parties that have to

be paid on time by the company. All three carry a heavy (sometimes hidden) cost to the company when unexpected cash shortages occur.

But, just as no mechanic would add two gallons of oil to an engine that was designed for one; we can conclude that there is a certain optimal amount of operating cash that a well-managed company requires to allow it to run smoothly. If it has more than the optimal, the company is wasting its resources. That surplus cash should be put to better use by the company.

It is not uncommon to see two companies that operate in similar industries, of similar size, with similar operating characteristics and notice that Company A manages quite well with an average operating cash balance of $50 k, while Company B, with average balances of $100 k, has constant cash problems and a bad record among its creditors, due to slow bill payment habits.

How can Company A do better than Company B with only half as much operating cash (lubricating oil)?

Usually, we find that company A is "smarter" in managing its operating cash requirements, smarter in *foreseeing* and *predicting* changes, and quicker to *react* to changes in cash inflow/outflow patterns. This is largely due to the speed and amount of information that the company has about its customer's payments habits and its obligations to its suppliers.

6.4.2 Second Current Asset—Receivables

Consider this statement: "If a company could stop selling on credit without losing sales, it would immediately do so."

To most companies, having receivables on its books presents a *headache* because they:

- require considerable administration,
- often cause friction with clients,
- cost interest to carry them on the company's books,
- produce negligible interest revenues to the company.

In short, receivables are a necessary evil, a burden that the company has to bear, in order to help the company's sales volume. This is particularly true if your competition uses credit as a key feature of their marketing effort.

For example, it is important to remember that a company that has $5 M of average receivables on its books plays the role of banker to its customers to the extent of a $5 M loan. The question arises; do you want to be in the banking business? Most often the answer is a resounding NO!

Receivables Management

Receivables management basically aims to continuously monitor whether a company's present credit policies are optimal.

This job has two aspects: companies should try to find out if a shift to a tighter credit policy would be beneficial, or whether a shift to an easier credit policy would be the way to go.

Each of these two policy changes produces both benefits as well as costs.

Generally, a shift to *tighter* credit produces the following *benefits*:

- lower average receivables,
- lower receivable carrying costs,
- lower interest costs,
- lower bad debts,
- lower administration costs.

Unfortunately, it also produces the following *costs*:

- loss of certain credit sales,
- loss of profits from those credit sales.

For instance, if the trade-off between benefits and costs of this tighter credit change turns out to be favourable (for example, benefits rise $50 k per year and costs rise $40 k per year), the company is $10 k per year better off, and you can conclude it was a smart move.

Warning: Do not automatically assume that a shift to tighter credit policies is always the smart way to go. Let us examine the opposite situation.

Suppose that another company chooses to make its sales credit policy more *generous*. This shift produces the opposite benefits and costs. It causes the following *benefits*:

- additional credit sales,
- additional profits from those extra sales.

It would also produce the following *costs*:

- higher average receivables,
- higher receivable carrying costs,
- higher interest costs,
- higher bad debts,
- higher administrative charges.

It is quite possible that the trade-off between the benefits and costs of this policy change towards "easier credit" turned out to be favourable (for example, benefits rise $75 k per year and costs rise $60 k per year) making the company $15 k per year better off. In this second example, more generous credit policies would be the way to go.

In conclusion, there is simply *no way to predict* the outcome without knowing more about your customers' characteristics. To effectively manage its receivables, a company must have broad and rapid knowledge about:

- the state of its receivables,
- its customers' payment habits,
- its customers' buying intentions from your company.

Can this company benefit from better communication capability? Of course, it can. Needless to say, without modern information-transfer technology, it is very difficult for a company to achieve this knowledge.

6.4.3 Inventory Management

6.4.3.1 The Next Current Asset—Inventories

It is important to realize that when it comes to inventories, we are focusing largely on *merchandising businesses*—companies that sell a product. Companies that sell services usually have a very small inventory or supply levels, and few benefits can be gained by focusing attention on them. Merchandisers can be manufacturers, wholesalers and retailers. Their common characteristic is that they sell goods, and in the process of doing so, these companies usually carry inventories—raw materials, components, parts, goods in the process of being assembled, and finished goods.

Just as in the case of receivables, it is useful to see inventories as a *"necessary evil.*" If a company had perfect foresight and could predict with a high level of accuracy the behaviour of its customers, suppliers and production process, it could theoretically operate with virtually zero inventory levels. Of course, in the real world of business, perfect foresight and absolute accuracy do not exist.

But remember, modern information-transfer technology can bring every business closer to this ideal of perfect foresight and accuracy.

6.4.3.2 Role of Inventories

One useful way to picture the role of inventories in a business is to see it as a vat filled with water. At the top of the vat is an inlet and at the bottom is an outlet.

The level of water in the tank represents the inventory. If a business had absolute knowledge of the rate at which water would flow out of the vat (inventories are drawn down or sold) and it had absolute knowledge of the rate at which it could pump water into the vat (i.e., control over the speed and rate of

inventory deliveries to the company), it could operate this system with barely an inch of water in the vat (minimum average inventory levels), without ever running dry. This is the ideal that good inventory management is striving for.

6.4.3.3 Dangers of Inventories Too Low

Inventories which are too low can cause "stock-outs." Stock-outs can be very damaging to companies because they cause:

- damage to customer goodwill,
- loss of sales,
- expensive delays.

These are but a few examples of the cost of running out. Again, the hidden and measurable dollar costs can be astronomical and as a result, companies often willingly absorb very high inventory costs as insurance against stock-out losses. What they often fail to realize is that there is a far cheaper stock-out insurance available—enhanced communication and/or information-transfer capabilities.

The *less* a company knows about its customers' buying habits and the less a company controls the rate and speed with which inventory levels can be increased, the *more* inventory should be held to prevent expensive stock-outs. In this regard, inventories should be seen as buffers to protect against stock-outs.

6.5 Business Intelligence—The Key Asset

6.5.1 Inventory Richness

A special situation exists in the case of those merchandisers who consider the *richness and breadth of inventory selection* an important marketing tool.

Let us consider the following example: Suppose you own a tie shop. It would be quite natural to guess that your collection of ties would be more marketable if you had an inventory of 500 different colours and four ties of each colour, for a total inventory of 2,000 ties (500×4), rather than 50 different coloured ties and 40 ties of each colour for an equal inventory of 2,000 ties (50×40).

Obviously, selection is superior in the first inventory which is an advantage from the marketing point of view. However, the probability of stock-outs is much higher, as is the frequency of reordering inventory.

To sum up, we can say that for more efficient management of inventory levels, the company needs to know more about its customers' buying intentions and be able to quickly transmit instructions for inventory deliveries to its suppliers. This information should be integrated with the company's internal operations. Here also, modern information-transfer technology plays a major role.

This fact is proven by some solid examples, as in the case of a retailing chain

of work and sports garments. In 1998, it operated its inventory at a turnover level of approximately 40 times per year, i.e., the average number of days that inventory is unsold is about nine calendar days (360 days ÷ 40). During this same period, the industry average was 12 times per year, giving an average of 30 days in which the products went unsold.

This phenomenal inventory turnover was achieved through effective communication strategies between the company, its customers and its suppliers.

This concludes our overview of the nature of operating cash, receivables and inventories.

6.6 Two Approaches in Measuring the Costs of Receivables and Inventories

Let us consider our two accounting statements again: the Balance Sheet and the Income Statement. You will recall that the left side of the balance sheet shows the tools that a company owns (asset), which are financed with funds that appear on the right side of the balance sheet (liability and equity).

In the Income Statement, the expense of items can be expressed as a percentage of the annual sales, or revenues. While in the Balance Sheet we often try to measure the cost of having a particular asset on the books (this is sometimes called carrying costs). In short, there are two ways in which we can express the cost (or burden) that an asset creates for the company which has such an asset on its books: In short:

(a) The Balance Sheet Approach: Here, we express the cost "as if" it were an interest rate that the company pays for the funds raised to finance that asset.

Example: The amount of the asset is $1 M. The annual cost that the asset "created" is $200 k. Therefore, that "interest rate" or carrying cost is ($200 k / $1 M) = 20%

(b) The Income Statement Approach: Here, we express the same annual costs of $200 k as a percentage of the Annual Sales of this company.

Suppose the Annual Sales are $8 M. Therefore, ($200 k / $8 M) = 2.5% of the Annual Sales.

Using this dual approach in portraying the costs that assets create for a company throws a fresh light on the issue of whether the company's investment in that particular asset profitable or not. Since we are dealing with working capital, the assets that we will be focusing on are mainly inventories and receivables.

Example: We have used Canadian averages in the example shown, and the final figures may surprise you. When using the Balance Sheet Approach it was found that on average all costs associated with havingreceivables and inventories, produced the following carrying costs:

- It is as if receivables are financed with a very expensive loan carrying a 19.5% virtual annual interest rate.

- It is as if inventories are financed with a very expensive loan carrying a 37% virtual annual interest rate.

Using the Income Statement to express the heavy costs of owning receivables and inventories, we discover that on average the costs of:

- receivables costs a company about 1.77 cents per dollar of sales (or revenues).
- inventories costs a company about 6.33 cents per dollar of sales (or revenues).

These two figures do not mean too much by themselves, but they become crucial when you consider that the average after-tax profit margin (NIAT/Sales) in Canada is approximately 7 cents per dollar of sales.

Now, it can easily be seen that even a modest lowering of the above mentioned costs of 1.77 cents and 6.33 cents per dollar of sales have a strong impact on profit.s.

6.7 Receivables Management—Introduction

If credit sales are a significant part of your total sales, then receivables management becomes a very important part of the running of your business. The higher the percentage of credit sales, the more significant receivables management is.

Some questions pertinent to receivables include:

- Are you satisfied with the management of your receivables?
- How important are credit sales to your sales strategy?
- Would less generous credit policies significantly hurt your sales?
- Would more generous credit policies significantly boost your sales?
- Would your credit customers take advantage of the opportunity if they could electronically transfer funds to your company?
- Could it hurt your sales if you could “force” them to do so?
- Could you “encourage” your customers to do so by offering specific discounts?
- Would more generous credit terms help your sales volume?

We will look at the techniques to calculate the trade-off between:

- the benefits of faster receivables collections (ties up less money) and the costs of speeding up your receivables collections.
- the extra sales profits that more generous credit terms bring and the costs of offering those more generous credit terms.

6.7.1 Receivables Management

An additional investment in a more integrated and close-knit communication

capability between the company and its customer base could result in several benefits:

- improved receivables management—a reduction in the average length of time that receivables remain unpaid and lower percentage of bad debts,
- improved inventory management—a reduction in the average length of time in which your inventory remains unsold, a lower percentage of slow-moving stock, and a higher percentage of faster-moving stock,
- additional sales and potentially higher sales margins—due to your superior ability to meet customer needs and ability to monitor your customer's fortunes.

The aim of receivables management is to reduce the amount of scarce financial resources that a company has tied up in its receivables without damaging the company's profits that are derived from its credit sales.

6.7.1.1 An Example of Receivable Costs

Let us look at a typical small company that sells on credit and finances its receivables by obtaining short-term bank loans. Suppose that the company's average borrowing costs are 10% per year, and its receivable turnover is approximately 11 times per year, which is a recent Canadian average. Its receivables are unpaid on average about 33 days (360 days ÷ 11). This means that this company's cost of financing its receivables is 0.91% (10% ÷ 11) of its credit sales.

Assume Annual Credit Sales are $100 M, therefore Average Receivables Balance is ($100 M/11 x) = $9.09 M. Therefore, Annual Interest Cost is 10% × $9.09 M = $909 k, which equals ($909 k/$100 M) = 0.91 of 1% of Annual Credit Sales. In addition, the firm pays out $800 k py in Sales discounts to encourage clients to pay their bills quickly.

- Average Receivables Balance = $9.09 M. Therefore, $800 k/$9.09 M = 8.8% = discount cost.

There are other costs associated with lending money to customers, i.e., having receivables on your company's books.

(a) Receivables administration costs:

- These include clerical costs, postage, telephone, and other overhead costs.
- Analysts have estimated that these costs can range from 4%～8% of average receivable balances or 0.36%～0.73% of annual credit sales.
- Strong differences in sales credit policies among industries explain the range of the numbers.

(b) Many corporations that sell on credit offer purchase discounts in order to encourage quick payment:

- Industry practices differ as to their size and importance.
- A typical industrial wholesaler sells on 2/10/30 terms; 40% of its credit customers take advantage of the discount offered and pay their bills in ten days, saving themselves 2%.

- This wholesaler's annual credit sales are approximately $100 M. Therefore, $40 M is paid quickly, saving the customers and costing the wholesaler $800 k (2% × $40 M) per year in purchase discounts.
- The overall effect is that the discounts cost the company 0.8% ($800 k ÷ $100 M) of its annual credit sales (approximately 8.8% of the company's average receivables balance).

(c) Receivables often create bad debts:
- Industry differences play a big role, but one generalization can be made—the more generous the credit terms granted, the higher the percentage of uncollectible receivables.
- Canadian averages range from 0.14%～0.41% of annual credit sales or 1.5%～4.5% of average receivables balances.

Combining the costs, we find the following:

Costs as a ⇒	% of Total Credit Sales	% of Average Receivables Balances
Carrying receivables (financing)	0.64	7
Receivables administration	0.38	4.2
Granting discounts	0.56	6.2
Bad debt	0.19	2.1
Average Cost of Receivables	1.77	19.5

These average percentages imply that:
- Out of each 100 cents of credit sales, 1.77 cents are used to play the role of creditor to your customers.
- It is as if the receivables part of a company's total assets are financed with a loan that costs the company an interest rate of 19.5% per year.

By either measure, we see that having receivables on the books—lending money to your customers, you indulge on a very expensive activity.

Consequently, it is very important to look at the benefits to these credit sales provided to the company.

6.7.1.2 An Example of Improved Receivables Management

Cost/Benefit Analysis

This example is based on an actual company that had the following numbers:
- annual credit sales of $10 M,
- average receivables balance of $918 k,
- receivables cost $250 k per year,
- average number of days for unpaid receivables—even with discount-takers who pay their bills quickly—is 33 days i.e. 360 days × ($918 k/$10 M).

The management of this company decided to spend on an enhanced communication capability to its credit customers, which costs $10 k per year.

This investment brought about the following changes:

- The average number of days that the receivables remained unpaid fell from 33 days to 30 days, which lowered the receivables carrying costs from 2.5% to 2.27% [(30 ÷ 33) × 2.5%]—a net reduction of 0.23%,
- The bad debt and receivables administration costs taken together fell from 0.275% to 0.175% of credit sales: a drop of 0.1%.

These two events produce a total positive effect of 0.33% = (0.23% + 0.1%) of annual credit sales. Since the annual credit sales were $10 M, the 0.33% meant a reduction in cost of $33 k per year. The benefit/cost ratio of the management decision to invest in better communications worked out to $33 k/$10 k or more than three to one.

6.7.2 Summary

This concludes our overview of receivables management.

The purpose of receivables management is to reduce the average length of time that receivables remain unpaid and lower the percentage of bad debts. Another goal is to reduce the average length of time that inventory remains unsold, lower the percentage of slow-moving stock and raise the percentage of fast-moving stock, which will ultimately increase sales and potentially give higher sales margins.

When dealing with the cost of granting credit to customers, receivables management should reduce the amount of financial resources that the company has in its receivables, without the decrease the company's profits derived from its credit sales.

Now, we will look at the effect that an enhanced information-transfer system can have on a company's inventory management.

6.8 Inventory Management

6.8.1 Introduction

If inventory is a large part of your company's total assets, then inventory management becomes a very important part of the running of the business. The higher the percentage of inventory, the more important inventory management becomes.

Some questions pertinent to inventory include:

- Are inventory levels in your company a concern to you?

- Are they too high?
- Are there high levels of slow-moving items?
- Are there regular stock-outs of fast-moving items?
- Is the selection mix of your inventory sufficiently rich enough to satisfy your customers?
- Would a richer, more varied inventory mix likely boost your sales?
- Are you satisfied with the "inventory pipeline" between you and your customers (downstream flows)?
- Between you and your suppliers (upstream flows)?

The aim is to reduce inventory levels, while maintaining selection choice, without significantly hurting sales.

6.8.2 Inventory Management

Let us look at the *upstream pipeline first*—the movement of inventory from your suppliers to your company. Consider the following methods to improve your inventory management:

- improved information-transfer with suppliers and customers,
- constant stock monitoring,
- more frequent shipments of smaller batches,
- field warehousing,
- bypass shipping,
- just-in-time techniques.

Most of these techniques require far more intense information transfer between your company and your suppliers and customers.

We will later look at the techniques available to analyze the trade-offs. We will calculate the *benefits* that those improved inventory techniques can bring because of fewer funds tied up in inventory levels and enhanced sales' profitability, through superior response to customer's needs. Then we will calculate the *additional costs* of a much more sophisticated communication capability between your company, your suppliers, and the more intensive flow of information between your company and your customers.

If we focus on the *downstream pipeline*, from your company to the customer base, the methods and techniques largely mirror those in the upstream pipeline.

Remember, the overall aim is, through vastly superior information transfer between your company and your customer base, to become acutely aware of your customer's inventory needs and to respond more quickly to those needs (information-transfer technology offers opportunities here).

This translates into better service, which not only enhances your sales, but often provides you better pricing opportunities. Having a better knowledge of your customer's inventory needs allows you to operate at more optimum inventory

levels, and reduces the number of stock-outs and slow-moving stock, which in turn, lowers your inventory carrying costs.

The aim of inventory management is to reduce the amount of scarce financial resources that a company has tied up in its inventory without damaging the company's profits.

Remember that the cost of owning inventory can be expressed as a *percentage of annual sales* or as a *percentage of average inventory balances*.

The first expression looks at a company's Income Statement and breaks down each dollar's worth of sales in its components of various costs and profits. The second expression looks at a company's assets and measures the company's cost of financing those assets.

The cost of owning inventory can be broken down into the following categories:

(a) Inventory Carrying or Financing Costs—Basically it is the Weighted Average Cost of Capital (WACC %) that the company uses to finance the asset called inventory;

(b) Holding Inventory Costs—Warehousing, security, spoilage, shrinkage, insurance and handling costs, etc;

(c) Transportation Costs—Associated with bringing inventory to the company if these costs are borne by the company.

Obviously, total inventory costs vary greatly from industry to industry. Though it is dangerous to generalize, let us look at each of the cost categories.

6.8.2.1 Financing Costs

An examination of the Dunn & Bradstreet statistics can give you an idea of the various inventory turnover ratios prevailing in the economy, their average is 8 x per year. Since Dunn & Bradstreet only publishes the (Sales/Inventory) ratio and throughout this book we have used (Cost of Goods Sold/Inventory), we have to convert the (Sales/Inventory) ratio of 8 x per year, to a (Cost of Goods Sold/Inventory) ratio by multiplying 8 x by the (Cost of Goods Sold/Sales) ratio of 73% to obtain a (Cost of Goods Sold/Inventory) ratio of 5.84 x p.y. or 62 days unsold.

If we use 14% as an average WACC %, we see that an average company with $100 M in annual sales with an average inventory turnover of 5.84 times per year will have an average inventory balance of approximately $17 M ($100 M ÷ 5.84 times), which when financed at 14% causes an interest cost of (14% × $17 M) = $2.38 M, which equals 2.38% of Annual Sales.

6.8.2.2 Holding Costs

Holding costs range rather widely depending on:

- the character of the inventory that the company owns,
- its relative per unit value,
- its vulnerability to exposure,

- deterioration,
- its ease of handling,

and so on.

Various studies of inventory management have mentioned 10% to – 20% of average inventory values, or 1.7% to – 3.4% of annual sales, as an average range of annual inventory holding costs in North America.

6.8.2.3 Transportation Costs

This leaves the last cost associated with owning inventory—transportation. Generalization is difficult, but one observation is important.

While suppliers may offer to pay for the cost of bringing inventory to the company, ultimately, it is the buyer of the inventory who pays for this. Transportation and shipping studies in the USA have found that 4%～12% of average inventory values, or 0.7% to 2.1% of annual sales, is the range that would apply to transportation costs to most merchandising businesses.

If we list the three costs of owning inventory, we get the following values:

Average Costs as a ⇒	% of Annual Sales	% of Average Inventory Balances
Carrying or financing	2.38	14
Holding	2.55	15
Transportation	1.4	8
Average inventory cost	6.33	37

The first average percentage implies that out of every dollar of sales, 6.33 cents is consumed by the cost of *having* the inventory. *Do not confuse this cost with the actual cost of inventory* itself; Canadian averages place that cost as approximately 68 cents out of each sales dollar (i.e., it is the Cost of Goods Sold).

The second average percentage implies that a company's investment in the asset "inventory" is financed at an average cost of approximately 37% per year (quite a steep rate if you financed your home or car at that rate). Needless to say, business has a powerful incentive to lower these inventory costs and the most effective way to do so is to lower the inventory balances by speeding up inventory turnover ratios without hurting the company's sales and the profits generated by these sales.

The magnitude of these numbers makes us realise the enormous competitive edge e-mail business has over more conventional business.

One of the potential advantages of e-mail businesses is that they can operate at substantially lower inventory levels. The bookseller AMAZON.COM is operating with inventory levels that are but a fraction of a regular bookseller. No doubt this gives the company a very powerful cost advantage, aside from the other advantages that a virtual existence gives to the e-mail businesses.

However, to safely operate with much lower inventory levels a company needs to know more about their customers' buying habits, their need for inventories, and the available delivery systems to their customers. On the other side of the equation, the company has to provide its own suppliers with better information about its need for inventory inflows and delivery systems into its place of business.

Modern communication technology can help management get this information about their own company, about the needs of their customers (downstream), and the needs of their suppliers (upstream), and combine this knowledge with upstream and downstream shipping costs, shipping speeds and shipping constraints to develop a smarter way to manage the company's inventory.

Remember, the ideal would be happy suppliers, happy customers, virtually zero inventory levels and good profit levels for your company. Obviously, a hard to achieve task, but the closer a company comes to this ideal, the better its inventory management.

Just-in-time inventory is one such aspect of inventory management and another is "bypass shipping". Remember that all these techniques aim for the same common goal—to reduce the amount of scarce resources that a company ties up in its inventory without damaging the company's profitability.

The following procedure may help to summarize and facilitate quantitative analysis. Total inventory costs can be expressed as a percentage of annual sales, or as a percentage of average inventory balances owned by the company. We will use 6.33% and 37% as averages.

Suppose that a company decides to spend $50 k per year on enhanced telecommunication capability to improve its inventory management and this annual expense turns out to be 1% of the company's annual sales (i.e., annual sales are $5 M), the payoff of this expenditure should exceed 1% of annual sales.

Such a payoff should be looked for in lower carrying costs due to a drop in average inventory levels and lower holding costs in warehousing, security, spoilage, shrinkage, insurance, handling, etc. A word of warning: the third inventory cost—transportation—often tends to rise in this scenario and should obviously be treated as an additional expense.

6.8.2.4 Summary

This concludes the overview of inventory management.

The purpose of inventory management is to reduce the amount of scarce financial resources that a company has tied up in its inventories without damaging its profitability. The overall aim is to become acutely aware of your customer's inventory needs to be able to respond quickly to those needs—give better service, receive better pricing opportunities, and reduce stock-outs and slow-moving stock.

The following techniques should be considered as ways to improve your inventory management: improved communication, constant stock monitoring, more frequent shipments of smaller batches, field warehousing, bypass shipping,

and just-in-time techniques. All of these techniques require far more intense communication and information-transfer between your company and your suppliers.

6.9 Operational Cash Management

6.9.1 Introduction

The effect of better information transfer on operational cash management is to reduce the needless and excessive build-up of operational cash balances, allowing the company to reduce its reliance on line-of-credit financing, and hopefully raise interest earnings from temporary short-term investments. These goals *should not increase* the risk of embarrassing and harmful operational *cash shortages*. however.

We will look at the following subjects:

- Global Distributing Example,
- Fluctuating Short-term Debt,
- Cash Management,
- Accounts Payable Management.

6.9.2 Global Distributing Example

6.9.2.1 Facts

A small company, Ontario Distributing, operates over a wide geographical area. It purchases from approximately 300 suppliers who ship directly to a dozen Ontario Distributing centres across the province. The various centres rely strongly on their autonomy and independence in purchase decision-making. This has been a key factor in Ontario Distributing's success among its customers, who find close attention and rapid response to their needs.

Ontario Distributing sells to approximately 1,000 corporate customers, who demand prompt attention to their needs and appreciate the company's flexibility in handling their payment terms. The company's sales credit policies play a significant role in its overall marketing strategies. Each centre carries its cash, receivables and payables on its own books, and each centre manager has the responsibility to manage them well. Other short-term borrowing by Ontario Distributing is done at its head office through a centralized single Line of Credit (maximum $6 M).

The company's overall accounts payable (money owing to its suppliers) is approximately $10 M on annual purchases of about $80 M. The company's annual sales, virtually all on credit, total about $160 M.

The company's operational seasonality is such that approximately 70% of its

sales occur during its "busy" half year and the other 30% of its sales occurs during its "slow" half year. During the busy period, the company relies heavily on its line of credit loan (average balance $5.5 M) and it also has a small average balance of approximately $100 k in its marketable securities account. This account should be seen as a "temporary parking place" for surplus cash that Ontario Distributing enjoys from time to time.

Average operational cash balances are about $50 k per centre or $600 k overall. (There are 12 centres.)

6.9.2.2 Effect on Balance Sheet

During the slow period:

- Ontario Distributing's line of credit loan averages only $500 k.
- Marketable securities account has an average balance of $500 k (think of this as a temporary parking place for surplus cash).
- Average operational cash balances are about $100 k per centre or $1.2 M overall.

The above numbers can be summarized as follows. Focus on the numbers from *before the changes* to operational cash management took place (left side of page).

Ontario Distributing Example
Partial Balance Sheet

Before

Busy Period

Assets		Liabilities	
Cash	$600 k	Line of Credit Loan	$5,500 k
Marketable Securities	$100 k		

Slow Period

Assets		Liabilities	
Cash	$1,200 k	Line of Credit Loan	$500 k
Marketable Securities	$500 k		

Average/Year

Assets		Liabilities	
Cash	$900 k	Line of Credit Loan	$3,000 k
Marketable Securities	$300 k		

After

Busy Period

Assets		Liabilities	
Cash	$300 k	Line of Credit Loan	$ 5,100 k
Marketable Securities	$0 k		

Slow Period

Assets		Liabilities	
Cash	$360 k	Line of Credit Loan	$0 k
Marketable Securities	$840 k		

Average/Year

Assets		Liabilities	
Cash	$330 k	Line of Credit Loan	$2,550 k
Marketable Securities	$420 k		

The following interest yields and interest costs prevailed during the year:

- average yield on marketable securities is 6%,
- average interest cost on the line of credit 10%.

6.9.2.3 Corrective Action

The company decided to tighten up and integrate the information flow of its dozen regional centres by adopting extensive communication capability, while at the same time, preserving as much as possible the flexibility of the regional centres. A large reason for its success in the marketplace was due to its claim—"We serve your needs as if your life depended on it."

The enhanced data transfer and access to information among all twelve centre managers and head office allowed the company to *match* temporary cash surplus in one location with temporary cash shortages in another. It also was better able to *space payments* to suppliers without incurring their wrath for late payment. *Better predictions* on cash inflows were obtained.

The overall improved cash flow management enabled the centre to lower their operational cash balances by 50%. It also virtually eliminated unanticipated cash surpluses during the busy periods. These two events enabled Ontario Distributing to reduce its average line-of-credit loan balances by $400 k during the busy period.

During the slow period, the results were: lower operational cash needs of $360 k, a virtual elimination of average line of credit borrowing, and an increase of average marketable securities balances by $340 k to $840 k.

The net effects of these efficiencies are most easily calculated when we look at the annual averages. The average balance of the marketable securities rose from $300 k to $420 k, subsequently raising the interest revenues earned from them by $7.2 k (6% × $120 k).

The big benefit occurred in its drop of interest expenses. There was an average reduction of $450 k in the line-of-credit borrowing throughout the year, at an interest cost of 10%, which amounted to $45 k per year in lower interest expenses. The total benefit of higher interest revenues of $7.2 k and lower interest costs of $45 k amounted to $52.5 k.

Ontario Distributing "paid a price" for this improved efficiency, with the costs associated with:

- creating an increase in communication capability,
- rapid data transfer,
- frequent use of the communications between the various players within the organization's branches.

In this case, the total annual communication expenses of the company rose by approximately $2.1 k per year, producing a benefit/cost ratio of $52.5 k / $1.2 k or approximately 44 times, and leaving the company better off by $51.3 k ($52.5 k—$1.2 k) before taxes.

It should be noted in this case that Ontario Distributing went to great lengths to preserve local autonomy and freedom of its regional centres.

More impressive gains could probably have been obtained by a:

- more autocratic, centrally directed cash inflow/outflow control system, and
- stricter purchase and payment authorization system.

In fact, many companies have chosen to go this route. The potential victim in such a tighter framework is often customer and supplier goodwill. While the damages to this goodwill are not easily measurable in dollars and cents, they can often be significant.

The beauty of modern telecommunications technology is the possibility to enjoy the benefits of *coordinated behaviour, while minimizing the bureaucratic inefficiency of centrally-directed behaviour and maximizing the creativity and spontaneity of individual enterprise.*

6.10 Fluctuating Short-Term Debt

The overall aim of cash management on fluctuating short-term debt is to minimize the level of operational cash that a company requires to meet its day-to-day obligations without causing cash flow embarrassments.

Just like receivables and inventories, operational cash should be seen as merely a resource needed to facilitate day-to-day bill paying out of the company. The more a company knows about its cash-out requirements, its estimation of its cash inflows, and its day-to-day, even hour-by-hour, cash balances that it owns among its operational units, the better the company can manage its operational cash balances.

Enhanced communication capability allows a company to do this.

Most corporations operate with the help of short-term loans, which take the form of lines of credit or revolving credit. Their most common characteristic is a term which varies in length from six months to three years, with one year being the most common term length. The loan contract also mentions a ceiling, which indicates the maximum balance that the loan amount may reach.

Other characteristics which may be contractually stipulated in the loan agreement are the:

- minimum size of a loan draw,
- minimum size of a repayment instalment,
- floor and ceiling levels in a company's operational cash account that trigger loan repayments and loan draws.

The key characteristic of such line-of-credit loans and a company's operational cash balance is an interplay, or seesaw, between the average loan levels and the degree that the company is cash-rich as a result of its operations.

There are many examples of companies that have a very poor grasp of their

near-term, cash outflows and inflows. They consequently borrow far more through their line of credit than is absolutely necessary, while they may simultaneously have an *average* cash balance that is much higher than it needs to be.

The result is bad inventory management of the resource cash. This is especially true of companies that have multiple operational units that individually have cash inflows, outflows and cash balances.

Obviously, there are strong advantages in giving these operational units the freedom to handle cash. It should not be the aim of operational cash management to needlessly curtail this freedom if it would result in strained relations with each centre's customers and suppliers.

Unfortunately, there are numerous examples of draconian and bureaucratic cash management, heavily centralized and strictly focused on the head office. They often result in such negative by-products as friction between the operational units and those who should be paid by them, and those who should pay the operational units. Logic and flexibility should tell you to avoid this.

Modern information-transfer technology should, and can, overcome a lot of these problems, allowing distant operating units to make rapid cash payments as long as their legitimacy and impact on the overall cash position of the company can be instantly and constantly monitored.

Similarly, on the inflow side, cash receipts of the outlying operational units can be instantly and constantly electronically monitored and reflected in the overall cash position of the company.

This enhanced level of data does something else as well that may in the long run do even more to improve cash management. It helps the company become a "*better guesser*" or estimator and budgeter, which in turn improves the planning process throughout the whole company.

Drucker, the famous management scientist, is supposed to have said that the one key attribute that separates winners and losers in the world of business is the "*quality of a company's guesstimates*." In a world in which the rate of change is continuously accelerating, this statement is truer than ever.

6.11 Cash Management

6.11.1 Some Useful Questions to Ask

Does the company consist of a single operating unit in one location, or are there several operating units (branches, subsidiaries, sales offices, etc.) located in different places? If the last situation exists, do these operating units have separate cash inflows, outflows and balances?

Are you satisfied with the degree of knowledge (and the speed with which it is available) that the central office has about each unit's day-to-day cash inflows,

outflows and balances?

Are you aware that superior information-transfer capabilities can dramatically improve your company's control of day-to-day cash flow management?

Observations: Modern cash management can strongly reduce the company's average "minimum required" cash levels, avoid temporary cash shortages, and avoid needless cash surpluses; all this for the company as a whole, as well as the individual operating units.

The benefits of this superior cash management include lower average loan balances, producing lower interest costs, and/or higher average interest income (earned from temporary cash surpluses).

Case studies have found very favourable benefit/cost trade-offs associate with cash management. In one situation, a company, whose operational area extended over approximately 1,000 miles by 500 miles, had an operational structure consisting of six cash "spending, receiving and holding" centres. This company invested approximately $20 k per year in a superior communication/information-transfer capability.

The benefits obtained through lower interest costs and higher interest revenues amounted to $96 k per year. A benefit/cost ratio of more than 4.8:1 was realized.

One important additional benefit that superior information-transfer between head office and its branch network on cash flow can produce is an *improved level of security and a reduction of fraud and theft levels*.

It is true that historically, excessive head office control of cash flows often produced bureaucratic slow-downs, inefficiency, and strained feelings between the company and its customers and suppliers. Modern information-transfer technology between operating units within a company can reduce these irritants considerably, allowing the company *the best of both worlds; better overall cash control and continued operational flexibility at the branch level*.

Last but not least, superior information-transfer technology allows the company to interact more quickly with money markets. The company's loan levels, through its operating lines of credit, will respond more quickly and in smaller increments to the company's need for money.

This will lower the company's interest costs, while at other times, temporary surplus liquidity can be taken advantage of more quickly, giving the company higher interest revenues from those surpluses.

Somewhat related to operational cash management is the management of a company's accounts payable, bills to be paid in the near future, usually to suppliers of the company.

6.11.2 Accounts Payable Management

Usually in the relationship between a company and its many suppliers of goods and services, all buying is centrally controlled and managed through a single

purchasing department. The most obvious reason for this is the need to control cash outflows and the need to monitor the legitimacy of the purchase.

However, centralized purchasing often brings with it serious disadvantages, among which are:

- bureaucratic slow-downs,
- lack of flexibility,
- loss of quickness to respond to sudden opportunities.

The unique needs of different operating units within the company often are poorly served by central purchasing control.

Accounts payable management aims to *preserve the benefits that a purchasing department produces and simultaneously create freedom and flexibility for the different operating units within the company*, allowing them to operate more efficiently.

Not surprisingly, modern information-transfer technology can bring powerful benefits that allow the company to achieve this aim. For instance, if the requirements—potential purchase of a company's various operating units—could be made known instantaneously to the purchasing department and simultaneously made known to the other operating units, this would produce an explosion of information among various parts of an organization about each other's needs.

In the belief that the more departments know about each other's needs, the more likely the whole organization will work cohesively; this exchange of information is seen as beneficial. It opens the door to:

- pooling of purchases,
- interdepartmental exchanges of supplies,
- reduced stockpiling beyond needs,
- a greater understanding of each department's role within the company as a whole.

Shared information within a corporation is not to be feared—it should be encouraged.

Additionally, accounts payable management gives a company the opportunity to streamline the way it manages its bill paying techniques. It might involve spacing of payments to match fluctuating cash inflow patterns.

Finally, the company might also monitor more closely its purchase discount opportunities through better information-transfer technology. A surprising number of companies are unaware of the great cost reduction opportunities that they miss in this area.

6.11.3 Summary

This concludes the overview of the nature of operational cash management.

The purpose of operational cash management is to reduce the build-up of operational cash balances, allowing the company to reduce its reliance on its line-of-credit financing, and raise interest earnings from temporary short-term investments. Be careful not to be caught short of operational cash. Modern telecommunications allows a company to do this.

The benefits of improved information-transfer technology on accounts payable include:

- control of cash outflows while serving the needs of the different operating units,
- increased knowledge about the various operating units,
- the pooling of purchases (increased purchase discount opportunities),
- interdepartmental exchange of supplies,
- reduced stockpiling, and
- a streamlined way to manage bill paying techniques (spacing payments).

We will next look at the effect that modern communications can have on a company's receivables management.

6.12 Investment Analysis

6.12.1 Introduction

Suppose a company is considering spending an additional $100 k per year to obtain better information-transfer capability. We would like to know by how much that company's sales or revenues have to increase to pay for this expenditure.

We shall make the *conservative assumption* that this new $100 k per year expenditure *will not* create new efficiencies within the company thereby, lowering other operating costs (although there are many examples where this has happened). Instead, we assume that the $100 k per year new expenditure will cause the company's total operating expenses to rise by $100 k per year.

6.12.2 Investment Analysis

We shall analyze two situations.

In the first situation, we assume that the entire $100 k per year is a fixed expense, i.e., the company will pay this amount regardless of what happens to its sales volume.

In the second situation, we assume that the $100 k per year is treated as a variable expense, i.e., a small portion of the $100 k is allocated to each successful sale that was generated through the new communication capability. Furthermore,

the company has the option to spend more or less than $100 k per year in response to rising or falling sales levels.

Suppose that this company has the following Income Statement, as seen in the first column labelled "Before."

	Before	Increase in FOE	
		Break-even Scenario 1	Scenario 2
Revenues (REV)	6,000 k	6,200 k	7,000 k
Fixed Operating Expense (FOE)	– 1,000 k	– 1,100 k	– 1,100 k
Variable Operating Expense (VOE)*	– 3,000 k	– 3,100 k	– 3,500 k
EBIT	2,000 k	2,000 k	2,400 k
Interest Expense (INT EXP)	– 600 k	– 600 k	– 600 k
NIBT	1,400 k	1,400 k	1,800 k
Tax 50%	– 700 k	– 700 k	– 900 k
NIAT	700 k	700 k	900 k

* Note that the ratio (VOE / REV) = 3,000/6,000 = 0.5 stays unchanged.

We first need to introduce the concept of Contribution to Overhead Percentage (CTO %).

6.12.2.1 First Approach

This company's contribution to overhead % (CTO %) is:

$$\frac{\text{REV} - \text{VOE}}{\text{REV}} = \frac{6,000\text{ k} - 3,000\text{ k}}{6,000\text{ k}} = 50\%$$

6.12.2.1.1 Scenario 1

The amount of extra annual revenues that are needed to pay for this $100 k new fixed expense is called Required Sales Increase or RSI.

$$\text{RSI} = \frac{\text{New Fixed Expenseper Year}}{\text{CTO\%}} = \frac{\$100\text{ k}}{50\%} = \$200\text{ k / Year}$$

Rather than using a total annual revenue increase number, such as RSI, we can express it equally well as the Required Number of Sales Increase (RNSI) that will pay for the new fixed expenditure of $100 k per year.

Suppose this company's $6,000 k annual revenues were generated through 3,000 sales orders (determined from the sales records of past years). The average size of each sales order is $2,000 ($6,000 k ÷ 3,000 orders).

We then divide our RSI of $200 k by the average sales order of $2,000 ($200 k ÷ $2,000) to obtain 100 additional sales of approximately $2,000 each. These should

be generated in a year by the new communication capability to pay for itself, i.e., leave the company's profits unchanged.

6.12.2.1.2 Scenario 2

What happens if the revenue increase Exceeds the RSI or RNSI? The increase in after-tax profits will be:

$$[(\text{CTO}\% \times \text{Sales increase}) - \text{Increasein Fixed Expenses}] \times (1 - \text{tax}\%)$$

Suppose that the new communication capability boosted the company's annual sales by \$1,000 k (one million). The result would be an increase in the company's after-tax profits of \$200 k, as seen in the last column.

$$[(50\% \times \$1,000\text{ k}) - \$100\text{ k}] \times (1 - 50\%) = \$200\text{ k}$$

6.12.2.2 Second Approach

Here, we are treating the \$100 k expense of the new communication capability as a variable expense. That is, we allocate part of the expense to each successful sale that was caused by the new communication capability.

Suppose that the company makes 50 calls per working day during 200 working days per year, totalling 10,000 calls (50×200) per year, which have a success rate of 10%, producing 1,000 ($10\% \times 10{,}000$) successful sales orders. We now allocate \$100 k per year expense of the new communication capability to the 1,000 successful sales orders (\$100 k ÷ 1,000 orders), giving us an additional variable cost of \$100 per successful sales call. Remember from the previous page that the average size of a sales order is \$2,000. Therefore, the \$100 additional variable cost is a 5% increase in average VOE.

When we add this 5% new variable cost to the old 50% existing variable cost percentage that prevailed (see Income Statement), we obtain a new variable cost/revenue percentage of 55%. Therefore, the company's new contribution to overhead percentage, CTO%, falls to 45%. Remember that we have left the Fixed Operating Expenses of the company unchanged.

To find out how much the revenues have to rise in order to pay for the \$100 k per year expenditure in communication capability, we can ignore the unchanged Fixed Operating Expenses, and focus on the contribution to overhead dollar totals before and after the change.

If (old CTO% × old Sales) = (new CTO × new Sales), the new investment will have paid for itself:

$$(50\% \times \$6,000\text{ k}) = (45\% \times \text{new Sales})$$

$$\$3,000\text{ k} = 0.45 \times \text{new Sales}$$

$$\text{New Sales} = \$3,000\text{ k} / 0.45 = \$6,667\text{ k}$$

New Sales have to be $6,667 k per year, increasing by $667 k (See column “After” in the following Income Statement).

Variables	Before	Break-even	
		After	Scenario 2
Revenues (REV)	6,000 k	6,667 k	7,000 k
Fixed Operating Expense (FOE)	– 1,000 k	– 1,000 k	– 1,000 k
Variable Operating Expense (VOE)*	– 3,000 k	– 3,667 k	– 3,850 k
EBIT	2,000 k	2,000 k	2,150 k
Interest Expense (INT EXP)	– 600 k	– 600 k	– 600 k
NIBT	1400 k	1,400 k	1,550 k
Tax 50%	– 700 k	– 700 k	– 775 k
NIAT	700 k	700 k	775 k

* (VOE ÷ REV) changes from 50% to 55%.

Note that Scenario 2 produces substantially higher NIAT, if the $100 k additional expense is treated as a fixed expense.

6.12.3 Summary

This completes the example of an analysis of a company’s investment in better communication capability.

We wanted to know by how much the company would have to increase its sales or revenues to pay for its communication expenditure. We looked at two different ways to approach this scenario.

In the first situation, we assumed that the entire cost was a fixed expense (the company would pay this amount regardless of sales volume). The amount of extra annual revenues that are needed to pay for the communication capability is $200 k per year.

In the second situation, we assumed that the cost was a variable expense (a portion of the cost is allocated to each successful sale that was generated through the new communication capability). New sales have to generate an additional $667 k per year to pay for the communication capability.

This concludes the overview of the various types of information which may influence financial decisions.

7 Fixed Assets

Unit Objective: To help you decide whether a company's investment in a fixed asset is an attractive proposition from a financial point of view.
Key Words: Fixed Asset, Weighted Average Cost of Capital, After Tax Cash Flow, Internal Return Rate (IRR)

7.1 Capital Budgeting

Capital budgeting is an analytical technique that enables a corporation to evaluate the financial attractiveness of, an investment in, Fixed Assets, i.e. Plant and/or Equipment. A few important ground rules should be kept in mind:

(a) All cash flow streams over time need to be converted into Present Value numbers, i.e., a dollar paid or received in the future has a lesser value in today's terms, due to the fact that money today has an opportunity to earn a yield and therefore a future in/out flow of money is worth less in today's terms.

(b) The crucial figure that the analyst tries to determine is the differential after tax annual cash flow during the time that the newly acquired Fixed Asset is expected to remain in use. This, of course, means that capital budgeting requires that the analyst make an educated guess about the Use-Life of the new Fixed Asset and about the changes in Revenues or Sales and/or Operating Expenses that are caused by the newly acquired Fixed Asset.

(c) The process of converting future in/out flows of funds into present value numbers is called Discounting. Discounting requires a certain interest rate at which the discounting process occurs. Fortunately, every spreadsheet software package has a function (command) that will discount a "future amount" into a present value. All you have to do is tell the computer which interest rate to use to do that discounting.

(d) About that interest rate; you will recall that at the very start of this course we talked about the two tasks into which the whole subject of finance can be reduced. The second of those tasks involved a company's Cost of Capital Percentage. This Cost of Capital is the Weighted Average after Tax Cost of Capital that the company pays in order to obtain the use of funds. A list of those possible sources of funds in ascending order of costs follows.

In our example we shall quote the relative percentage costs as they are applied to a medium size, successful Canadian manufacturer; the numbers were calculated as at the end of 2000. We shall also quote the Market Values of various securities that were issued by this manufacturer. It should be clearly understood that this is an example only; external forces, i.e., changes in monetary policy and internal changes in our company's credit worthiness, can and will change these numbers significantly.

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7.1.1 Example of a Typical Capitalization of a Canadian Corporation

	Market Value of the Securities	Effective After Tax % Cost
Short term Debt Financing i.e., 90 day Commercial Paper issued	$25 M	3.6%
Long term Debt Financing 10 year Debenture issued	$125 M	4.8%
Preferred Share Financing i.e., # Pfd. Shares outstanding	$75 M	10%
Common Share Financing i.e., # Common Shares outstanding	$375 M	16%
Total Market Value	$600 M	

To calculate the "Weighted Average Cost of Capital" that this company pays for its entire capitalization of $600 million, we use the following technique:

$$\left(\frac{25}{600}\times 3.6\%\right)+\left(\frac{125}{600}\times 4.8\%\right)+\left(\frac{75}{600}\times 10\%\right)+\left(\frac{375}{600}\times 16\%\right)$$

which produces a WACC of 12.4%. Note the significant difference between the costs of borrowing and the cost of share capital. This is due to the fact that interest is a tax deductible expense and dividends are paid out of after tax income dollars. Of course, to the provider of funds debt financing carries less risk than equity financing, consequently the cost of the former is lower. The differences in the cost of preferred share capital and common share capital reflect differences in risk and are also due to the fact that preferred shares are a favourable investment vehicle for corporations seeking to invest money. Consequently, their popularity drives their yield down.

7.1.2 An Example of Spreadsheets Used for Capital Budgeting

Probably the easiest way to portray a typical spreadsheet employed in a capital budgeting analysis is to use an example.

Suppose that in the year 1999 a corporation that suffers from capacity constraints is considering acquiring additional Plant/Equipment which promises to enable the company to increase its Sales significantly.

Without the new Plant/Equipment, sales would quickly reach a $100 million capacity ceiling within one year. The following Pro-Forma (i.e., guessed at) Income Statements prevail:

	Year (*All figures in millions*)				
	2000	2001	2002	2003	2004
Total Revenues	95	100	100	100	100
Cash Operating Expenses	– 70	– 71	– 72	– 73	– 74
Non-Cash Operating Expenses	– 8	– 6.4	– 5.12	– 4.10	– 3.27
Taxable Income	17	22.6	22.88	22.9	22.73
Tax @ 30%	– 5.1	– 6.78	– 6.86	– 6.87	– 6.82
NIAT	11.9	15.82	16.02	16.03	15.91
+ Non-Cash Expenses	+ 8	+ 6.4	+ 5.12	+ 4.10	+ 3.27
After Tax Cash Flow	**19.9**	**22.22**	**22.14**	**20.13**	**19.18**

It is the very last stream of numbers in the table that we must focus on; the after Tax Cash Flow (ATCF) which will be generated by our company if we *do not* acquire additional Plant and Equipment.

Note how ATCF was calculated, we add our Non-Cash Expenses, i.e., Depreciation Expenses on our existing Plant/Equipment, to our NIAT. We assumed that the non-depreciated (Book Value) of that old Plant/Equipment was $40 million in 1999 and we simply depreciated it at 20% per year on the declining balance, i.e., 20% × $40 M = $8 M in 2000; 20% × ($40 M – 8 M) = $6.4 M in 2001, etc.

Let us suppose that the end of our analytical time horizon is five years, i.e., the year 2004. We further assume 2000 Sales of $95 million; and that inflation causes our Cash Expenses to rise gradually as indicated. *Now let us create a Pro-Forma Income Statement series assuming we do acquire $20 million worth of additional Plant/Equipment.* This promises to eliminate our capacity constraints.

Assume that our Sales Capacity rises from $100 million to $180 million, giving our Sales/Revenues lots of room to grow. After consulting with our best marketing and production experts the following best guesses are made for the next few years:

	Year (*All figures in millions*)				
	2000	2001	2002	2003	2004
Total Revenues	100	106	113	120	128
Cash Operating Expenses	– 70	– 72	– 75	– 79	– 84
* Non-Cash Operating Expenses	– 12	– 9.6	– 7.7	– 6.14	– 4.91
Taxable Income	16	24.4	30.3	34.86	39.09
Tax @ 30%	– 4.8	– 7.32	– 9.09	– 10.46	– 11.73
NIAT	11.2	17.08	21.21	24.40	27.36
+ Non-Cash Expenses	+ 12	+ 9.6	+ 7.7	+ 6.14	+ 4.91
After Tax Cash Flow	**23.2**	**26.68**	**28.91**	**30.54**	**32.27**

* This sequence of numbers is obtained by multiplying the annual depreciation rate, in our case 20%, by the new amount of total Plant/Equipment ($40 M, i.e. original equipment, + $20 M, new equipment) which is $12 M in the year 2000, and 20% × ($60 M – $12 M) = $9.6 M for the year 2001 etc.

Now we calculate the "differential After Tax Cash Flow" upon which all Capital Budgeting analysis is based (σATCF).

Let us show the two streams of ATCF numbers together:

	Year				
	2000	2001	2002	2003	2004
ATCF (without new Plant/Equipment)	19.9	22.22	22.14	20.13	19.18
ATCF (with new Plant/Equipment)	23.2	26.68	28.91	30.54	32.27
σATCF	3.3	4.46	6.77	10.14	13.09

It is this stream of estimated future benefits which the additional Plant/Equipment promises to produce that we need to convert into a present value number.

We need to express the stream of σATCF into an equivalent single amount of 1999 dollars. As we said before, any spreadsheet will do this for you in a microsecond. Let us use as a discount rate the WACC, i.e., Weighted Average Cost of Capital that we just calculated, WACC = 12.4%. My computer tells me that the Present Value of this stream of numbers is $24.88 million in 1999 dollars.

7.1.2.1 Residual Values Also Enter This Equation

There is one more factor we must consider and this is the change (increase) in Residual Values that the $20 million purchase of Plant/Equipment caused in the year 2004, i.e., the end of our computational time horizon. Let us make the assumption that the Residual Value of the new equipment equals its non-depreciated value as at year 2004. This number happens to be $6.55 million. Knowing that the new additional Plant/Equipment's Residual Value equals $6.55 million in the year 2004, we now have to convert this future amount also into a Present Value. Using the 12.4% discount rate our computer tells us that its Present Value equals $3.65 million. We now add these two benefits together:

Present Value of the Operating Benefits	$24.88 M
+ Present Value of the Residual Value benefit	$3.65 M
Present Value Total Benefit	$28.53 M
and now subtract the cost of the new Plant/Equipment	$20.00 M
And we have now calculated the:	$8.53 M
Net Present Value (NPV) of the Investment to expand our capacity	

7.1.2.2 One More Important Number in Capital Budgeting: The IRR

Our spreadsheet software allows us to make one more powerful calculation, and that is to calculate this proposal's *Internal Rate of Return* (*IRR*).

The IRR is simply the interest rate, i.e., the discount rate that causes the present values of the proposal's benefits to equal the Cost of the Proposal – $20 million in our case. When I ask my computer to do this for me it tells me that the IRR of this proposal is 19.85%. This means that the $20 million investment which produced the stream of benefits whose dollar amounts we calculated, yielded a return of 19.85% per year. When we compare this IRR of 19.85% with our WACC of 12.4% we see that this promises to be a beneficial investment that will enhance the value of the company. Remember our initial discussion of Task #1 and Task #2, Asset Yields and Costs of Capital.

7.1.2.3 Some Broad Guidelines For Capital Budgeting

- Investment Projects that promise a positive NPV are worth doing.
- Investment Projects that promise a negative NPV are not worth doing.
- Projects whose IRR exceeds the company's WACC are worth doing.
- Projects whose IRR is less than the company's WACC are not worth doing.

7.1.2.4 General Observation

Capital Budgeting analysis is a very inexact process. There is a mistaken belief that by making the Spreadsheet Model very detailed, extensive and complicated, one obtains higher levels of predictive accuracy. Research that has been done in this area suggests otherwise. There are numerous examples where billion dollar corporations have invested millions of dollars of expert's time and computer time to build monstrous spreadsheets whose predictions turned out to be hopelessly wrong. Since they relied on so many factors that has to be guessed the probability that the end result of this complicated "guesswork" was wrong was very high.

The reality is that there is no substitute for experience in Capital budgeting. And it is better to employ a small group of analysts to run the analysis than employing a bigger group. What is important is to pick analysts that have no "ax to grind" (i.e., in promoting or dismissing the proposal); and that these analysts consult as many sources as possible whilst maintaining their own counsel in deciding whether a particular factor really offers the added accuracy which the analysts hope to achieve with their spreadsheet model.

Note: The example that we have used is a very simple one. The real world will present you with numerous "variations on a theme" which could turn out a lot more complicated. A few examples:

- A replacement investment decision, i.e., presently owned old Plant/Equipment is to be sold (or traded in) to be replaced with new Plant/Equipment.
- An investment, instead of occurring in a single year may take place over a number of years and the promised benefits will be coming "on stream" only gradually. Similarly, the replacement of older Plant/Equipment may also occur gradually over a period of years.

Obviously such Capital Budgeting scenarios are more complicated and require more complex spreadsheets, but the basic principles for these scenarios have been laid down in the example we used.

7.2 The Analysis of "Financial Leasing"

The purpose of this analysis is to help you decide whether an investment in fixed assets ought to be financed through debt or through leasing.

Financial Leasing should be seen as merely another way of financing the acquisition of a fixed asset for a company. This means that *first* a capital budgeting analysis must have confirmed that acquiring the fixed asset was a good idea (i.e., NPV > 0 or IRR > Cost of Capital). Once this fact has been established, Financial Leasing Analysis tries to answer the question, "Would ownership or leasing be the best way of financing the fixed asset?"

From an analytical point of view, it *makes no difference* that a company may have so much surplus liquidity that it has no need to borrow funds for the acquisition, because the opportunity cost of the resources argues that we need to conduct the analysis as if funds *were* obtained to finance the fixed asset.

When a company *leases* a fixed asset, it gives up *depreciation expenses and interest on debt expenses* as tax deductible items which it would have had if it borrowed the funds and bought the asset. *Instead*, the company obtains the periodic lease payment as a tax deductible expense.

7.2.1 Cash Flow Lease Analysis (Best Performed Using Spreadsheets as a Tool)

Compare the present value of a series of *After Tax Cash Flow* numbers obtained from two series of pro-forma statements. *The first series of pro-forma costs statements reflect* the situation if the company borrowed money and bought the fixed asset. The second series of pro-form costs statements reflect the situation if the company had leased the fixed asset. The length of the two streams of "After Tax Cash Flows" is equal to the expected use-life of the fixed asset. *Present values* of the two streams of After Tax Cash Flows are calculated using the company's *After Tax Cost of Debt Interest Rate* (i.e., Loan Rate × (1 – company's tax rate)) and NOT the company's WACC % as was done in the Capital Budgeting Analysis.

The financing method which produces the lowest present value cost number is the preferred one.

Probably the easiest way to explain the analytical technique used to decide whether to borrow and buy rather than lease the capital asset is to use an example.

Let us assume the following scenario. A corporation, after a thorough capital budgeting Analysis, comes to the conclusion that a $500 k piece of production equipment should be acquired. Completing this task is step one of a two-step process.

Once step one has confirmed the wisdom of the acquisition, in step two, we determine whether to borrow and buy or to lease the fixed asset.

In this analysis, we focus strictly on the costs associated with the two choices. We ignore any benefits that the equipment promises to bring.

One more assumption is made; we will include an annual equipment maintenance cost of $10,000 associated with the ownership choice only, assuming that this cost will be borne by the Lessor in the other choice. Note that this assumption can easily be altered. Obviously, details of the leasing contract determine whether the Lessor or the Lessee is responsible for equipment maintenance.

Another point to remember—there is an important difference with Capital Budgeting Analysis and that is the interest rate used for the discounting process to convert the stream of future dollar flows into today's dollars. Whereas we used the company's Weighted Average Cost of Capital (WACC %) as the discount rate in capital budgeting analysis, we shall use the "After Tax Borrowing Rate", ATBR at which the company can obtain debt financing in a Leasing Analysis. In this example, we assume an interest rate of 8% per year and a corporate tax rate of 30%, thereby, producing an ATBR of $8\% \times (1 - 30\%) = 5.6\%$.

We shall use a five-year time horizon and assume that the net realizable value of the equipment at the end of five years equals the "non-depreciated" or book value of the equipment at that time.

The $500 k loan is assumed to be repayable in five equal instalments that contain yearly changing proportions of interest and principal. We call this a fully amortized loan; our home mortgage loan repayments run on the same principle.

The equipment, if owned by a corporation, can be depreciated at a 20% rate based on a declining book value. The following tables show the relevant numbers of the analysis:

Loan Amortization Table
Loan Amount $ 500 k
Interest Rate 8%

Year	Payment	Interest	Principal	Balance Owing
1999	—	—	—	$500,000
2000	$125,228	$40,000	$85,228	$414,772
2001	$125,228	$33,181	$92,047	$322,725
2002	$125,228	$25,818	$99,410	$223,315
2003	$125,228	$17,865	$107,363	$115,952
2004	$125,228	$9,276	$115,952	$0

Depreciation Schedule
Original Cost $500 k

Year	Calculation	Depreciation	Undepreciated (Book) Value
2000	20% ($500 k)	$100,000	$400 k
2001	20% ($400 k)	$80,000	$320 k
2002	20% ($320 k)	$64,000	$256 k
2003	20% ($256 k)	$51,200	$204.8 k
2004	20% ($204.8 k)	$40,960	$163.84 k

It is further assumed that the Lessor is willing to lease this equipment to the corporation (the Lessee) for an annual lease payment of $ 100 k. At the end of the five-year lease contract, the equipment, with an estimated residual value of $163.84 will revert back to the Lessor (the Leasing company).

Note that should it choose to borrow and buy, our company will be able to deduct the annual interest and depreciation expenses from its taxable income and thereby reduce the amount of taxes payable. This is called the Tax Shield. Should our company choose to lease, only the annual lease payment is a tax deductible expense.

Following are a set of tables which show the calculations used to determine the two key numbers, i.e., the "Present Value (PV) of the Cost of Owning" and the "PV of the Cost of Leasing" the equipment.

Cost of Owning
(borrowing 100% and buying)

1 Year	2 Loan Repayment	3 Principal	4 Interest	5 Balance Owing	6 Maintenance Costs	7 Depreciation Expense
2000	125,228	85,228	40,000	414,772	10,000	100,000
2001	125,228	92,047	33,181	322,725	10,000	80,000
2002	125,228	99,410	25,818	223,315	10,000	64,000
2003	125,228	107,363	17,865	115,952	10,000	51,200
2004	125,228	115,952	9,276	0	10,000	40,960

In year 2004 — equipment's realizable value = residual value 163,840 which is treated as cash in-flow.
PV cash-in-flow (163,840) × 0.7615 = (124,764). This cash in-flow is converted into a PV as at 1999.
This amount must be deducted from Column 12 giving a total of $317,371.

Continued

Year	8 (4 + 6 + 7) Total Expenses	9 Tax Dedn. 30% × 8	10 (2 + 6 − 9) Net Outflow	11 PV @ 5.6% equiv. @ 8% × (1 − 30%) PV Equivalents	12 (10 × 11) PV Cost of Owning
2000	150,000	45,000	90,228	0.947	85,446
2001	123,181	36,954	98,274	0.8967	88,120
2002	99,818	29,945	105,283	0.8492	89,406
2003	79,065	23,720	111,508	0.8042	89,675
2004	60,236	18,070	117,158	0.7615	89,216

Proof: 85,446 + 88,131 + 89,666 + 89,675 + 89,217 − 124,764 = $317,371.
Present Value of the Cost of Owning = $317,371.

Now we calculate the cost of leasing.

Cost of Leasing

1 Year	2 Annual Lease Payment	3 Tax Dedn. 30% × 2	4 (2 − 3) Net Outflow with Leasing	5 PV Equiv. @ 5.6% (8% × (1 − 30%))	6 (4 × 5) PV Cost of Leasing
2000	100,000	30,000	70,000	0.947	66,290
2001	100,000	30,000	70,000	0.8967	62,769
2002	100,000	30,000	70,000	0.8492	59,444
2003	100,000	30,000	70,000	0.8042	56,294
2004	100,000	30,000	70,000	0.7615	53,305

Present Value of the Cost of Leasing $\sum$ 298,102

Note that in Column 11 of the first table and Column 5 of the second table, we have shown the Present Value equivalents for each of the five years, using a discount rate of 5.6%.

The figure says that a dollar received or paid in the year 2000 is worth only $0.947 or 94.7 cents in the year 1999 if a yield of 5.6% were available. And a dollar in the year 2004 is worth $0.7615 or 76.15 cents when expressed in 1999 dollars.

The first number is calculated as follows:

$$\frac{\$1}{(1.056)} = 0.947 \text{ the other number } \frac{\$1}{(1.056)^5} = 0.7615$$

But as we indicated before, a single command on your spreadsheet will convert a stream of future dollar flows into a present value equivalent if you tell the computer the interest rate at which the discounting occurs.

As you can see, comparing the two crucial numbers—PV Cost of Owning is $ 317,099 and PV Cost of Leasing $298,102—produces a net advantage to leasing i.e.: NAL of $18,997 (nearly $20 k).

7.2.2 General Observation

Many corporations fail to perform rigorous leasing analysis to determine the "net advantage of leasing" NAL number that we have just calculated.

No doubt this is due to a lack of time, expertise and to the fact that corporate lenders, who of course compete with Lessors for this type of business, often prove less energetic (aggressive) in pursuing this business than leasing companies. In our example, figures were chosen that created our NAL of nearly $20 k, therefore favouring the leasing decision. This situation does not always reflect the reality in the world of business, where we often come across leasing contracts that produce a negative NAL-value which indicates that the company would have been better off owning the Fixed Asset.

Moreover, recent research has shown that a significant portion (in one case, more than 20%) of leasing deals, when rigorously analyzed, produce NAL values that are negative. That means the companies would have been better off to borrow and buy the asset. In most of these situations, the corporations would have had no problems in obtaining 100% loan financing.

The writer knows of one case where a six-year leasing contract for $12 million worth of equipment produced a negative NAL value of approximately $590 k, not an insignificant amount. This company in question could have used the $590 k very well for other purposes.

One final observation about the close connection between leasing analysis and capital budgeting analysis: It is quite possible for an investment in fixed assets which produced a borderline unattractive result (that is a negative NPV) to be "saved" if the follow-up leasing analysis turns up an attractive leasing proposition that produces a substantial NAL value.

Let us say that a $10 million project produces a negative NPV value of $80 k (less than 1% of the investment). Let us further suppose that the subsequent leasing analysis produces a NAL with a positive value of $120 k.

In this situation, the decision to lease the assets turns an unattractive capital investment proposal into a positive one, i.e. the combined numbers— $80 k and + $120 k would provide the corporation with a net benefit of $40 k.

8 Budgeting

Unit Objective: To develop sharp budgeting skills that promotes realism and planning and minimizes waste and inefficiency.

Key Words: Pro-forma Statements, Surplus Liquidity (SL), External Financing Needed (EFN)

8.1 Introduction

Unfortunately for many people, the word budgeting brings many negative connotations. One particularly unflattering definition describes it as:

"an exercise in creative lying and deceit in order to protect one's sphere of influence, to hide one's incompetence and to further one's selfish aims."

This cynicism is no doubt caused by the fact that many organizations use the budget process exclusively to allocate resources. And, to make matters worse, they also fail to commit sufficient effort to analyze the legitimacy and justifications of the budget request.

Departmental managers are quick to discover this failure and, in such a climate, the clever budget manipulator often appears to do better than the more serious budgeter. Cynicism quickly gains the upper hand and the budget process becomes subverted.

Budgeting ought to be far more than strictly a resource allocation tool; it can be a powerful planning and monitoring device that allows an organization to remain nimble in a quickly changing environment. Unfortunately, these other uses of budgeting are often lost in the manipulative abuses of budget process.

Government bureaucracies are infamous for this charade, which, in turn, is a major cause for government waste and high taxes. But, these abuses are by no means restricted to governments; they are endemic in most large, private organizations as well.

And, while the burden of government waste is merely shifted unto the taxpayer, such a shift is much harder to accomplish in private organizations, particularly when they are exposed to an increasingly competitive business climate. In such conditions, waste, caused by poor budgeting, can lead to loss of competitive strength and ultimately bankruptcy. There are many spectacular examples of large, seemingly invincible, corporations that died as a result of bad management and waste.

While it is not the scope of this book to go into detailed coverage of the budgeting processes, you should be aware of some useful guidelines for meaningful budgeting.

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- Make it a participative process, involving as many subordinates as possible. Too often, "top down" budgeting creates alienation among those who are expected to implement a budget's consequences and who had no input into its creation. Allocate enough time and resources to the budget process by realising that this participative process is often slow, time consuming, and seemingly inefficient when compared with the quickness of the top down approach. Yet, do not be fooled by this false sense of efficiency. Ultimately, it is the enthusiasm and commitment of its employees that make a company do well.
- Do not punish "under-spenders."
  One typical and unfortunate result of many budgets is the tendency to automatically reduce a department's future budget allocation if it did not spend all of its past allocation. This creates an incentive to spend resources needlessly to prevent such reduction in future allocation. If the budget was fairly determined, such under-spending often reflects superior effort and improved productivity. Try to reward such performance in creative ways rather than punishing it by budget reductions.
  Caveat: Of course you must be aware that this opens to the door to abuse if managers pad their budgets to set the stage for budget surpluses. Again, the more realistic the budget is, the less likely that this will occur.
- Clearly identify *fixed* vs. *variable* cost components.
  A common mistake is the insufficient breakdown of costs into their sub-components. Some of these sub-components are fixed—others are variable. Instead, "too large cost components" are often incorrectly labelled all fixed or all variable, creating poor estimates.
- Make frequent budget revisions in light of actual experience.
  Computers and spreadsheets have taken a lot of drudgery out of the budget process. A company I know of revises its six-month cash flow budget *every two weeks* (they used to do it monthly). The level of predictive accuracy for estimates three months away rose from 75% to 95%, turning this budget into a powerful analytical tool.
- Reduce unnecessary budget secrecy. The more that budget units within a company know about each others' resource allocations, activities and responsibilities, the more realistic the *entire* budget process becomes: you'll be surprised at the rise in accuracy and the drop in budget padding. As an added bonus, a better grasp of each department's role within the whole improves interdepartmental coordination and cooperation. Management consultants often find needlessly excessive budget secrecy in large organizations. The result: one part of the organization often doesn't know what another is doing. Certain tasks are done more than once and what is worse, other necessary tasks are not done at all. Granted that for strategic reasons a certain degree of budget secrecy is necessary, but it is useful to keep this secrecy level *within* the corporation to an absolute minimum.

- Do not tie managers' salaries and ranking to the size of the budget they administer.
  In many organizations (particularly governments) managerial ranking and salaries are blindly tied to the amount of budget allocation a manager is responsible for. This is often irrational since there is seldom a correlation between the size of a department's budget allocation and its importance to the future of the company. Other criteria should be relied on in determining managerial compensation.

Exercise #8A

Why do we prepare budgets? We prepare them for planning, evaluating performance, coordinating activities, implementing plans, communicating, motivating and authorizing actions.

Required:

Prepare the 1999 budget for this department, within a corporation. You have been told to allow for costs as follows (thousands of dollars):

		1999 *Budget*	1998 *Actuals*
Salaries Management	(11 people)		$470
Wages Clerical	(6 people)		310
Employee Benefits	(20% × 780)		156
Computer Timeshare Costs			83
Stationery			27
Furniture & Office Equipment			36
Rents			5
Employee Expense Management			4
Miscellaneous	(all other)		9
			$1,110

Prepare the 1999 budget based on the following criteria:

(a) Stationery costs are expected to be less in 1999 by 10%.

(b) Employee benefits are 20% of salaries and wages for 1999.

(c) Attrition has resulted in a 10% saving in management salaries.

(d) Miscellaneous costs are expected to increase by 4.0%.

(e) Furniture and office equipment costs are expected to be $4,000 less in 1999.

(f) Attrition has also resulted in payroll savings for clerical of 9% in 1999 compared to 1998.

(g) All other costs are expected to remain the same.

Exercise #8B—Trend Analysis

Trend analysis is primarily a matter of establishing important patterns and relationships of changes. The financial statements of a company in a particular

year are often not as significant in themselves as when they are compared to prior years' performances or industry performances.

Required:

Are the dollar changes from 1998 to 1999 favourable? Or unfavourable? What other conclusions can you draw from this company's performance? "Economies of Scale" means that as productivity increases, costs per unit usually reduce. Does there appear to be strong economies of scale? Why?

Income Statement

Dollars	1999	1998
Net Sales	$1,000,000	$600,000
Cost of Goods Sold	700,000	360,000
Gross Profit on Sales	300,000	240,000
Expenses (including income taxes)	200,000	150,000
Net Income	$100,000	$90,000

Exercise #8C—Variance Analysis

Required:

Perform a variance analysis between 1990 budget and 1990 actual. Specifically answer the following:

(a) For those variances which exceed 10%, identify whether they are favourable or unfavourable. (Use letters F and U for identification.)

(b) List three possible explanations for the variances.

(c) List three possible alternative actions which you might take to handle the variance.

	Variance ($000's)	1990 Budget ($000's)	1990 Actual ($000's)
Salaries—Management		$700	$750
Salaries—Clerical		2,000	2,140
Benefits		540	578
Material—Minor		100	300
Engineering Services—Other		800	500
Commercial Training		75	75
Consultant Fees		10	90
Employee Expense—Management		40	15
Employee Expense—Clerical		55	65
Sales—Marketing Support		250	200
Sales—Plant Training		780	670
Total Expenses		$5,350	$5,383

Exercise #8D—Budget Preparation

Required:

Prepare the 1999 budget based on the following facts:

(a) Clerical and management salaries for 1999 are going to increase by 6% from the previous year.

(b) Benefits continue in the same relation to salaries.

(c) You expect both clerical and management employee expenses to be an average of the 1998 budget and actual.

(d) The director of your department has told you to include in your budget an extra $100 k in marketing support and an extra $60 k in plant training. These additional funds are to support the implementation of quality training. This directive is in addition to the $50 k reduction in marketing support and $110 k reduction in plant training which you had been anticipating because of project cutbacks.

(e) You have no consulting requirements in 1999. Also, all other expenses will remain the same as the 1998 budget.

	1999 Budget ($000's)	1998 Budget ($000's)	1998 Actuals ($000's)	1998 Variance ($000's)
Salaries—Management	$	$700	$750	
Salaries—Clerical		2,000	2,140	
Benefits		540	578	
Material—Minor		100	300	
Engineering Services—Other		800	500	
Commercial Training		75	75	
Consultant Fees		10	90	
Employee Expense—Management		40	15	
Employee Expense—Clerical		55	65	
Sales—Marketing Support		250	200	
Sales—Plant Training		780	670	
Total Expenses	$	$5,350	$5,383	

8.2 Less Common Financial Ratios for Use in Budget Design and Performance Appraisal

Corporations and departments within corporations whose output consists of physical products that are sold in a free, competitive market have it relatively easy. The value of their output can be determined without much effort.

Unfortunately, this is not the case if the output of a department, cost center or budget unit consists of goods and services that are more difficult to measure.

Far more creativity, imagination and hard work are needed to define what we mean by "output" in such circumstances. One approach used is simply to walk away from the problem of defining and measuring such indefinable output and provide resources based on historical figures plus or minus a figure that can reflect factors such as:

- A manager's ability to sell the importance of his/her department and his/her peers. The more senior a manger's position, the easier this is and the less likely tough justification is demanded.
- The top management's often vague notion that a department's "hard to define output" should be raised or curtailed in light of new directions for the company.

While such an approach to budgeting can be legitimate in a few special circumstances, financial consultants often find that it is used far too often in circumstances where, with some effort and mental discipline, the "difficult to define" output can be expressed in measurable quantities.

Some observations in this regard may be helpful:

- You will inevitably encounter the argument that "our work simply cannot be expressed in dollars and cents or in other numbers." This statement is more or less true about *all work* that is performed in an organization. And, while certain work or output may be hard to quantify, creative, co-operative efforts have often yielded innovative measures of output in very unusual circumstances.
- The more you break down a department or budget unit into subgroups, the easier the task of defining that subgroup's output becomes. This breakdown into smaller subgroups need not occur on the official level (although computers have made this easier), but can merely be done to help a larger department define its output.
- Output has been defined in numerous ways. Here are a few examples: physical units, units of time, telephone calls made or received, length of calls, costs avoided, costs incurred, pages of text processed, and pages or drawings completed. *And while it is very easy for a critic to find fault with virtually any unit of output, ask the critic, since s/he knows so much about the subtleties of the situation, to use his/her creativity to refine that clumsy measurement.*
- Inputs similarly can be defined in numerous ways. A few examples: person hours, person days, operating costs per hour, day, month, average value of physical assets employed, at cost, at replacement value, etc.

For illustrative purposes, here are some examples of ratios that the author has come across:

- Pages of word processing produced divided by person hours available in a word processing department.

A variation of the previous ratio to measure equipment productivity is:

- Pages of word processing produced divided by *original cost* or *replacement cost* or *depreciated costs* of word processing equipment *available* in the department.

Or

- Number of calls made (either telephone calls or physical calls) divided by person hours available in a department per period.

A variation of this ratio is:

- Number of successful calls divided by total calls made to determine the average success rate. Another variation:
- Number of successful calls times average amount of sales divided by the total (or variable) operating costs of a department.
- Number of service calls handled divided by person hours available in the department per period.

Somewhat related to this:

- Measure the *number* of work stoppages due to equipment failure and multiply by the average length of the work stoppages. Its product would be total time lost due to equipment. Divide this amount by person hours available in the service department.

Of course, we could also attach dollar figures to these quantities.

- Total student contact hours taken by students divided by total person hours available in an educational department or a more limited type of person hours available.

Again, dollar values, revenues and cost dollars can be attached to these quantities.

Please note that these ratios are given only in order to stimulate your imagination and help you design more appropriate ratios that fit the unique operating characteristics that prevail in your work environment.

Another point needs to be made. Nobody pretends that these ratios can capture *all* subtleties that we encounter in our daily work. Intangibles, such as customer satisfaction, quality of service, changing technologies, unusual tasks that take an increasing amount of our time, come to mind. A good budget analyst tries to modify his/her findings by keeping these *subtleties* in mind. Blind use of these ratios and a budget allocation system that slavishly hangs on to these ratios while ignoring all subtleties obviously subverts the aim of the budget process, which is to optimize resource allocation and encourage asset productivity.

Threatened people will find ways to subvert the budget process, often to protect their influence, their job or to hide their inefficiencies. But, when co-operation *can* be obtained and productivity *is* rewarded, creative budgeting techniques can be powerful tools that raise a company's performance standards.

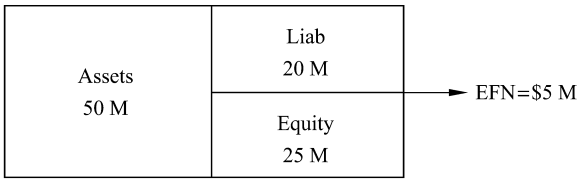
8.3 A Particular Type of Budgeting: Pro-Forma Statement Building

While most of the budget work done in business deals with the near future (that is, creating educated guesses about dollar inflows and outflows that will occur within a year or less), it can be very useful to lengthen this time horizon to a year or even a few years. One sees occasionally attempts to guesstimate over even longer time horizons, i.e. five years into the future and even longer. Experience has been that these are largely an exercise in futility and a waste of time. The degree of accuracy achieved is usually low. One often comes across these exercises as supporting documents in capital budget proposals, where five year and ten year time horizons are not uncommon.

The building of a set of financial statements that a corporation may have one or two years from today, however, can be an extremely valuable exercise. Probably the most important benefit to come from this activity is that it may predict the corporation's need for external financing (EFN, external financing needed) or the opposite, for example the company being in the position of having surplus liquidity (SL). You may recall these two acronyms EFN and SL when we dealt with the section called *"Going broke while selling more than ever"*. Strictly speaking, the EFN and SL numbers that we shall obtain in this exercise are not exactly the same as those that were obtained earlier, although there are profound similarities between the two sets.

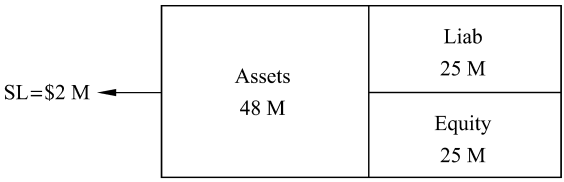
Pro-Forma Statement Building, (as this educated guessing is called,) aims to come up with an Income Statement and Balance Sheet, and even a flow of funds statement that a corporation would obtain one or two years from now. We shall shortly go through a numerical example, but first we should make clear how our estimates of EFN or SL are calculated.

Suppose, after we have completed our Pro-forma Balance Sheet, we came up with the following numbers:



We see of course that the Pro-forma Balance Sheet does not "balance" (they seldom if ever do). In this situation an amount of $5 M is needed on the right side of the Balance Sheet. This is defined as "external financing needed." Whether this $5 M is to be raised as new debt or new equity is another question.

Suppose instead that our Pro-forma Balance Sheet produces the following numbers.



This "unbalanced" statement requires $2 M on the Asset side to create balance, and this is defined as surplus liquidity.

Knowing next year's, level of EFN or SL strengthens the management position considerably. Should EFN levels be manageable, a company's lenders will be far more receptive to additional lending if they know of the need for it well in advance. "Orderly, pre-planned loans are far easier to obtain, than a panicky last minute call for a loan that was not anticipated," a well-known banker once said. Should EFN predictions turn out to be larger than the management and the bankers would like it to be, there is time to search for other sources of funds, equity perhaps, or a change in operating strategy is called for in order to reduce the EFN level.

Surplus liquidity is a nice problem to have, it is often said. Excessive SL levels may enable a company to consider new initiatives and/or investments that will absorb some of that surplus liquidity, which could strengthen future profit levels. In short, knowing your levels of EFN and SL in the near future provides managers with powerful intelligence. Remember, very high levels of Surplus Liquidity can make a company a desirable take-over target. Do not forget that this money belongs to the owners of the company. Extra Dividends or Share Buy-backs are obviously available to reduce very high Liquidity levels.

8.4 Example of Pro-Forma Statement Building Based on the 1998 Financial Statements of Electronic Distributors Case #4

Let us assume that the company's management team comes up with the following estimates for the coming year 1999:

- Sales estimate—The sales growth from $750 k in 1983 to $960 k in 1998 works out to an annual average compound percentage growth of 5%, the sales manager predicts this trend will continue.
- Gross Profit Margin—The 1998 GPM of (326/960) = of 34% is expected to come under competitive pressure. The Marketing Manager predicts that to maintain market share, the GPM may have to shrink to 32%.
- Fixed Operating Expenses—There is ample unused capacity in EDI's—various departments and facilities, a SALES increase of 5% should not present any capacity problems. The Fixed Operating Expenses are expected to remain at $100 k for the year 1999.

- Variable Operating Expenses—The production manager estimates that inflationary pressures and a "seller's market" among certain suppliers will put upward pressure on the "variable operating expense to sales" RATIO, it will rise from (102/960) = 10.625% to 11.5% in 1999.
- Interest Expenses—These are related to the company's debt levels. The company's Plant and Equipment BV of $280 k is partially financed with $160 k of Long Term Debt, which carries a 10% interest rate. The 1998 Int. Expense of $28 k was caused by non-recurring unusual circumstances. The company is under no obligation to repay the $160 k long-term debt. The $13 k short term debt must be repaid shortly. Estimated 1999 Int. Expense 10% × $160 k = $16 k.

We now shift our attention to Balance Sheet Items.

- Cash and Near Cash—The company's CEO criticizes the staff for the excessive levels of this account balance. Industry averages are one week's worth of sales particularly for a healthy company with a good credit record. Our 1998 (Cash/Sales) level is (40/960) × 360 days = 15 days. This will be reduced to 7 days in 1999.
- Receivables—The 1998 average number of days that receivables are unpaid is (90/960) × 360 days = 34 days. The credit manager indicates that if the company wants to compete with generous credit granting competitors, this number will have to rise to 40 days' worth of daily Sales in 1999.
- **Inventories**—The 1998 average number of days that Inventories were unsold was (50/634) × 360 days = approximately 28 days. Improved ordering, stock control and warehousing efficiencies that have been implemented cause the management to aim for an improvement of average Inventory levels from 28 days to 20 days unsold in 1999.
- Prepaid Expenses and Other Current Assets—Are expected to maintain the same proportion to sales.
- Plant and Equipment—No additions to plant and equipment are planned. annual depreciation charges will cause the accumulated depreciation balance to rise from 80 k to $125 k.
- Trade Payables—The 1998 average number of days payables were unpaid was (40/634 × 360 days) = approx. 23 days. The purchasing department recommends reducing this figure to 14 days. While this will reduce the effective credit that the company obtains from its suppliers, the goodwill that this change will bring about in better purchase deals and superior service from suppliers will make this worthwhile.
- Contributed Capital—The shareowners are not expected to invest additional funds in the corporation.
- Dividends—The same Dividend Payout Ratio (17.6/57.6) = approx. 30% is to be used in 1999.

What follows is the Pro-Forma Income Statement and Balance Sheet for 1999 (all figures multiples of $1 k).

Income Statement

Accounts		Explanations
1. Sales	$1,008.00	105% × $960 (1998 Sales)
2. Gross Profits	$322.56	32% × $1,008
3. C of GS	$685.44	diff. between Sales and G.P.
4. Fixed OP Exp.	– 100.00	same as in 1998
5. Var. Op. Exp.	– 115.90	11.5% × 1,008
6. EBIT	$106.66	Gross Profit – Op. Exp.
7. Interest Exp.	– 16.00	10% × L.T. Debt $160
8. NIBT	$90.66	EBIT-INT. Exp.
9. TAX 40%	$36.26	Assume same tax rate (38.4/96) = 40%
10. NIAT	$54.40	NIBT-TAX
11. Div. Paid	$16.32	30% × NIAT
12. Tfr. to RE	$38.08	NIAT-DIV
13. Cash + Near Cash	$19.60	(7 days/360 days) × 1008 Sales
14. Receivables	112.00	(40d/360d) × 1008 Sales
15. Inventories	38.08	(20d/360d) × 685.44 C. of G.S.
16. Prepaids + O.C.A.	21.00	($1008/$960) × 20
17. Pl + Equipm (gross)	360.00	unchanged from 1998
18. Accum. Deprec.	(125.0)	increases from $80 to $125
19. Pl + Equipm (B.V.)	235.00	line 17 – line 18
20. TOTAL ASSETS	$425.68	
21. Trade Payables	26.66	(14 days/360 days) × C. of G.S. 685.44
22. Other Cur. Debt	0	$13K repaid early in 1999
23. Long Term Debt	160	unchanged from 1998
24. Contrib. Capital	150	unchanged from 1998
25. Retained Earnings	$155.08	1998 R.E. $117 + 1999 Tfr. to R.E.
26. Total L + Eq.	$491.74	

Since Assets > Liab. + Eq. there will be Surplus Liquidity of $491.74 – $425.68 = $66.06

9 Economic Value Added

Unit Objective: To learn a new and powerful measure of financial performance and use it as a tool to improve the corporation's profitability.
Key Words: Net Operating Profit after Tax (NOPAT), Weighted Average Cost of Capital (WACC)

9.1 Using Economic Value Added (EVA) as a Strategic Evaluation Tool

The use of EVA as a yardstick of a company's financial performance has been steadily increasing in recent years. It is probably true that currently (in 2007) the majority of financial analysts still focus mainly on the widely known DuPont ratios. That is, "the ability of assets to generate sales" (Trev/Assets) and "the ability of those sales to generate profits" (NIAT/Trev) and "the degree that assets are financed with investors' funds" (Assets/Equity); and by combining those three ratios calculating "the returns that those investors funds generate" i.e. (NIAT/Equity) or RoE (i.e. Return of Equity).

But, the use of EVA as a financial performance indicator is growing steadily. To put it in simple words, EVA measures a company's ability to obtain economic benefits that exceed the "rent" that such a company pays for the use of the owners and lenders resources employed.

EVA, therefore, is a powerful measure of managerial performance.

9.2 A Fresh Look at the Balance Sheet

To understand the meaning of EVA it is useful to look at the Balance Sheet of a company in a new light.

Balance Sheet

Left Side	Right Side
Assets They are the tools that a company employs to conduct its business. These assets were bought with funds that were obtained from two major sources. The assets employed by the company generate "Earnings Before Interest and Taxes" often called "Operating Profits".	One source of these funds is lenders' money, i.e., Liabilities for which the company pays a tax-deductible rent, i.e. Interest to creditors.

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Continued

Left Side	Right Side
From this EBIT amount, the company pays what is due to the government, i.e., Corporate Taxes. The rest (EBIT-Tax) is often called NOPAT or "Net Operating Profit After Tax."	The other source of these funds is owner's money, i.e., Equity for which the company pays non-tax-deductible Dividends to investors.

From this NOPAT the company has to pay a Weighted Average Rent for the use of those two sources of funds (Liabilities and Equity). Let us call this weighted average rent percentage, the weighted average cost of capital or WACC%. Multiplying WACC% by the total amount of assets employed gives us the "dollar value of the WACC" or WACC$.

The EVA Equation

To calculate EVA, we simply subtract from the NOPAT generated by the company's Assets, the WACC$ (i.e. the dollar value of the weighted Average Cost of Capital) which the company owes lenders and investors for the use of their money. To state it symbolically:

$$\text{EVA} = \text{NOPAT} - \text{WACC\$}$$

which can be written as:

$$\text{EVA} = (\text{EBIT} - \text{TAX}) - (\text{WACC\%} \times \text{ASSETS})$$

From this equation we can immediately see that EVA levels are powerfully influenced by a company's ability to earn operating profits (EBIT), its taxation, its cost of funds, and the amount of Assets that the company employs.

9.3 What About EVA Levels

It should be obvious that the better a company is at maximizing its NOPAT and at minimizing its WACC$, the higher the company's EVA level will be and the more a company "justifies its economic existence" so to speak. Of course, one could also say that when a company's NOPAT is less than its WACC$, the profits that the company's assets generate fail to reach the dollar rent that the company pays for the use of those assets, with the result that the company causes economic value to disappear. Such a company fails to justify its economic existence during the time that this situation prevails.

Of course, a company's EVA level tends to fluctuate from year to year. It is quite possible that unfavourable circumstances can produce low or even *negative* EVA-values. But, *sustained* negative and/or low EVA values clearly signal the need for a re-examination of the company's direction, policies, operations, and

goals. The goal of management should be to raise and/or sustain high levels of EVA in a corporation over the long run.

9.4 To Calculate EVA We Need to Know the WACC%

Traditionally, in our attempt to maximize EVA, most attention has been paid to the left side of the Balance Sheet; i.e. Maximizing Asset Productivity and Asset Profitability with the goal of raising NOPAT = (EBIT – TAX).

But, the right side of the Balance Sheet should not be ignored. Remember that the dollar value of a company's cost of capital WACC$ is the product of the WACC% multiplied by the dollar value of the Asset Employed. It is important to note that, the WACC% is strongly influenced by a company's "Debt to Equity" mix. To put it symbolically:

$$\begin{aligned}\text{WACC\%} = &(\text{After Tax Cost of Debt} \times (\text{Debt/Assets})) \\ &+ (\text{After Tax Cost of Equity} \times (\text{Equity/Assets}))\end{aligned}$$

As you can see, those (Debt/Assets) and (Equity/Assets) Ratios play an important role.

As stated earlier, the interest that a company pays on its corporate debit is a tax deductible expense. This makes the After-Tax Cost of Debt percentage significantly less than a company's before tax borrowing rate. In fact, a company's After Tax Cost of Debt% equals the (Before Tax Borrowing Rate %) × (1 – tax rate).

For example, a company that borrows money from a bank at 8% and pays a 40% Corporate Tax Rate has an After-Tax Cost of Debt of 8% × (1 – 40%) = 4.8%. However, when it comes to calculating a company's Cost of Equity, this favourable tax treatment does Not apply. The dividends that investors receive for providing the company with Equity funds and which form part of the Cost of Equity, are not a tax deductible expense to the company paying those dividends. Hence, in calculating the Cost of Equity% we do Not multiply a percentage by the term (1 – tax rate).

In addition, given that the risk associated with providing Equity Capital is higher than that associated with providing Debt Capital, there is a second reason why a company's Cost of Equity % is significantly higher than its Cost of Debt %. In this book we shall use as a rough approximation the following relationship: it is assumed that the Cost of Equity % equals the Before Tax Borrowing Rate plus 10%.

This rough approximation does not apply to large, publicly traded corporations. But, since this book's focus is on smaller companies the (before tax borrowing rate + 10%) as a rough estimate for the cost of common share capital is surprisingly realistic. These small firms face considerable discrimination in financial markets as they seek to raise capital and this rough approximation works surprisingly well.

For example, a company whose average before tax borrowing rate is 8% is assumed to have a Cost of Equity of 8% + 10% = 18%. More accurate methods of estimating cost of Equity exists.

9.5 The Debt/Equity Mix's Effect on WACC%

To demonstrate the powerful effect that a company's "Debt to Equity" mix has on its WACC%, let us use the following examples. Assume the following:

Example 1. A company's average before tax borrowing rate is = 8%,
Its Corporate Tax Rate = 40%,
Therefore its Approx. Cost of Equity Capital = 8% + 10% = 18%.
Suppose this company's Debt to Equity mix is $4 million to $6 million.
First, we calculate the Cost of Debt Capital = 8% × (1 − 40%) = 4.8%.
Now, we calculate the weighted average cost of capital percentage.
WACC% = [4.8% × Debt/Assets ($4/$10)] + [18% × EQ./Assets ($6/$10)]
12.72% = 1.92% + 10.8%

Example 2. Let us now assume that the company's Debt to Equity mix is $6 M to $4 M.
This WACC% = (4.8% × $6 M/$10 M) + (18% × $4 M/$10 M)
10.08% = 2.88% + 7.2%

We can label debt as relatively cheap money and equity as expensive money. We see in examples #1 and #2 that the company can lower its WACC% quite significantly (i.e. nearly 21% = (10.8/12.72) − 1 by using more cheaper debt financing and less expensive equity financing to finance its assets.

Of course, we should immediately note that in these two examples we assumed that the company's Borrowing Rate of 8% did not change when the company's reliance on debt financing increased. This is not necessarily true. Corporate Lenders, once a company's reliance on debt financing reaches the end of their comfort level, will often dramatically raise the Average Borrowing Rate of such a company. But, it is equally true that until the end of the lenders' comfort level has been reached, a company can often significantly raise its reliance on debt financing without having to pay higher borrowing rates, nor higher Costs of Equity. In such circumstances, using more debt can significantly lower a company's WACC% and thereby lower its WACC$ and thus raise its EVA, assuming that this causes no significant negative impacts on NOPAT levels aside from higher interest expenses.

9.6 Strategies to Raise EVA

Aside from the strategy of lowering WACC$ by manipulating the company's Debt/Equity Mix which we just covered, there are three other approaches to raise

EVA. They are:

- Get your existing assets to work harder
  A company can try to raise its Asset Productivity and thereby, hopefully, the Asset Profitability of the company's existing stock of Assets. We define Asset Productivity as (Trev/Assets) i.e., the volume factor in the DuPont model and Asset Profitability as (Ebit/Assets) i.e. asset yield.
- Buy new, harder-working assets
  A company can acquire additional Assets whose Productivity and Profitability promises to be higher than that produced by the company's existing stock of Assets, or
- Get rid of lazy assets
  A company can dispose of certain Assets whose Productivity and Profitability is significantly below the prevailing levels attained by the company's other assets.

Of course, in the real world of practical financial management we do not neatly compartmentalize the four approaches. Most decisions that aim to improve a company's financial performance are a combination of two or more of the four approaches.

9.7 Three Measures of Financial Performance

The three important measures of performance that play a role in our search for superior EVA figures are:

- Asset Productivity (Trev/Assets): It measures the Assets' ability to generate sales and/or revenues. (Previously referred to as asset turnover or the volume factor.)
- Asset Profitability or Asset Yield (Ebit/Assets): It measures the Assets' ability to generate profits, before interest and taxation charges.
- Operating Efficiency (OP.EXP./TREV): It measures the portion of each sales and Revenue dollar that is absorbed by the company's expenses (except for Interest and Taxation changes which are removed later). Remember that the lower (OP.EXP./TREV), the better the operating efficiency of a company is.

While these three measures inter-relate, they do not necessarily improve simultaneously.

For example: It is quite possible for a company to aggressively "push its sales" thereby raising its (Trev/Assets) while this causes negative consequences on the cost front and thus see its (Ebit/Assets) and/or (OP.EXP./TREV) weaken.

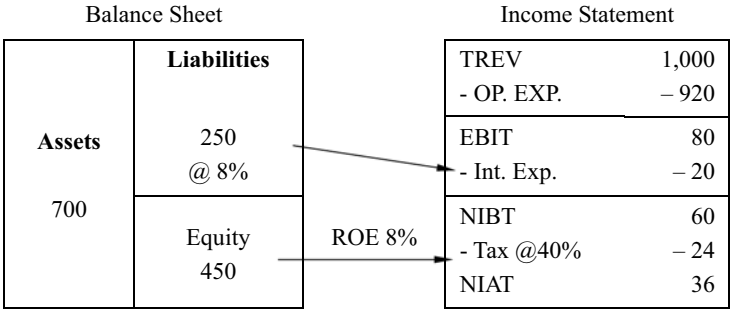
Ideally, one would like all three performance measures to improve as a result of a newly adopted course of action by the management. Failing that, where there is a trade-off between two or more of the performance measures, one should at

least aim for a positive trade-off. In such a trade-off the relative improvement in one measure outweighs the negative change in the other measure(s).

9.8 Financial Goal-Setting Using EVA

Probably the most useful application of the EVA-equation is its use as a tool in financial goal setting (FGS). In FGS, companies select EVA levels as goals to be attained. Then, the advantages and disadvantages of the four approaches are evaluated in reaching such goals. A numerical example can easily demonstrate this technique. We shall portray a company whose financial performance is rather poor, both in terms of DuPont Numbers and in its ability to generate a satisfactory EVA.

Example Case
Original Situation



These statements produce the following DuPont Numbers:

(Trev/Assets)	×	(Niat/Trev)	×	(Assets/Equity)	=	Return on Equity
(1,000/700)	×	(36/1,000)	×	(700/450)	=	(36/450)
1.43	×	3.6%	×	1.56	=	8%

9.8.1 Calculating EVA

Before Tax Borrowing Costs = 20/250 = 8%
Cost of Debt 8% × (1 – tax%) = 4.8%
Cost of Equity = 8% + 10% = 18% (rough approximation)
Therefore, the WACC% equals
(Debt/Assets 250/700 × 4.8%) = 1.72% plus (Equity/Assets) 450/700 × 18%
= 11.57%
WACC% = 1.72% + 11.57% = 13.29%

This company's EVA therefore is:

NOPAT	–	(WACC$)
(Ebit-Tax)	–	(WACC% × Assets)
(80 – 24) = 56 less		(13.29% × 700) = 93 equals EVA = – $37, a negative value

9.8.2 Conclusion

This company produces a rather meagre return on equity of only 8% as well as a negative EVA of $37. The company would have difficulty justifying its existence should this performance continue, it will obviously have to do better. Suppose we set as our goal the attainment of Zero EVA, still not impressive, but this company is "at least paying the rent" as a financial analyst would say.

9.8.3 Approach One

We try to lower the WACC$. We do this by lowering the WACC% through the use of more debt financing (and less equity financing). Some assumptions are needed here:

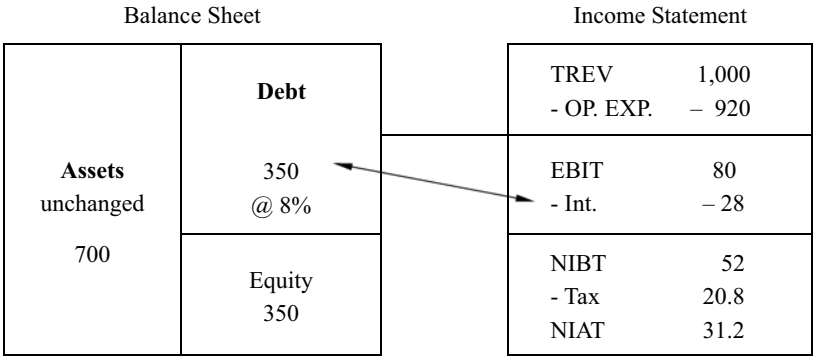
Let us assume that the financial markets will allow the existing Debt to Equity mix of ($250 to $450) to rise to ($350 to $350) without raising the existing before tax borrowing rate of 8%. Changing the Debt/Equity mix will result in be a new lower WACC%; it will be (350/700 × 4.8%) + (350/700 × 18%) = 11.4%. Notice the significant 14% drop (11.4/13.29) – 1, from the original WACC% of 13.29%. Of course, the higher debt level would cause the Interest Expense to rise to 8% × 350 = 28. Assuming no change in EBIT = 80, the NIBT = 80 – 28 = 52 and the tax would fall to 40% × $52 = $20.8 (as compared to $24, witness the tax shield effect of higher debt). The new EVA would be:

(EBIT – Tax)		less		(new WACC% × Assets)
(80 – 20.8)	–	(11.4% × 700)	=	EVA
$59.2	–	$79.8	=	($20.6)

While the negative EVA of $20.6 is definitely better than the original negative $37 value, changing the Debt to Equity mix offers little hope of significant help in raising EVA to the zero level. Using even higher levels of Debt (and lower levels of Equity) will unlikely be well received in financial markets and could dramatically raise the borrowing rate. One could of course calculate the trade-off between a greater use of relatively cheaper debt and rising borrowing rates. But, it is unlikely that using this route to better EVA levels is very fruitful or long-lasting. About the only positive thing that can be said about this approach is

that it may be useful in situations where a company is using significantly less debt than is common in the industry and the use of significantly more debt financing would not meet objections from the financial markets and cause higher borrowing rates.

The Balance Sheet and Income Statement after the changes had taken place would look as follows:



(EBIT – Tax)		(WACC% × Assets)		
EVA = (80 – 20.8)	–	(11.4% × 700)	=	(20.6)
59.2	–	79.8		

9.8.4 Approach Two

Here. we try to obtain higher Asset Productivity and/or Profitability from the existing Asset Pool. We implicitly assume here that no changes occur to the right side of the Balance Sheet. It is quite possible that significant improvements in a company's financial performance could result in more favourable (lower) borrowing rates. But, we shall ignore this possibility in our example. Remember the relevant EVA numbers from our original example.

NOPAT		WACC$	
(EBIT – Tax)		(WACC% × Assets)	
(80 – 24)	less	(13.29% × 700)	
56	–	93	= EVA negative (37)

Our goal is to attain zero EVA. To achieve it, the value of NOPAT must equal at least 93.

Applying a bit of algebra, we rewrite the amount of tax as [(tax%) × (EBIT – Interest)]. We know the values of tax% equals 40% or 0.4 and the amount of Interest

is 20. Hence, NOPAT can be rewritten as (1EBIT – 0.4EBIT + 0.4 × 20) and this equals (0.6EBIT + 8) which must be 93. Solving for EBIT gives us a value of 141.67.

We now know that to obtain a break-even (zero) EVA the company's existing Asset Base of 700 should generate an EBIT level of 141.67. This is an Asset Yield of (141.67/700) or 20.4%. Looking at the Income Statement we see that EBIT is the difference between two key values, Total Revenues (TREV) and Total Operating Expenses (OP.EXP.). We shall use two extreme examples to obtain a 141.67 EBIT level from a given asset base. In reality, there can be countless combinations of TREV and OP.EXP.

First we assume that TREV remains unchanged (i.e. 1,000) and the improvement in performance will come exclusively from better operating efficiency (i.e. lower OP.EXP.). In this case OP.EXP. must be no more than (1,000 unchanged TREV) – (141.67 Required EBIT) = 858.33. When we compare that with the existing level of OP.EXP. of 920, it suggests that an improvement in operating efficiency of (858.33/920) – 1 = 6.7% is needed to achieve our goal of Zero EVA.

It is interesting to note that a rather modest 6.7% improvement in operating efficiency allows us to reach our goal of Zero EVA. Compare that with our second approach to improvement. You will see that that approach requires a far more formidable task. There is a lesson here.

The Balance Sheet and Income Statement after the changes were made in the first assumption of APPROACH TWO would look as follows:

Balance Sheet

Assets	**Debt** 250
700	Equity 450

Income Statement

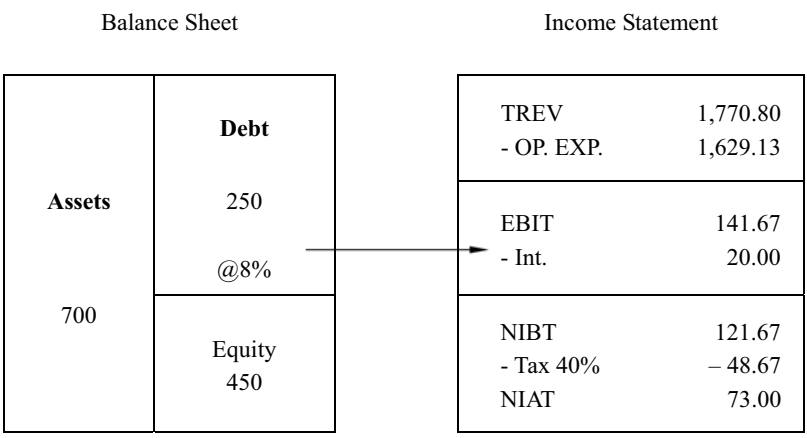
TREV	1,000.00
- OP. EXP.	858.33
EBIT	141.67
- Int.	– 20.00
NIBT	121.67
- Tax @40%	48.67
NIAT	73.00

$$\text{EVA} = (141.67 - 48.67) - (13.29\% \times 700) = \text{zero}$$
$$93 - 93$$

The other extreme assumption is that the financial improvement should be obtained only through higher sales levels generated by the unchanged level of Assets (i.e. 700). We further assume that the current level of Operating Efficiency (i.e. OP.EXP./TREV = 920/1,000 = 92%) shall remain the same. In this situation,

(EBIT/TREV) of course equals 1 – 92% = 8% and all we need to calculate is the level of TREV that can produce the required EBIT level of 141.67. Simple algebra tells us if 8% of TREV = 141.67, therefore TREV = 1,770.88 i.e. (141.67/8%). This suggests that if we want to improve our EVA only through higher sales generated by the same level of Assets and the same operating efficiency, it can only be achieved through a rather formidable sales increase of (1,770.80/1,000) – 1 = 77%. This is a daunting task.

The Balance Sheet and Income Statement after the changes had taken place in Approach Two (second assumption) would be as follows:



EVA = (141.67 – 48.67) – (13.29% × 700) = zero
93 – 93

Obviously, between the two extremes there are many combinations of higher TREV and improved operating efficiencies that can achieve our goals. But one thing should be obvious from the two extremes we looked at. Improving operating efficiency (i.e. controlling operating expenses) is far more fruitful than raising sales in improving EVA levels.

9.8.5 Approach Three

Here, the company acquires additional assets that promise a higher Asset Productivity (TREV/Assets) and/or higher Asset Yield (EBIT/Assets) than that produced by the company's existing stock of Assets. Note that we have used two measures of improvement generated by a company's Assets: (TREV/Assets) and (EBIT/Assets). Let us focus on the second, on Asset Yield (EBIT/Assets). We see that in our original case the Asset Yield is (80/700) = 11.4%. We shall ask ourselves

what new Asset Yield is needed to obtain zero-EVA. A few issues need to be considered here:

- How large should the increase in Assets be?
- How should this acquisition be financed?
- Does the new higher Asset Yield that the acquisition promises, apply only to the new assets or do spin-off effects raise the Asset Yield of the existing Assets as well?

Many assumptions can be made, but let us assume the following:

- The company will acquire $200 in new assets.
- The acquisition is financed with the same Debt to Equity Mix as currently prevails, i.e. 250 to 450 which equals 35.7% to 64.3%. This means that the 200 Asset Expansion will be financed with 71.4 new debt and 128.6 new Equity. (By leaving the Debt to Equity Mix unchanged, it is quite realistic to assume that the company's WACC% will remain unchanged at 13.29% at least in the short run).
- The new Asset acquisition promises to raise the Asset Yield of both old and new Assets to a new higher level.
- Our goal of zero EVA remains unchanged.

Let us restate our original EVA value:

NOPAT	WACC$	
(EBIT – TAX)	less (WACC% × Assets)	
80 – 24	13.29% × 700	
= 56	= 93	equals EVA = ($37)

the new WACC$
(WACC% unchanged) × (old + new Assets)
13.29% × (700 + 200)
= 119.61

Therefore, the new NOPAT must equal at least 119.61 to reach the goal of zero EVA.

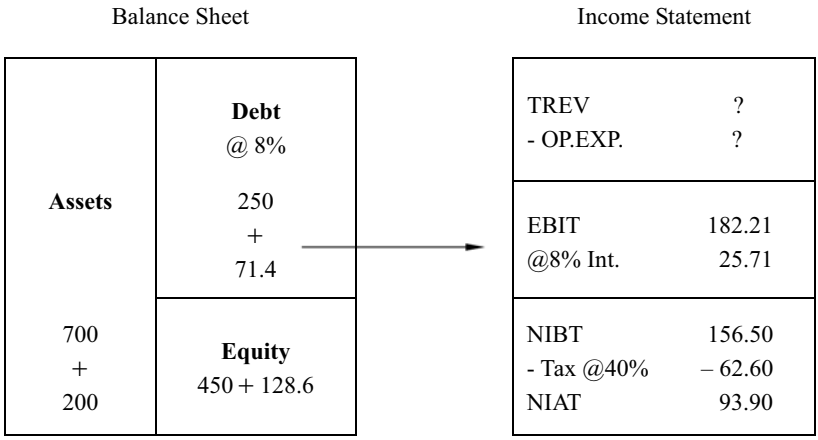
We know from Approach Two that (EBIT-Tax) can be written as (EBIT – (EBIT – INT) × Tax%). We know that the Tax % is 40% or 0.4. The new Interest Expense is 8% × (Old Debt, 250 + New Debt, 71.4) = 25.71. Inserting the numbers in the equation produces:

(EBIT – 0.4EBIT + 0.4 × 25.71) which must equal 119.61
Solving for EBIT gives us
0.6EBIT = 119.61 – 10.28
EBIT = 182.21

Confirming our calculations:

EBIT	182.21
- INT.	25.71
NIBT	156.50
40% Tax	62.60
NIAT	93.90

Where does this leave us as far as necessary Asset Yield (EBIT/ASSETS) is concerned? The EBIT, just calculated as 182.21 divided by the new TOTAL Assets (700 + 200) produces our Asset Yield of 20.25% (181.21/900). This is significantly higher than the original Asset Yield of (80/700) = 11.4%. In fact, this is a 78% increase in Asset Yield which is a rather tall order to fulfill. This in spite of our rather generous assumption that the new asset acquisition was going to raise the yield of the old Assets as well. Two more lines (quantities) in our Income Statement need to be calculated to complete the top two lines; TREV and OP.EXP. We do know that the required EBIT is 182.21. Let us see what the two statements look like.



Remember that our original operating efficiency was (OP.EXP./TREV = 920/1,000) = 92%. If we assume an unchanged level of Operational Efficiency (OP.EXP./TREV) the required EBIT of 182.21 represents 1 – 92% = 8% of TREV. Therefore, the required TREV to generate this EBIT level is (182.21/0.08) = 2,277.62 which in turn requires OP.EXP. of 2,277.62 – 182.21 = 2,095.41.

All in all, our calculations confirm that in this particular case, Approach Two (acquiring additional harder-working assets) was not a very fruitful way in rising EVA. To reach this goal requires a massive improvement in Asset Yield (EBIT/Assets) from 11.4% to 20.25% or 78%.

Equally daunting given unchanged levels of Operating Efficiency (OP.EXP./TREV) of 92%, the company's Total Revenues need to rise from 1,000 to 2,277.62, i.e. 128% increase. Hopefully, the reality is likely to be that the new Asset Acquisition may well improve (lower) the Operational Efficiency (OP.EXP./TREV) and this would reduce the need for such a massive increase in sales.

Time does not permit us to calculate the required improvement in operating efficiency (OP.EXP./TREV) that would allow us to reach our goal. I am sure the reader can do so.

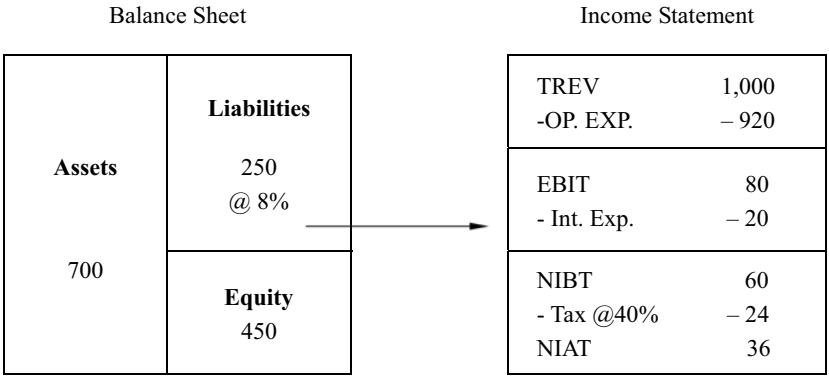
9.8.6 Approach Four

The final approach to raise EVA is to dispose of under-performing Assets in the hope that the remaining smaller asset pool will produce higher Asset Productivity (TREV/Assets) and/or higher Asset Yield (EBIT/Assets) and/or superior Operating Efficiency (OP.EXP./TREV).

Interestingly, this approach often results in significant reductions in Sales (TREV) accompanied by higher levels of profits. "Getting rid of lazy assets" or "making a lazy overweight company fit again" are other labels used for this approach.

The company becomes leaner, focusing on its core-competencies, often foregoing low profit margin sales and focusing on higher profit margin sales. One analyst described the process as *"a bloated unfit company shedding some useless pounds and becoming leaner and fit."* We need to work from our base model again.

Let us look at our original situation again.



And the EVA equation		WACC$	
(EBIT – INT)	less	(WACC% × Assets)	
80 – 24		13.29% × 700	equals EVA = ($37)
56		= 93	

The latest assumptions are:

- The company sells 200 in Assets.
- The proceeds are used to reduce Debt and Equity in the ratio (250 to 450) which equals (35.7% to 64.3%) which causes Debt to fall by 71.4 and Equity to fall by 128.6. (Remember from the previous approach that we choose to do this in order to keep WACC% unchanged at 13.29%.) As a brief aside, it should be noted that, in a situation where an under-performing company with excessive reliance on debt, a debt reduction would be welcomed by financial markets and could produce lower Borrowing Rates. We shall ignore this possibility.
- The disposed assets were the company's least productive ones.

The disposal of the 200 in Assets causes the second part of the EVA equation to become:

$$\begin{matrix} \text{WACC\$} \\ [\text{WACC\%} \times (700 - 200)] = 66.45 \\ 13.29\% \times 500 \end{matrix}$$

To attain our goal of zero EVA, the first part of the EVA equation (EBIT-TAX) must equal 66.45 as well. As before, we rewrite this as EBIT-TAX% (EBIT-INT.). We know that the new lower amount of Interest paid equals 8% (250 – 71.4) =14.29. The tax% = 40% = 0.4. The equation therefore becomes

1EBIT – 0.4EBIT + 0.4 × 14.29 which must equal 66.45
0.6EBIT = 66.45 – 5.72
The required EBIT = 101.22 will produce a zero EVA value.

Once we have calculated the required EBIT level, we need to determine the values of the top two lines of the Income Statement, TREV and OP.EXP., that must produce the required EBIT of 101.22. By disposing of 200 of our least productive Assets, it is hoped that the remaining Assets of 500 will produce an operational efficiency (OP.EXP./TREV) that is superior (i.e. lower) than the 92% that existed before. We already see that the (required) EBIT/Asset i.e. Asset Yield after the disposal is (101.22/500) = 20.24% which is significantly higher than the original 80/700 = 11.42%.

Obviously, we can make several assumptions about the effect on TREV and OP.EXP. caused by the disposal of 200 in Assets. One example: If we assume an unchanged TREV level of 1,000, with a required EBIT of 101.22, the OP.EXP. would have to be 898.78, reflecting a new Operating Efficiency of 90% (i.e. 898.78/1,000) compared to the original 92%, a modest improvement of 2.2%.

Another example: Assume that the 200 Asset disposal would force the company

to deliberately forego 100 of its TREV, this would necessitate OP.EXP. of (1,000 – 100 – 101.22) = 798.78. This reflects an Oper. Efficiency of (798.78/900) = 89%. i.e. (88/92 – 1) = 3.3% improvement over the original 92%.

9.9 Summary

It is important to define the approach to financial analysis that has been described in the previous pages.

Step 1: Strip down a company's Balance Sheet and Income Statement to its essentials.

Step 2: Calculate the company's EVA level.

Step 3: Set some target EVA level to reflect the improvement being sought.

Step 4: Select from four approaches, the one approach (or combination of approaches) that offers the most promise of success, given the economic and production realities in which the company operates.

Step 5: Calculate the "Required EBIT Level" that will reach the EVA goal set in Step 3.

Step 6: Examine the range of possibilities that might produce the TREV and OP.EXP. levels needed to obtain the required EBIT.

Of course, instead of being "EVA goal oriented" you could use this analytical technique in reverse order.

Now, you start with determining the company's new TREV and OP. EXP. levels that will likely be produced as a result of a proposed change in Operations and then calculate the EVA level that this will produce and compare this with the company's current EVA level to decide whether the planned course of action that produces these numbers is the right one.

It is a good idea when calculating possible or desired EVA levels, that the DuPont numbers before and after the change be calculated as well.

9.10 Some Additional Thoughts about EVA-Enhancing Strategies

As you may have observed by now, not every one of the four strategies seems to produce the same degree of success in reaching the goal of improving EVA.

The fourth approach—eliminating a corporation's least productive assets and reducing its capitalization—seems to offer the most dramatic and most easily obtainable improvement in EVA levels. That should not be surprising because the effect of this strategy is an almost instant reduction in WACC$, mainly because of the reduced level of Assets which causes (WACC% × $Assets) = WACC$ to

fall, thereby causing EVA to rise, as long as NOPAT$ does not fall strongly because of the Asset disposal. This is unlikely; otherwise, we would not have chosen this strategy in the first place.

Symbolically:

$NOPAT	–	WACC$		=	$EVA
(EBIT – Tax)		(WACC% × Assets)			
σ very little at first hopefully $\sigma \uparrow$ later on		σ?	$\sigma \downarrow$ instantly	=	$\sigma \uparrow$ very quickly

This brings us to the change in the company's Weighted Average Cost of Capital Percentage symbolized as σ? Whether the reduction in the company's capitalization which this strategy embodies results in an increase or decrease in WACC%, depends on the relative reduction in the total debt (cheaper money) compared to the relative reduction in total equity (a more expensive source of money).

Here is a possible scenario that explains this: Suppose a company is burdened with an excessive debt load. As a result, its cost of debt is relatively high (let us say 12% [1 – 40%tax] = 7.2%). Therefore, a rough estimate of the cost of equity is 12% + 10% = 22%. Let us say the Debt/Equity mix is $75 M to $25 M. Its original WACC% = [75/100 × 7.2%] + [25/100 × 22%] = 10.9%.

Suppose the company reduces its Assets by $30 M and uses the proceeds to lower its debt by $25 M and its equity by $5 M. This is done to lower its reliance on debt. Suppose that the company's lenders welcome this debt reduction, and in response lower the company's borrowing rate from 12% to 11.5%, thereby reducing its cost of debt from 7.2% to 11.5% (1 – 40% tax) = 6.9%. The cost of equity of course also falls from 22% to (11.5% + 10%) = 21.5%.

Let us see what this capitalization reduction, coupled with a reduced reliance on debt financing, does to the WACC% the new WACC% = (75 – 25/100 – 30 × 6.9%) + 25 – 5/100 – 30 × 21.5% = 11.07%. Compare that with the original WACC of 10.9%. We see that the debt and interest rate reduction caused WACC% to *rise*, simply because the company finances itself with a larger proportion of (more expensive) equity money. However, note the significant change in WACC$ that this move caused:

Orig. WACC$ = 10.9% × $100 M = $10.9 M	A $3.15 M
New WACC$ = 11.07% × $70 M – $7.75 M	reduction.

which will have an instant and powerful effect on the raising of EVA.

The third approach to raise EVA—acquiring additional, more productive

assets—will produce benefits that are often *much slower* in coming on stream. New assets often take time to produce their benefits and thereby increase NOPAT$ = (EBIT – Tax) levels. Some analysts use the expression "the gestation period of investments in productive capacity." While this may take some time to develop, the effect of the asset acquisition is the instantaneous increase in WACC$, with the result that the EVA level may well suffer a temporary decline.

Symbolically:

NOPAT$		WACC$		
(EBIT – Tax)	–	(WACC% × Assets ↑)	=	EVA
σ ↑ slow to increase		σ ↑ instant increase		σ ↓ temporary

Here too, the question whether the WACC% will rise or fall will depend on the relative proportion of Debt vs. Equity Financing used to pay for the asset expansion *and* on whether the financial markets (i.e. lenders and investors) approve or disapprove of the financing mix chosen by the corporation. Remember that the financial markets "reward" by lowering the cost of funds and "punish" by raising the cost of funds that corporations pay.

As far as the second approach towards higher EVA is concerned—trying to raise Asset Yield and/or asset productivity while *not* changing the asset base—it is unlikely to produce the instant success that approach number four often gives. In this approach, WACC$ will likely remain unchanged; it might even decline somewhat if financial markets discover and approve of the improvement in asset productivity, but this takes time. NOPAT$ i.e. (EBIT – Tax), on the other hand, can and does sometimes improve dramatically and very quickly without significant changes in asset levels. This can be brought about by improved operating efficiency and/or asset productivity that are often *people-induced* rather than *equipment-induced.* But, more often such improvements take time and, therefore, such EVA increases also will take time to accomplish.

This brings us finally to the first approach to raise EVA, namely shifting the corporation's capitalization towards higher reliance on (relatively cheaper) debt. Obviously, whether this approach is realistically available to the company depends very much on its existing Debt/Equity mix *and* whether the financial markets, corporate lenders and investors, would view such a move with indifference or concern. Should the move be met with indifference, the cost of debt and cost of equity levels would change little, if any, but the WACC% would fall very quickly as more use is made of cheaper borrowed funds. This would lower WACC$, and thus raise EVA rather quickly. The danger lies in the event that financial markets would *not welcome* the shift to the higher use of Debt. Financial markets have been known to punish such corporations quickly and severely with a higher cost

of debt and cost of equity levels. In such a case, corporations have discovered that access to additional borrowed funds is made difficult and/or prohibitively expensive. Obviously, before a corporation would even seriously consider this first approach, it would have to obtain first-class advice from investment dealers and the like, to find out if this approach would be met with approval or disapproval from the financial markets. his ends our section on EVA.

In closing it should be obvious to the reader that this technique is ideally suited to Spreadsheet Manipulation where it has proven to be a formidable tool in analysis of corporate financial strategy.

10 Foreign Exchange and Interest Rate Risk Management

Key Words: Forward Contract, Futures Contract, Call Options, Put Options

10.1 Introduction

There are several techniques available by which a company involved in international trade can reduce, or even eliminate, the risk inherent in such trade. We shall focus here on two kinds of risk*: foreign exchange risks* caused by dealings in a foreign currency and interest rate risk caused by the fact that payments or receipts will occur at some future date rather than today.

Most large corporations use risk management techniques to eliminate these two risks. But, there are many medium and smaller companies involved in international trade that do not employ any such methods. These companies fail to use these techniques either because they are unaware of their existence or because they do not understand how to utilise them.

The purpose of this chapter is to give you a thumbnail sketch of some of the most frequently used risk reduction techniques. We shall try to use as little technical jargon as possible.

As was said earlier, the foreign trader (importer or exporter) faces two kinds of risk: foreign exchange risk and interest rate risk.

10.2 Foreign Exchange Risk Management Techniques

10.2.1 FX Forward Contracts

The *Forward Contract* is basically a custom-made private deal between a customer and its bank. In this contract, the bank guarantees to "buy from" or "sell to" that customer a certain amount of foreign currency at a certain foreign exchange rate on a date in the future.

Note the essential element of a forward contract—it is a tailor—made deal between the customer and his bank; it can be written for any amount and for any length of time (within reason of course).

C. Priester et al. (eds.), *Financial Strategies for the Manager*

Example

Suppose that on October 11th, 1998, a Canadian Importer knows that he is obliged to pay 73 million Yen to its Japanese supplier on December 13th, 1998. He enters into an FX forward purchase contract with his bank for the *exact* amount and the *exact date*, i.e.: the bank guarantees *to sell* the foreign currency to the importer. If the importer would like to have some time-flexibility, he can make the forward contract "option-dated". This will give him *a period* during which he can buy those yen rather than being tied to the single date of December 13th. Option-dated forward contracts are slightly more expensive than fixed-dated forward contracts.

The foreign exchange rate that the importer agreed to with his bank on October 11th can be more or less than the spot-rate prevailing on that day. The difference is largely influenced by the level of interest rates in Canada and the foreign country.

Obviously, by buying the forward FX contract, the Canadian importer has eliminated the possibility of enjoying unexpected gains—if the yen had weakened during the intervening two months; but the importer also has eliminated the possibility of unexpected losses if the yen had strengthened instead. Most importantly he has eliminated Foreign Exchange Risk. After all, the importer's business is foreign trade in goods and not gambling on the foreign exchange market.

What about the Canadian company that expects to *receive* an amount of foreign currency at an exact future date (or at an approximate future time period)? It can enter into a custom made FX forward contract in which the bank guarantees *to buy* a certain amount of foreign currency at a certain exchange rate on a certain date. Here also, option-dated or fixed-dated contracts are available.

10.3 Foreign Currency Futures

As an alternative to using "FX-Fwd" contracts, one can also use foreign currency futures.

10.3.1 FX Futures Contracts

This risk reduction technique is not a tailor-made private deal between a company and its bank, but in general this technique tends to be a cheaper way to buy FX risk insurance.

FX futures contracts are traded on an organized exchange; the Chicago Mercantile Exchange is the best known. FX future contracts are only available in a handful of currencies among which are CDN Dollars, UK Pound, German Mark, Swiss Franc and Japanese Yen. It is important to note that the futures contracts likely to be used by Canadian companies are all quoted in US Funds.

FX futures contracts are "born" and "expire." They have often a term of one

year, and are "born" 4 times per year in March, June, September and December. Between four to six contracts trade at any given time on the exchange. For instance, during October 1998, six Yen futures contracts were being traded, they are: Dec. '98, March '99, June '99, Sept. '99, Dec. '99 and March '00. At the year's end, as the Dec '98 contracts expire, June '00 contracts begin to trade, and so on.

Each FX futures contract is for a fixed amount of foreign currency. Some contract sizes at the Chicago Mercantile Exchange are:

Currency	Size of Each Contract	
German Mark	DM	125,000
Swiss Francs	SF	125,000
Cdn. Dollars	C$	100,000
Jpn. Yen	Yen	12.5 million
UK Pounds	UK£	62,500
Austr. Dollars	A$	100,000
Mex. Peso	M.P.	500,000

A Canadian company involved in foreign trade that anticipates to receive or pay a certain amount of those foreign currencies or U.S. dollars could "take a position" in FX futures In Opposition to its future cash flow created by its foreign exchange contract.

For example: In mid-October 1998, a Canadian importer knows he will be obliged to pay US $400,000 to a foreign supplier in March 1999. The Canadian company would SELL 4 Canadian dollar futures contracts that expire in March 1999 (it creates a short position). Suppose that in March 1999 the US dollar has strengthened against the Canadian dollar. Paying his bill to his foreign supplier will *cost the Canadian importer more*, but the company would BUY 4 Canadian dollar March futures contracts (to cover its short position in futures) at a lower price than what it originally sold them for in October, 1999. This would give the company a trading gain on the futures market that would offset the added cost of paying its foreign supplier with a weaker Cdn. dollar.

In short, you create a situation, through the use of FX futures contracts, that will give you a trading gain, if the currency in which your commercial contract is expressed moves against you and causes you to have a FX loss. The gain that you enjoyed on the futures contract with more or less offset the loss that you suffered on your commercial contract.

Suppose, instead, that in March 1999 the US dollar has *weakened* against the Cdn dollar; paying its bill to the foreign supplier will *cost the company less*, but as the company buys 4 Cdn dollar March 1999 future contracts to cover its short sale of October '98, it would *pay more* than what it sold them for in October '98. This would give the company a *trading loss* on the futures market, that would offset the *company's gain* enjoyed as it paid its foreign suppliers with weakened US dollars.

10.4 Important Differences and Similarities Between FX Forward and FX Future Contracts

- Both techniques can eliminate FX losses should a currency move "against" the position that a company finds itself in, if it expects to receive or pay a foreign currency in the future.
- Both techniques will also eliminate FX gains should a currency move "in favour" of the position that a company finds itself in, if it expects to receive or pay a foreign currency in the future.
- FX futures contracts required day-to-day settlements in an account that is held for you with the bank or broker through which you obtained your FX futures contract and until you close your FX futures contract position, you will not know the total gain or loss that the futures deal created.
- FX futures contracts only involve multiples of fairly large amounts. This amount may well be more or less than the exact amount in foreign currency that you expect to pay or receive in the future. You do not have a "perfectly matched" hedge that equals the amount of foreign currency exposure that exist in your company's foreign trade transaction.
- FX forward contracts, because of their custom-tailored nature, tend to be more expensive. The bank's "fee" is built into the FX quotation of the contract.
- FX futures contract fees are clearly stated and paid up front: daily gains/losses that your open position creates are reflected in your account at the broker or bank through which you obtained your FX futures contract.

There is a third technique for reducing risk associated with foreign currency exposure, and that is the use of Foreign Currency Options.

10.5 FX Options

Unlike the previous two techniques which largely eliminated both possibilities of loss as well as gain, FX options enable you to eliminate the possibility of *loss* while preserving the possibility that you may gain should currencies move in your favour. There are basically two types of FX currency options. They are: "Exchange-traded" FX options with standard amounts and expiry terms, and "custom-made" FX currency options with non-standard amounts and expiry terms that trade over the counter; which means they are private deals with financial institutions such as Banks. Over the counter FX options are custom-made deals. We will discuss the former only, i.e. the Exchange-traded FX option contracts.

The best known organized market for exchange traded FX options is the

Philadelphia Stock Exchange. Here are some examples of option contracts quoted in US dollars traded on that exchange:

Currency	Size of Each Contract	
Austr. Dollars	A$	50,000
UK Pounds	UK£	62,500
Cdn. Dollars	C$	100,000
EURO	EURO	125,000
German Mark	DM	125,000
Swiss Francs	SF	125,000
Cdn. Dollars	C$	100,000

There are "options-to-buy" contracts (call options) and "options-to-sell" contracts (put options). Unlike the futures markets, option contracts expire monthly, at any given time approximately 6 contracts are traded. For instance, during June '99, the July, August, September, October, November, and December contracts were being traded. When using FX options as a risk management technique we shall look at the buying of options only.

While it is possible to sell call and put options, we shall ignore this possibility since a seller of options usually is *taking* risks rather than *avoiding* risks. This article focuses on the need of Canadian foreign trading companies that either expect to pay or receive foreign currency in the future and that want to avoid risks associated with this foreign exchange exposure.

Such a company can *buy* a call option or a put option. Owning a call option gives you the *right to buy* a fixed amount of currency at a certain price at a certain date.

Buying a put option gives you the *right to sell* a fixed amount of currency at a certain price at a certain date. (Remember having the *right* to do something also means you have the right to do nothing and letting the option expire.)

For example: In mid-October 1998, a Canadian Exporter expects to receive US $ 300,000 in March '99. The Canadian company worries about the US dollar weakening against the Canadian dollar. The company buys three call options on the Cdn. dollar expiring March '99 (i.e.: it has the right to buy $3 \times \$100{,}000$ Cdn.).

Should the US dollar indeed weaken against the Cdn. dollar, by March '99 the payment the company receives from its US customer will cause the Canadian company a foreign exchange loss. However, as owner of six call options (rights to buy $-3 \times \$100\text{ k} = \text{Cdn. } \$300\text{ k}$), the company can exercise its options, buy the Cdn. dollars at the lower option price and sell at the higher spot price that now prevails and enjoy a gain from its option play.

What if the opposite had happened and the US dollar strengthened against the Cdn. dollar? The company's US customer, as it pays its bill in mid-March '99,

will give the Canadian company an FX gain, i.e.: you can convert those US dollars into more Cdn. dollars than you thought in October '98. What about the six call options that you still own? Obviously since they are worthless to you, you should let them expire.

You will be out of pocket by the cost of buying those options originally in October'98, but this is offset by the gain that you enjoyed as you converted your customer's US cheque into Cdn. dollars.

Should you expect to pay US dollars to a foreign supplier at some future date, you should buy Put Options on the Canadian dollar to protect yourself against the risk of the Cdn. dollar weakening against the US dollar, while still leaving open the possibility of benefiting should the Cdn. dollar strengthen against the US dollar.

10.6 Interest Rate Risk Management

As stated earlier, exporters and importers not only face risks caused by changes in *foreign exchange* rates, changes in *interest rates* can hurt them as well. Obviously, a company need not be a foreign trader to be hurt by interest rate fluctuations and what follows applies to all companies that are vulnerable to changing interest rates.

Two situations exist: *Rising* interest rates can hurt companies that have (or will have) variable-rate-debt outstanding. *Falling* interest rates can hurt companies that have (or will have) variable-rate-yielding financial assets. Since the first situation is far more common among (non-financial) business enterprises we will focus on *borrowers* that can be hurt by rising interest rates, and ignore the second situation.

Before we look at the examples, it is important to understand that the price (value) of a financial asset goes *down* as its effective yield goes up. And a financial asset's price (value) goes up as its effective yield goes *down*. This inverse relationship between a financial asset's price and yield allows a company to protect itself from damage caused by rising interest rates.

The Montreal Exchange has established a Financial Futures Market in two debt instruments; short term Bankers Acceptances and longer term Government Bonds. Just as with FX futures contracts, there are four delivery dates: March, June, September and December, and on any given day between three to six different "maturities" trade on this futures market.

For Example: A company that has (or expects to have) variable-interest-rate debt and which can be hurt by rising interest rates, can create a situation where rising interest rate will give it trading gain, by using the two aforementioned financial instruments.

For instance, selling Debt Future Contracts, (i.e.: creating a short position) will produce trading gains if interest rates rise as anticipated. These trading gains can offset the company's higher interest expenses on its variable interest loans. If the

company guessed wrong, the *declining* interest rates will give the company a trading loss on its futures contracts which will be offset by the lower interest expenses on its, now cheaper, loans.

Bond Options provide another interest risk management technique. The Montreal Exchange has also created a Government of Canada Bond options market in 1982; each option contract represents $ 100,000 face value of selected issues of Canada Bonds. Investors can trade in call options (giving the right to buy) and put options (giving the right to sell).

A buyer of a call option gains when interest rates fall and the value of financial instruments rise.

A buyer of put options gains when interest rates rise and the value of financial instruments fall.

As we stated earlier, we are focusing on corporate borrowers that stand to suffer as interest rates rise and that seek to avoid the risk of this loss occurring.

Such a company may consider buying a Canada bond put option since their price rises as interest rates rise. This trend provides the company with a trading gain that will offset the higher interest expenses that the company must pay on its more expensive loans. Should the opposite occur instead, the bond put options will lose value, causing the company a trading loss that will offset the lower interest expenses that the company now pays on its cheaper loans.

Obviously, this article is far too elementary to go into hedging strategies. Our purpose is to introduce companies whose activities expose them to foreign exchange and interest rate risks, and to mention some of the techniques that can lower their vulnerability to such risks. There are other more sophisticated techniques, such as interest rate caps, floors and collars, FX and interest rate swaps, that lie outside the scope of this introductory treatment of risk management.

11 Mergers, Acquisitions and Private Equity

Key Words: Target Company, Valuation, Takeover, Private Equity

11.1 Introduction

An article in the *Wall Street Journal* in May 2007 noted that private equity transactions (which are a particular type of acquisition) during the past twelve months totaled $2 trillion—that is a "2" followed by 12 zeros, an amount that boggles the mind.

The explosive growth of this trend has generated a lot of attention and comment in the financial press. Observers are asking whether this trend is good for the economy or not. There is little doubt that it has helped drive stock markets to record levels amid rising concerns about the coming end of this bubble, as some call it.

Part of the reason why mergers and acquisition (M&A) activity has grown so strongly is that the world is awash in liquidity. The supply of money has been rising dramatically in recent years and this has caused the cost of money, i.e. interest rates, to be quite low. Lenders are competing strongly to make this money available to the buy-side of the M&A world, in particular to private equity firms.

Of course, every buyer in an M&A deal is hoping to find the extra value that may be created after the target company has successfully been acquired. Whether this extra value is found, however, is not always the case. DaimlerBenz's purchase of Chrysler a few years ago, followed by its recent sale to Cerberus, a private equity firm, has cost DaimlerBenz tens of billions of dollars.

11.2 Synergy

The main force that drives two companies to combine is the belief that additional value will be created through this combination. In general, this is more likely to be the case when economic conditions are relatively poor and the price for which target companies can be acquired tend to be low.

By combining forces with another firm, the acquiring company hopes that the new larger firm will be more competitive, cost efficient and have more marketing power. Target companies are, therefore, often more amenable to takeover offers when economic conditions are difficult. However, the enormous volume of M&A deals taking place today (mid 2007) is certainly not a sign of economic depression. In fact, worldwide economic conditions today are quite strong.

C. Priester et al. (eds.), *Financial Strategies for the Manager*

11.2.1 Acquisition vs. Merger

An acquisition occurs when the target company no longer exists after the transaction is complete. In a merger, two companies of somewhat similar size decide to combine their operations and in the process create a new corporate entity that will replace both of the merging companies, which will cease to be legal entities.

Mergers occur far less often than acquisitions. Often for public relations purposes, acquisitions are labelled mergers when in fact they are not. This is done to avoid hurt feelings and ruffled feathers of the target company's owners and managers.

The hoped-for benefits of an M&A combination are called synergies. This is often described as "one plus one equals three." Possible sources of these benefits are:

(a) Reductions in the number of employees,
(b) Economies of scale,
(c) Acquisition of new products, processes or technology, and/or,
(d) Creation of a larger client base.

It should be noted, however, that many mergers and acquisitions have failed to produce these hoped-for synergies and there are more than a few cynical observers of the mergers and acquisitions industry that believe that most of the deal making is driven by the "deal makers", i.e. the middlemen in that process. These are the investment bankers that reap very large advisory and brokerage fees when a deal is successfully concluded.

These dealmakers are far from the scene when reality sets in and the benefits of the deal turn out to be hard to find.

Considerable research has been done to indicate that in the short run shareholders of the target company nearly always benefit from acquisitions, whereas in the long run shareholders of the acquiring company quite often suffer losses due to lower share prices.

11.2.2 Paying for the Purchase

In an acquisition, a company can buy the target company either with cash or shares. The choice is determined by tax considerations. If the purchaser pays for the acquisition with cash or a debt instrument, the proceeds to the seller are taxable. Buyers usually like this method because it allows them to record the bought assets at their purchase price which is nearly always higher than their book value. This, in turn, produces higher future levels of depreciation expenses and therefore future tax benefits.

When the buying company pays for the purchase with its own shares, the target company's assets are recorded at their book value and those future tax benefits are not available to the buying company.

11.2.3 Valuation

Two ratios can be used by acquiring companies to calculate the value of the target company. The "Price/Earnings Ratio" is most often used, although the "Enterprise Value to Sales Ratio" is fairly popular as well. Of course, the acquiring company usually has to pay a premium over the target company's industry average if it hopes to be successful in its takeover attempt.

The tremendous increase in private equity deals that we have witnessed in 2007 has caused these takeover premiums to rise quite significantly, sometimes exceeding fifty percent over the recent market values of the target company's share prices.

What this means of course is that the extra value that the buyer hopes to obtain as a result of the takeover will be harder to find. Given today's feverish M&A activity, bargains are harder to find and the hoped for profits may turn into losses.

A third evaluation technique uses the DCF (or Discounted Cash Flow) of the target firm's estimated future free cash flows (FCF).

The free cash flow equals:

EBIT + non-cash expenses (such as amortization + depreciation) less regular capital expenditures, less taxes paid in cash +/− changes in working capital. These free cash flows are estimated for a limited number of years, usually less than eight years, and this flow of FCF is discounted and converted into a single present value by using the WACC%.

This technique is sometimes criticized for relying too heavily on many assumptions. Assumptions that are often impossible to make in today's world of rapid technological and economic change. It is also argued that this more complicated DCF technique produces very little useful additional information when it is compared with the simpler ratio methods.

Another evaluation technique is simply based on the replacement cost of the target company's physical assets plus the estimated value of its intellectual property plus the cost of replacing the human talent of its key personnel. However, this method also relies heavily on guesswork and would not be suitable if the target company operates in a service industry in which physical assets are often a small percentage of the target company's total assets.

11.3 Which Companies are Doing Most of the Buying

Traditionally, large, publicly traded,non financial ,companies accounted for most of the mergers and acquisitions (in dollar terms). By taking over their target companies these industrial giants would expand their operations vertically within their own industry.

It was hoped that by performing more steps between getting the basic input and selling the final product (output) there were more opportunities to earn profits at each stage of the production process. The integrated oil companies, such as Exxon and Shell, are examples of this approach.

Horizontal expansion was another motivation for takeovers by these large publicly traded industrial companies. They would takeover smaller competitors in the same industry, thereby increasing their market share and hopefully obtaining pricing power and operational cost savings through economies of scale.

In the 1970s, we saw the creation of conglomerates through M&A activity. Conglomerates brought together a large number of often unrelated businesses under a single ownership umbrella. The ITT company is an example. The popularity of conglomerates has diminished greatly however and one of the few successful ones remaining today is General Electric.

The investing public has dramatically changed its opinion of conglomerates. During their hayday, conglomerates shares traded at very high P/E levels, reflecting investor popularity. This, in turn, made it easy for the conglomerates to buy other less popular companies and raise their own share price in the process. An example of this is provided later in this Chapter.

Eventually investors lost their appetite for conglomerates as the majority of them proved unable to generate value (i.e. EVA) through internally generated performance rather than through takeovers. Shares of "pure play" companies (i.e. companies that focus on one activity, product or service) are often looked upon more favourably by investors today than shares of multi-faceted conglomerates.

In fact, private equity takeovers often reflect the "remaking" of such enterprises, in which a target company is broken up piecemeal once taken over. In the end, the value of the "parts" turns out to be higher than the original "whole enterprise". An example of this appears later in this Chapter.

Investment banks such as Goldman Sachs, UBS and others have always played an important advisory and facilitation role in M&A dealmaking. This role eventually broadened as these investment banks, using their own money, entered the M&A game. Today, a major share of the M&A buying is being done by the major investment banks for their own account.

Private equity companies started to play a significant role in the mergers and acquisitions world in the 1980s. An early, strong player was KKR. As stated earlier, the number of private equity companies, deals that they completed and the amounts involved has been growing at a spectacular rate.

In 2007 private equity deals make up the largest portion of M&A activity. Many knowledgable observers have serious concerns about today's (mid 2007) frenzied volume of M&A activity in the worldls' financial markets and warn of the dire consequences should this buble come to a sudden end.

11.4 Private Equity Firms Obtain Their Funding in Private Markets

The money that fuels Private Equity Companies comes largely from pension funds, banks, rich individuals and other financial institutions. Since these investors are considered financially sophisticated, private equity firms' transactions are less regulated and monitored than ordinary mutual funds. This lack of close supervision of the private equity industry by government agencies has raised serious concerns among some experts of the financial markets. In early 2007 the US Congress was in the process of strengthening disclosure requirements of M&A deals.

11.4.1 Categories of Private Equity Investments Include

(a) Leveraged buyouts, in which a large portion of the purchase is financed through debt,

(b) Venture capital, which is seed money to help start-up companies,

(c) Growth capital, providing small to medium private companies with funds to expand, and

(d) Mezzanine capital, temporary funding for medium private companies.

Virtually all of the companies in categories (b), (c) and (d) tend to be small to medium private limited companies whose shares are not publicly traded on a stock exchange. Companies in the first category are usually large and publicly traded and buyouts make up by far the largest share of private equity transactions.

The management of the firms, in which private equity firms invest, will usually end up to be controlled by them. Their ultimate goal is to turn these private limited companies into publicly traded ones which in turn allow the private equity firm to sell its investment at a profit through a public share offering.

The private equity deals that attract most attention because of their size and audacity are the takeovers. Takeovers can be hostile or friendly. A friendly takeover is one in which the shareholders of the target company welcome the purchase offer and it is supported by the Board of Directors, while a hostile takeover is one which is actively fought by the Board of Directors of the target company.

The target companies can be quite large and publicly traded. In the takeover, the private equity firm can put up the entire purchase price or borrow a portion of the funds needed, in which case the take-over is called a "leveraged buyout". Often new management is put in place once the target company is acquired.

The private equity firm can try to create value from the deal in various ways.

If the acquired company is underperforming, a turn-around or overhaul of the company is attempted.Through improved management, better operational efficiency

and/or asset utilization, the private equity firm hopes to increase the EVA level (see the EVA Chapter where various approaches to restore a company's performance are described). Once the company's performance has been restored, it can be sold back to public investors through an Initial Public Offering (an IPO), or the private equity company may choose to keep full or partial ownership of the acquired company as a subsidiary.

Another approach to create value from a newly acquired company is to break-up the target company into components and sell the components as pure-play companies. An example of this will be provided later in this chapter.

11.5 Will the Explosive Growth of Mergers and Acquisitions Activities Continue

The answer to this question depends on the future trends of economic globalization and the rapid increase of global liquidity levels. In May 2007, the world's economic growth is spread quite widely and has reached the highest levels in living memory. While at one time economic dynamism was concentrated in North America, parts of Europe and a few Asian countries, we are now witnessing strong GDP growth in the BRIC countries (Brazil, Russia, India and China) and a large group of other countries in Latin America and Asia. This, in turn, has caused global liquidity levels to rise strongly as well.

Traditionally, high economic growth would set off inflationary pressures and cause interest rates to rise. This time, however, interest levels worldwide have not risen dramatically. This is partially caused by the globalization of trade which has kept prices of finished goods and most services in check (unlike those of raw materials, which have risen significantly).

Another factor that has caused the rapid rise in liquidity levels is the fast growing integration and sophistication of worldwide financial markets. It is here that we see the creation of ever more complex derivative financial instruments that allow lenders to reduce their exposure to risk and thus raise their willingness to lend. One of the by-products of this risk reduction technique is that the central banks of the world that once had near absolute control of a nation's money supply have seen their power to do so diminish significantly.

The world's rapid liquidity growth is also fuelled by the "carriage trade." In the carriage trade, large institutional borrowers borrow vast amounts of money in countries where very low interest rates prevail (in Japan mainly, but Switzerland to a lesser extent). This money is then converted into other currencies that offer a higher yield, a lot of these funds finds their way into the M&A market.

Of course, these borrowers are exposed to interest rate risk as well as currency risk. In the event that interest rates and/or currency levels move against these carriage trade borrowers, we may well see a slowdown in this liquidity-fuelled

M&A volume. The fear is that such a slowdown would not be gradual, but instead occur extremely quickly, in which case we may well experience an exploding bubble and a very rapid decline in financial asset prices.

11.6 How Long Can This Go On

Will the ever growing level of M&A activity (dominated by private equity deals) continue at the break-neck speed that we witnessed in the first half of 2007? A recent event may suggest that the answer to this question is YES. In May 2007, an agency of the Chinese government, through a sovereign wealth fund, bought 9.9% of the big Blackstone Private Equity Fund. When you consider that China's foreign exchange reserves exceed one trillion dollars and the Bank of China has indicated that it plans to invest thirty percent, or $300 billion, in areas outside of the Bank's normal liquidity reserves, it means that this Blackstone purchase represents only one percent of other funds potentially available for similar purposes.

It is widely believed that China will use the Blackstone purchase to learn the mergers and acquisitions game from one of the most successful private equity firms in this business. There is little doubt that in not too many years Chinese private equity firms will play a large role in the M&A world.

Morgan Stanley, a large US investment bank, has estimated that the total wealth held by the Chinese sovereign wealth funds in 2007 could be as high as $2.5 trillion.

In fact, we may well witness the beginning of an era in which Sovereign Wealth funds will be the dominant force in the world of finance.

Morgan Stanley further estimates that when we include the U.A.E. and other Middle Eastern sovereign wealth funds, these government-owned investment entities will grow to nearly $28 trillion by 2022.

It boggles the mind what would/could happen to private equity volume if a significant portion of that money would be used for just such purposes.

This Blackstone deal is therefore one more reason to worry and sound the alarm, say the critics of the explosive growth of M&A. They fear that financial markets are moving ever closer to the bursting of a bubble in which we will see the value of financial assets fall catastrophically and trillions of the world's liquidity will evaporate. They point to the unprecedented near global rise of stock markets, highly inflated prices for works of art, and ever pricier luxury accommodation. They see this as clear signs that the excessive liquidity growth will lead to a very powerful correction in asset prices.

Of course, time will tell whether this scenario will play out. We should not rule out the possibility that a gradual slow down in mergers and acquisitions activity will occur as all the "low hanging fruit gets picked" and there are fewer and fewer attractive target companies to be found that can give the private equity buyers the opportunity to make a decent profit from a takeover target. This would

cause returns of Private Equity firms to fall and through a normal market correction we would see their role in M&A diminish.

There is little doubt, however, that M&A activity which so far has largely taken place in New York and London, will spread to other financial centres, particularly in Asia. This trend is helped by the fact that government oversight and control of M&A deals is most rigorous and intensive in the USA (i.e. the Sarbanes, Oxley Act and tough SEC regulations), as compared with the rest of the world. Voices on Wall Street have already warned that we are seeing the shift away from the US to foreign financial markets as a result of American over-regulation. Whether this is necessarily a bad thing is another issue.

Mergers & Acquisitions—Example One:

This scenario shows the result of a friendly takeover of Smaller Co. Ltd. by Bigger Co. Ltd. The takeover occurs through a share swap; three Smaller shares are exchanged for one share of Bigger Ltd. Since Smaller shares are trading at $2.78 and Bigger share at $10.15, the takeover results in an immediate gain of $1.81 for every three Smaller shares owned, or 21.7%.

The data which appear in the third column of the following data page portray the situation shortly after the takeover has been completed and before significant changes to operations have occurred.

Thus, the balance sheet and EBIT figures of column three are simply the result of adding up the values that appear in columns one and two. Only the average borrowing rate of Smaller Co. (Annual Interest Exp/Total Debt) was changed from 7% to 6%. This was because Bigger Co. took advantage of its size and stronger banking relationships and succeeded in renegotiating the terms of Smaller Co. loan contracts.

It is important to note that the success of this takeover rests largely on the different P/E (Market Value per share/Earnings per share) ratios at which Bigger and Smaller shares are trading on the stock market at the time of the takeover: "twenty times earnings" for Bigger shares and only "eleven times earnings" for Smaller shares. Several factors could account for Smaller Co.'s shares trading at lower "earnings multiple"; for instance, Smaller Co. could be a fairly small regional firm not widely known among investors, or it may be recovering from a difficult period and this recovery has not yet been appreciated by investors.

Also note that in the third column of the data page, the P/E Ratio has been kept at 20x, the same as Bigger's P/E before the takeover. This suggests that investors approve of the takeover. Should investor sentiment turn against such a move, the P/E Ratio would likely fall and Bigger's share price would drop and with it the benefits that shareholders would receive from this deal. What can we conclude from this?

"High P/E companies" can take advantage of their popularity among investors by buying other less popular companies' profit cheaply and thereby raise their own shares' prices. But, once their high P/E Ratios begin to fall, such a takeover

strategy will no longer work.

Notice that Smaller's asset yield (EBIT/Assets) of 18% exceeds Bigger Co.'s 15%. Smaller's superiority is further visible when we look at its ability to generate EVA from its asset base: 6.71% versus 3.31% for Bigger Co. as well as Smaller's superior return on equity (ROE).

Data Page

All figures are multiples of $1 M	Bigger Co.	Smaller Co.	Bigger after Takeover of Smaller
Assets	70 M	14 M	84 M
Liabilities	30	5	35
Equity	40	9	49
* Average borrowing rate (INT/Liab.)	6%	7%	6%
Asset yield (EBIT/Assets)	15%	18%	15.5%
EBIT = (A.Y.%) × Assets	10.5	2.52	13.02
Interest (ABR% × Liab)	1.8	0.35	2.1
Tax @ 30% of (EBIT − INT)	2.61	0.651	3.276
NIAT = (EBIT − INT) × (1 − 30%)	6.09	1.519	7.644
Shares Outstanding (Sh.O)	12 M	6 M	14 M
Earnings per share (NIAT/Sh.O)	$0.508	$0.253	$0.546
* Price Earnings Ratio (given)	20 x	11 x	20 x
Market Value per share (EPS × P/E)	$10.15	$2.78	$10.92
% change in share value	(10.92 − 10.15) − 1	10.92 − (3 × 2.78) − 1	
% change in share value	7.6%	+ 30.9%	
EVA – CALCULATIONS			
ROE = NIAT/Equity	15.22%	24.11%	15.59%
NOPAT = EBIT − Tax	$7.89 M	$1.869 M	$9.744 M
WACC% = (3/7 × 4.2%) + (4/7 × 16%)	10.94%		
WACC% = (5/14 × 4.9%) + (9/14 × 17%)		12.68%	11.08%
WACC$ = WACC% × Assets	$7.658 M	$1.775,2 M	$9.307,2
EVA = NOPAT − WACC$	$232 k	$93.8 k	$0.436.8 k
EVA/Assets	3.3%	6.7%	5.2%

When we examine the numbers generated by the EVA analysis, we see that Smaller Co. had a better ability to generate economic value added from its asset base.

Also, the EVA produced by the now larger company, i.e. $436.8 k, turns out to be $111 k more than the sum of the two companies before the takeover, an increase of 25%.

By making Smaller Co. part of Bigger Co., ROE and EVA productivity were enhanced. This analysis indicates that in terms of share price as well as financial

performance, both companies' shareholders benefited from this takeover. Remember, however, that if a company cannot produce higher profits internally, but relies on taking over other companies at bargain prices to boost its profits, its popularity among investors and its P/E Ratio may will decline in the long run.

Mergers & Acquisitions—Example Two:

Omega Partners (OP), a private equity company, purchased a small company called Healthy Growth Ltd. (HG).

HG shares were publicly traded on a regional stock exchange and OP bought all 10 million outstanding HG shares for $11 per share, or $110 M. The purchase price represented a premium of approximately 35% over the $8.15 price HG shares were trading at before the takeover.

HG Company's simplified Balance Sheet and Income Statement, before the takeover, were as follows:

Balance Sheet

Current Assets	24	S.T. Debt	16
		L.T. Debt	50
Capital Assets	96	Equity	10 M
		Shares	54
Total 120 M		=	120 M

Income Statement

Revenues		175 M
Total Oper.Exp.	–	159.4
EBIT		15.6
Interest Exp.	–	3.96
NIBT		11.64
Tax	–	3.492
NIAT		8.148
EPS		$0.815

With HG's shares valued at ten times per share earnings or $8.15 per share, this company's ten million shares were worth $81.5 M. When compared with the $54 M equity value in the Balance Sheet, we see that this company's "market-to-book" ratio was (81.5/54) = 151% suggesting that the shareholders recognized the potential value of this firm.

HG's DuPont Numbers

(Sales/Assets)	(NIAT/Sales)	(Assets/Equity)	=	ROE
(175/230)	(8.148/175)	(120/54)	=	(8.148/54)
1.46x	4.66%	2.22x	=	15.1%

These are quite respectable numbers although the reliance on debt is fairly high. The fact that Omega paid a 35% premium to buy the company suggests that Omega saw a considerable amount of "hidden value" in this company.

The hidden value was caused by the fact that HG operated three separate businesses that were somewhat related but which could easily operate as entities

on their own. The three operations run by HG were:

G.C. A dozen garden centres spread over a fairly large geographic area. Of the garden centres, eight of them owned sizeable parcels of raw land that was held for future expansion plans.

N.O. Two large nursery operations.

S.S. A specialty seed and orchid nursery that enjoyed a very high reputation and whose sales spanned the continent.

A thorough analysis of the financial performance and the asset deployment of these three activities produced the following information:

Assets Employed	Financed with Debt	Assets' Yield (EBIT/Assets)	EBIT $	Interest Expense	Taxes 30% NIBT	NIAT	NOPAT (EBIT-Tax)
G.C. 60 M	40 M @ 6%	10%	6 M	2.4 M	1.08	2.52	4.92
N.O. 40 M	20 M @ 6%	14%	5.6 M	1.2 M	1.32	3.08	4.28
S.S. 20 M	5 M @ 6%	20%	4 M	0.36 M	1.092	2.548	2.908
Σ 120 M	65 M	Weighted average 13%	Σ15.6 M	Σ3.96 M	Σ3.492	Σ8.148	Σ12.108

These data clearly indicate that the garden centres (G.C.) generate the lowest Asset Yield while employing the most assets, whereas the specialty seed business generates the highest Asset Yield of 20% while employing the smallest amount of assets.

The garden centres are facing stiff market pressure from larger and better financed competitors. One positive attribute is that the company owns some fairly large parcels of land adjacent to the garden centres that embody significant unrealized gains. This also explains the high level of debt used to purchase these lands.

The two nursery operations (N.O.) generate quite a good Asset Yield of 14%, but are handicapped to a certain extent because the large geographic spread of the dozen garden centres causes the nursery operations' transportation costs to be higher than desirable.

The best performing division is the specialty seed and orchid operation. Helped by a long held reputation for excellence and first class service, it serves a continent wide client base and generates an Asset Yield of 20%, a level that the company has averaged for a considerable time.

Financial market research indicates that "pure-play" operations from publicly traded companies that operate garden centres (G.C.), nurseries (N.O) and specialty seed growers (S.S.) have shares valued at the following price-earnings levels:

G.C. (8 x to 12 x) N.O. (12 x to 16 x) S.S. (15 x to 19 x)

Omega Partners, the private equity company, approaches several larger corporations that operate in these three industries and actively tries to sell the

divisions as separate entities. It succeeds in finding a buyer for the specialty seeds and orchid operation. It is a large family owned business operating in the same industry. The sale price of the specialty seed division is set at a P/E of 16x. The specialty seed division's NIAT was $2.548 M, thereby producing a sale price of 16x $2.548 M = $40.768 M. The sale includes the division's assets of $20 M and mortgages on its real property totaling $6 M are taken over by the buyer. After the transaction is completed, Healthy Growth's (now a wholly owned subsidiary of Omega) Balance Sheet looks as follows:

Balance Sheet

	Assets	Liabilities
Garden Centres	60 M	S.T. Debt $16 M
Nursery Operations	40 M	L.T. Debt $44 M (50 – 6)
* Goodwill (110 – 54)	56 M	Total Debt $60 M
* difference between sale price and original equity		
Cash (proceeds from S.S. Sale)	40.768 M	Equity $136.768 M*
Total	$196.768 M	$196.768 M

The $136.768 equity balance reflects the original $110 million cost to take over Healthy Growth plus a $26.768 million gain on the sale of the specialty seeds and orchid division. Remember ($20 M – $6 M) = $14 M of net assets were sold for $40.768 million.

A second sale of a Healthy Growth division was the disposal of the garden centres (without the vacant land) for a rather low nine times earnings or $9 \times 2.52 = \$22.68$ M.

A separate sale of the vacant land (whose book value was $45 M and which carried a debt burden of $35 M) to a property development company, took place for a price of $88 million. Part of these proceeds was used to repay the $35 M loans against the undeveloped land.

After this set of transactions, the Balance Sheet of Healthy Growth looked as follows:

Balance Sheet

	Assets	Liabilities
Nursery Operations	40 M	S.T. Debt $16 M
Cash (from S.S. sale)	40.768 M	L.T. Debt $9 M (50 – 6 – 35)
Cash (from G.C. sale)	22.68 M	Total Debt $25 M
Cash (from land sale)	53.00 M	Equity $187.448 M
Net of debt repayment ($88 – $35)		
Goodwill (110 – 54)	56.00 M	
Total	$212.448 M	$212.448 M

The sale of the garden centre plus the land sale for ($22.68 M + $88 M) = $110.68 M, produced a profit of $50.68 M because the garden centre assets had a book value of $60 M. Adding the $50.68 M profit to the equity value of the previous Balance Sheet (i.e. $136.768 M), gives us the equity total on the above Balance Sheet.

We can write off (fully amortize) the goodwill of $56 M against the equity balance of $187.448 M which reduces this amount to $131.448 M.

We should not forget the $110 M that Omega spent to buy Healthy Growth which still leaves $131.448 M – $110 M = $21.448 M profit while the nursery operation, whose net book value is $40 M – $25 M = $15 M, still remain unsold.

Assuming that Omega can realize at least the $15 M book value from selling the nursery operations, the total profit so far on Omega's original $110 M investment is $36.44 M, a return of approximately 33% Not bad!!

Appendix A Solutions to Exercises

Exercise #1A—Solution

Asset Yield increase from:

$$\frac{\$1.44}{\$9.00} = 16\% \qquad \text{to} \qquad \frac{\$1.44 + \$0.20}{\$8.00 + \$1.00} = 18.2\%$$

The difference between Asset Yield and Cost of Capital would rise from 1% to 3.2%.

Observation:

Note that the improvement of the Asset Yield from 16% to 18.2% works out to:

$$\left[\left(\frac{18.2}{16}\right) - 1\right] = 13.75\%$$

which causes the difference between the old and the new Asset Yield vs. Cost of Capital to increase by:

$$\left[\left(\frac{3.2}{1}\right) - 1\right] = 220\%$$

There is an important message in this. The effects of even modest improvements in a company's Asset Yield are magnified and results in much more significant improvements in a company's overall performance.

Of course this magnification process is not as powerful when the difference between the Asset Yield % and the Cost of Capital % is larger to start with.

Exercise #1B—Solutions

1. The new asset yield is 108% or $1.08 \times 17.5\% = 18.9\%$.
   The new cost of capital is 95% or $0.95 \times 14.9\% = 14.2\%$.
   The new difference between the two is $(18.9\% - 14.2\%) = 4.7\%$
   When we compare that with the original difference of $(17.5\% - 14.9\%) = 2.6\%$ this represents a huge increase in financial performance. The increase works out to $(4.7/2.6 - 1) = 81\%$.

2. The new asset yield is 90% or 0.9 × 17.5 = 15.75%.
   The new cost of capital is 105% or 1.05 × 14.9% = 15.65%.
   The new difference between the two is (15.75% – 15.65%) = only 0.1% (that is only one-tenth of one percent).
   When we compare that with the original difference of 2.6% this represents a huge decrease in performance. It works out to (0.1/2.6 – 1) = 96%.
3. The new asset yield is 96% or 0.96 × 17.5% = 16.8%.
   The new cost of capital is 110% or 1.1 × 14.9% = 16.4%.
   The new difference between the two (16.8% – 16.4%) = 0.4%.
   When compared with the original difference of 2.6% this represents a decrease of (0.4/2.6 – 1) = 84%.

Exercise #1C—Solution

Cash and Securities	$1	Accounts Payable	$2
Receivables	2	Mortgage Loan (15 years)	6
Inventories	3	Deferred Taxes	1
Prepaid Expenses	1		
Total Current Assets	7	Total Liabilities	9
Furniture and Fixtures	1	Contributed Capital	6
Truck Fleet	2	Retained Earnings	4
Plant and Equipment	7		
Goodwill	2		
Total Fixed Assets	12	Total Equity	10
Total Assets	**$19**	**Total Liabilities & Equity**	**$19**

Exercise #1D—Part I—Solution

a) Cash received	events?	“c” and “g”
b) Check written	events?	“f” and “d”
c) Cash paid	events?	“d” and “f”
d) Cash received	events?	“d” and “a”
e) Billed as a customer	events?	“c” and “a”
f) Paid rent	events?	“b” and “d”
g) Owners’ withdrawal	events?	“d” and “h”

Exercise #1D—Part Ⅱ—Solution

Use the following equation:

	OLD EQUITY	+	PROFITS (OR-LOSS)	+	OWNER'S INV	−	OWNER'S WITHDR	=	NEW EQUITY
ABC	245		?		0		0	=	345
Answer Profits = 100									
BCD	245		?				− 35	=	345
Answer Profits = $135									
CDE	245		?		+ 110			=	345
Answer Loss = ($10)									
DEF	245		?		+ 15		− 60	=	345
Answer Profit = $145									

Exercise #1D—Part Ⅲ—Solution

Use the Following Equation:

OLD EQUITY	+	REV.	−	EXP.	+	OWNERS' INV.	−	OWNERS' WITHDR.	=	NEW EQUITY
110	+	98	−	73	+	?	−	30	=	190

By elimination the missing number is 85 for EFG Co.

50	+	?	−	52	+	22	−	8	=	90

By elimination the missing number is 78 for FGH Co.

Exercise #1E—Solution

Income Statement for the Year Ended December 31,

	1998		1997	
Revenue		$28,000		$20,000
Fuel	$6,000		$4,000	
Repairs & Maintenance	3,000		2,000	
Salary	12,000		12,000	
Telephone	1,000		1,000	
Depreciation*	2,100		3,000	
Expenses		24,100		22,000
Net Income (Loss) before taxes		**$3,900**		**$(2,000)**

Balance Sheet as at December 31,

		1998		1997	
Assets[**]:	Cash		$7,500		$1,500
	Auto	$ 10,000		$ 10,000	
Less:	Accum. Depr.	(5,100)	4,900	(3,000)	7,000
Total Assets			**$12,400**		**$8,500**
Liabilities			$0		$0
Owners Equity			$12,400		$8,500
Total Equity			**$12,400**		**$8,500**

* Note that Depreciation Expenses do not require the payment of cash and therefore do not affect the cash balances in the balance sheet.

** Proof for 1997 cash balance = Revenues (cash in) = 20 k

Cash Expenses (22 k – 3 k) = 19 k

Beginning Cash = 0.5 k

Ending Cash = 1.5 k

** Proof for 1998 cash balance = Revenues (cash in) = 28 k

Cash Expenses (24.1 k – 2.1 k) = 22 k

Begin Cash = 1.5 k

End Cash = 7.5 k

Exercise #1F—Solution

The Asset growth during the five year period was ($65 M – $40 M) = $25 M, of which Liabilities provided ($33 M – $18 M) = $15 M, OR 15/25 = 60% of the funds.

Contributed Capital (from investors) provided ($10 M – $5 M) = $5 M OR 5/25 = 20% and re-invested profits provided ($22 M – $17 M) = $5 M OR 5/25 = 20% of the funds.

Exercise #1G—Solution

1993—1998 Flow of Funds Statement—*Gentleman's Wear*

	1993	1998	$\sigma \uparrow L+E$ $\sigma \downarrow A$	$\sigma \downarrow L+E$ $\sigma \uparrow A$
Assets			**sources**	**uses**
Receivables	100 k	400 k		300 k
Inventories	100 k	260 k		160 k
Other Assets	120 k	140 k		20 k
Total	320 k	800 k	ignore	totals
Debt	160 k	300 k	140 k	
Equity	160 k	500 k	*1539.75 k	*2199,750
Total	320 k	800 k	ignore	totals
			679,750 =	679,750

*1 Total NIAT for 1994, 1995, 1996, 1997, 1998 = 380 k + 159,750 = 539,750

*2 Total Dividends, by elimination, must equal = 199,750

Proof: Since equity rose by (500 k – 160 k) = 340 k and in footnote 1 we determined that Total NIAT = 539,750, we conclude that ($539,750 – $340 k) = $199,750 was spent on Dividends and other transactions reducing equity.

Analysis: Operations (i.e. profits) accounted for (539,750/679,750) = 79% of total sources, therefore only 21% of the sources where provided by additional debt.

Of the uses only 199,750/679,750 = 29% was spent on dividends, the remainder i.e. 71% was invested in Assets, largely current Assets. Overall, it suggests a stronger balance sheet; there is no evidence that the equity is weakened by excessive dividends and other reductions.

Exercise #1H—Solution

Note: We have combined several balance sheet accounts.

1993—1998 Flow of Funds Statement—EDI

	1993	1998	$\sigma \uparrow L+E$ $\sigma \downarrow A$	$\sigma L+E$ $\sigma \uparrow A$
Assets			**SOURCES**	**USES**
Cash + Near Cash	5	40		35
Receivables	100	90	10	
Inventories	120	50	70	
Other current assets	5	20		15
Plant + Equip. (BV)	70	280		210

Continued

Total	300	480	ignore	totals
Current debt	175	53		122
Long term debt	50	160	110	
Contrib. Capital	50	150	100	
Retained Earnings	25	117	*1217.6 k	*2125.6 k
Total	300	480	507.6	507.6

*1 Total NIAT for 1994, 1995, 1996, 1997, 1998 = $160 k + $57.6 k = $217.6 k.

*2 Total dividends, by elimination, must equal $125.6 k.

Proof: Since Ret. Earnings rose $92 and $217.6 was added to Ret. Earnings from NIAT, we deduce that ($217.6 – $92) = $125.6 k was paid out in Dividends.

Analysis: Operations (i.e. profits) provided (217.6/507.6) = 43% of total sources—that's a significant and healthy sign. Of the remainder (110/507.6) = 22% was provided by long term debt which replaced short term debt, always a welcome sign. Long debt financing is to be preferred over short term debt. The rest of the sources of funds were provided by a welcome reduction in excessive receivables and inventory levels. An analysis of uses of funds indicates that (210/507.6) = 41% was invested in additional productive capacity (Plant + Equipment). Another (122/507.6) = 24% served to repay short term debt. A significant portion (35/507.6) = 7% served to strengthen the company's liquid reserves.

Overall, quite a positive picture which produced a balance sheet that is significantly stronger than it was five years ago.

Total Dividend Payments when compared to total NIAT (125.6/217.6) = 58% are on the generous side but they did not cause a weakening of the balance sheet.

Exercise #2A—Solution

The average daily flow of cash received by check amounts to ($84 M/365) = $230.1 k, which works out to ($84 M/$575) = 146,087 checks per year or approximately (146,087/365) = 400 checks per day. A *one-day* reduction in the check float (i.e. transit time) would provide the company with the following annual benefit ($230.1 k × 1 day × 16% asset yield) = $36.816 per year.

The annual cost of adopting the new collection procedure is (146,087 checks per year × 50 cents per check) = $73,044. Therefore a reduction of ($73,044/$36,816) = 1.98 days in the transit time would be a break-even proposition. A reduction of two days or more would produce net benefits for the company.

Exercise #2B—Solution

Company's liquidity position:

1. Current Ratio 1997 $= \dfrac{\text{Current Assets}}{\text{Current Liabilties}}$

$= \dfrac{\$10\text{ k} + 15\text{ k} + 80\text{ k} + 26\text{ k} + 6\text{ k}}{\$20\text{ k} + 60\text{ k}}$

$= \dfrac{\$137\text{ k}}{\$80\text{ k}} = 1.7\text{ X}$

Current Ratio 1998 $= \dfrac{\$12\text{ k} + 5\text{ k} + 110\text{ k} + 40\text{ k} + 10\text{ k}}{\$30\text{ k} + 90\text{ k}}$

$= \dfrac{\$177\text{ k}}{\$120\text{ k}} = 1.48\text{X}$

2. Quick Ratio 1997 $= \dfrac{\$137\text{ k} - \$26\text{ k}}{\$80\text{ k}} = 1.39\text{X}$

Quick Ratio 1998 $= \dfrac{\$177\text{ k} - \$40\text{ k}}{\$120\text{ k}} = 1.14\text{X}$

3. $\left(\dfrac{\text{Cash 1997}}{\text{Annual Credit Sales}}\right)$ $= \dfrac{\$10\text{ k} - \$15\text{ k}}{\$720\text{ k}} = 3.5\%$

$= \dfrac{\$12\text{ k} - \$5\text{ k}}{\$800\text{ k}} = 2.1\%$

1998

4. $\left(\dfrac{\text{Cash 1997}}{\text{Current Assets 1998}}\right)$ $= \dfrac{\$10\text{ k} + \$15\text{ k}}{\$137\text{ k}} = 18.2\%$

$= \dfrac{\$12\text{ k} + \$5\text{ k}}{\$177\text{ k}} = 9.6\%$

Conclusion: The company's liquidity has worsened significantly during this period.

Exercise #2C—Solution

The daily dollar flow through is ($185 M/365) = $506.85 k.

Annual before tax benefits of a 2-day reduction in transit float equals: 2 days × $506.85 k × 14% asset yield = $141.92.

Annual before tax cost of obtaining a 2-day reduction: Annual # checks processed ($185 M/average check size $850) = 217,647 check per year × 50 cents handling fee per check.

Annual before tax costs = $108.82 k.

Therefore annual before tax net benefit to the company $141.92 – $108.82 k = $33.1 k per year.

A more sophisticated approach promises a 3-day float reduction.
Annual before tax benefit: 3 days × $506.85 k × 14% = $212.88 k.
Annual before tax costs: 217,647 checks per year × 90 cents = $195.88 k.
Annual net before tax benefit of a 3-day float reduction: $212.88K – $195.88 k = $17 k.

Conclusion: The two-day reduction is superior since it produces ($33.1 k – $17 k) = $16 k more benefits per year.

Exercise #2D—Solution

Our company's average # of days its inventory is unsold equals

(Average Inv. / Annual Cost of Goods Sold) × 360 days = 90 days
($2 M / $8 M)

The *industry* average is only 45 days. If our company was up to industry standards it should have an average inventory level of (45 days / 360 days) × $8 M = $1 M.

Our company's average # days its receivables are unpaid equals

(Average Receiv. / Annual Credit) × 360 days = 90 days
($3 M / Sales $12 M)

The *industry* average is only 40 days. If our company was up to industry standards it should have an average receivables level of (40 days / 360 days) × $12 M = $11/3 M.

It's "adjusted" (to industry standards). Current assets would therefore be only:

$0.1 M cash = mkt. secs.
$1.0 M average inventory
$1.33 M average receivables
$2.43 M TOTAL current assets.

We must first calculate our company's level of *current liabilities*. Remember it's original current ratio (Current Assets/Current Liab.) equaled ($3 M + $2 M + $0.1 M)/current liabilities which in turn equaled 2.04 x. Therefore the current liabilities are ($5.1 M/2.04) = $2.5 M.

Therefore the "adjusted" current ratio, if this company's current asset management was up to industry standards, equals only

($2.43 M / $2.5 M) = 0.97 x
(adjusted current assets / current liab.)

Considerably less than its original level of 2.04 x and less too than the average current ratio of 1.25 x prevailing in the industry.

Exercise #2E—Solution

Let us define the required asset yield % × assets \$100 = U (for unknown) = required EBIT.

For KLM Co.	For LMN Co.
$(U - 5.6) = \text{NIBT}$	$(U - 2.4) = \text{NIBT}$
$(U - 5.6) \times 0.6 = \text{NIAT}$	$(U - 2.4) \times 0.6 = \text{NIAT}$
and	and
$[(U - 5.6) \times 0.6]/30 = \text{KLM's ROE}$	$[(U - 2.4) \times 0.6]/70 = \text{LMN's ROE}$

We have to find the value for U to produce equal levels of ROE
Removing some brackets gives

$$\frac{0.6U - 3.36}{30} = \frac{0.6U - 1.44}{70}$$

Next we eliminate the division line:

$$70(0.6U - 3.36) = 30\ (0.6U - 1.44)$$

$$42U - 352.2 = 18U - 43.2$$

$$24U = 192$$

$$U = 8$$

since U = (asset yield% × assets \$100) = \$8.

Therefore an asset yield of 8% gives both companies the same ROE, namely 4.8% (check it out by calculating the ROE formulas above).

Exercise #2G—Solution

The company's financial leverage position in:

	1998	1994
$\frac{\text{Debt}}{\text{Assets}}$	$= \frac{\$340\text{ k}}{\$700\text{ k}} = 48.6\%$	$= \frac{\$150\text{ k}}{\$400\text{ k}} = 37.5\%$
$\frac{\text{Assets}}{\text{Equity}}$	$= \frac{\$700\text{ k}}{\$360\text{ k}} = 1.94\text{ x}\%$	$= \frac{\$400\text{ k}}{\$250\text{ k}} = 1.6\text{ x}$
$\frac{\text{Liability}}{\text{Equity}}$	$= \frac{\$340\text{ k}}{\$360\text{ k}} = 94\%$	$= \frac{\$150\text{ k}}{\$250\text{ k}} = 60\%$
$\frac{\text{EBIT}}{\text{Annual Interest Charges}}$	$= \frac{\$154\text{ k}}{\$47\text{ k}} = 3.28\text{ x}$	$= \frac{\$64\text{ k}}{\$20\text{ k}} = 3.20\text{ x}$

The company has increased its financial leverage from 1994 to 1998. This could be a good business decision *if* the increase in the asset base results in a significant increase in earnings to offset the risk associated with the increased debt load.

In this case we see that there is indeed a significant an increase in the Asset Yield of the company:

	1994		1998
$\frac{\text{EBIT}}{\text{Assets}} = \frac{\$64\text{ k}}{\$400\text{ k}}$	$= 16\%$	to	$\frac{\$154\text{ k}}{\$700\text{ k}} = 22\%$

Consequently, the company's ability to carry its "burden of debt," which is reflected in the (EBIT/Interest) ratio, shows an improvement, i.e., from 3.20 x to 3.28 x.

Exercise #2H—Solution

Conclusions about the company's working capital management and operating cycle:

		1998	1993
Inventory Turnover =	$\frac{\text{Annual Cost of GS}}{\text{Average Inventory}} =$	$\frac{\$540\text{ k}}{\$57\text{ k}} = 9$	$\frac{\$360\text{ k}}{\$45\text{ k}} = 8$
Receivables Turnover =	$\frac{\text{Annual Credit Sales}}{\text{Average Receivables}} =$	$\frac{\$840\text{ k}}{\$105\text{ k}} = 8$	$\frac{\$600\text{ k}}{\$100\text{ k}} = 6$
Payables Turnover =	$\frac{\text{Annual Cost of GS}}{\text{Average Payables}} =$	$\frac{\$504\text{ k}}{\$42\text{ k}} = 12$	$\frac{\$360\text{ k}}{\$40\text{ k}} = 9$

Therefore the average time inventory remains unsold is:

$\frac{360\text{ days}}{8}$	$= 45$ days	(1993)	$\frac{360\text{ days}}{9}$	$= 40$ days	(1998)

Therefore the average time to collect receivables is:

$\frac{360\text{ days}}{6}$	$= 60$ days	(1993)	$\frac{360\text{ days}}{8}$	$= 45$ days	(1998)

Summing the previous two lines gives us operating cycles of:

105 days	(1993)		**85 days**	(1998)

A dramatic improvement in Current Asset Management.

The payables turnover of: 12 x and 9 x indicates that the average time this company's bills used to get paid in 1993 was (360 days/9) = 40 days and in 1998 (360 days/12) = 30 days.

When we compare the operating cycle with the payable cycle in 1993 (85 days and 40 days) and we do the same in 1998 (105 days and 30 days), we notice that in 1993 a gap of 45 days and in 1998 a gap of 75 days that had to be financed by other sources of company funds, which could indicate reduced liquidity.

Exercise #2I—Solution

		1990	1989
Gross Profit Margin =	$\frac{\text{Gross Profits}}{\text{Sales}} =$	$\frac{\$216\text{ k}}{\$480\text{ k}} = 45\%$	$\frac{\$210\text{ k}}{\$420\text{ k}} = 50\%$
Operating Efficiency Ratio =	$\frac{\text{Operating Exp.}}{\text{Operating Rev.}} =$	$\frac{\$182.4\text{ k}}{\$480\text{ k}} = 38\%$	$\frac{\$176.4\text{ k}}{\$420\text{ k}} = 42\%$
Operating Profit Margin =	$\frac{\text{Operating Inc.}}{\text{Operating Rev.}} =$	$\frac{\$33.6\text{ k}}{\$480\text{ k}} = 7\%$	$\frac{\$33.6\text{ k}}{\$420\text{ k}} = 8\%$

This company is faced with a "pricing- or margin-squeeze," reflected in the falling gross profit margin, perhaps due to competitive pressures. It has "fought back," however, by improving its Operating Efficiency Ratio (in fact the operating efficiency improved by 38/42 – 1 = 9.5%), which resulted in the Operating Profit Margin only falling from 8 cents per dollar of Sales to 7 cents per dollar of Sales. Nevertheless, this represents a 12.5% decline.

Exercise #2J—Solution

EDInc.	1998	1993	%σ
Gross Profit Margin (Gross Profits/Sales)	34%	28%	21.3% ↑
Operating Efficiency (Oper. Exp./Sales)	21%	18.2%	15.6% ↑
Operating Profit/Margin (EBIT/Sales)	13%	9.8%	32.7% ↑
Interest Burden (Int. Exp./Sales)	2.9%	4.8%	40.0% ↓
Net Profit Margin (NIAT/Sales)	6%	3.0%	100% ↑

Analysis: A rising GPM suggests an easier marketing climate with lower competitive pressures; perhaps a shift to a higher profit margin output, a 21% rise in GPM is quite significant.

The higher GPM may have allowed the company to be less vigilant in its cost control, it is also possible that the weakening of the operating efficiency by

15.6% is the result of deliberate plan to enhance certain services that allow the company to obtain a higher GPM.

The resulting increase in OPM of nearly 33% is very impressive. This combined with the significant drop in the Interest Burden of 40% produced a spectacular (100% gain) doubling of the company's net profit margin from 3% to 6%.

All in all, a very favourable set of numbers.

Exercise #2K—Solution

Scenario #1—Bishop & Co.

ROE	$= \frac{\text{Sales}}{\text{Assets}}$	$\times \frac{\text{NIAT}}{\text{Sales}}$	$\times \frac{\text{Assets}}{\text{Equity}}$		$= \frac{\text{NIAT}}{\text{Equity}}$
ROE (1988)	$= \frac{\$350\text{ k}}{\$250\text{ k}}$	$\times \frac{\$14\text{ k}}{\$350\text{ k}}$	$\times \frac{\$250\text{ k}}{\$120\text{ k}}$	$= 1.4 \times 0.04 \times 2.08$	$= 11\%$
ROE (1990)	$= \frac{\$440\text{ k}}{\$480\text{ k}}$	$\times \frac{\$22\text{ k}}{\$440\text{ k}}$	$\times \frac{\$480\text{ k}}{\$210\text{ k}}$	$= 0.92 \times 0.05 \times 2.29$	$= 12\%$
Year to year percentage change	(34%)	+25%	+10%		$= 9\%$

Notice that an increase in the asset base (2/3 of which is financed by an increase in liability) has impacted sales and NIAT positively. Unfortunately, the 34% decrease in the volume factor exceeded the 25% rise in the margin factor. This is called a negative trade-off. The 9% increase in ROE was strictly due to the increased reliance on Debt Financing. The modest rise in ROE was combined with a weaker Balance Sheet.

Scenario #2—Cardinal & Co.

ROE	$= \frac{\text{Sales}}{\text{Assets}}$	$\times \frac{\text{NIAT}}{\text{Sales}}$	$\times \frac{\text{Assets}}{\text{Equity}}$		$= \frac{\text{NIAT}}{\text{Equity}}$
ROE (1988)	$= \frac{\$280\text{ k}}{\$230\text{ k}}$	$\times \frac{\$12\text{ k}}{\$280\text{ k}}$	$\times \frac{\$230\text{ k}}{\$105\text{ k}}$	$= 1.22 \times 0.04 \times 2.19$	$= 11.4\%$
ROE (1990)	$= \frac{\$570\text{ k}}{\$216\text{ k}}$	$\times \frac{\$18\text{ k}}{\$570\text{ k}}$	$\times \frac{\$216\text{ k}}{\$120\text{ k}}$	$= 2.64 \times 0.03 \times 1.80$	$= 15\%$
Year to year percentage change	116%	(25%)	(18%)		32%

This is a great performance. A reduction in the asset base has not prevented a large increase in sales and a huge (116%) rise in the volume factor. This benefit

nicely outweighs the reduction in the other two ratios, therefore, the ROE has improved in 1990 by nearly 32%. It is quite significant that the 32% rise in ROE was achieved at the same time that the company's reliance on financial leverage fell by 18%. This rise in ROE was combined with a stronger Balance Sheet.

Exercise #3A—Solution

	1996		1998
Assets (Book Values)	\$6 M		\$8 M
Liabilities	4 M		4.8 M
Equity	2 M		3.2 M
NIAT	200 k		480 k
Market Value per Share	1.4		3.68
No. of shares outstanding	1 M		1.2 M
Assets (net realized value)	6.5 M		8 M
BV per share (2 M/1 M sh)	\$2	(\$3.2 M/1.2 M sh)	\$2.67
NRV per share (2.5/1 M sh)	\$2.50	(\$3.2 M/1.2 M sh)	\$2.67
MV/BV per share (\$1.40/sh/\$2/sh)	0.70	(\$3.68/sh/\$2.67/sh)	= 1.38
EPS (\$200 k/1 M sh)	\$0.20/sh	(\$480 k/1.2 M)	\$0.40/sh
P/E Ratio (\$1.40/\$0.2)	7 x	(\$3.68/\$0.40)	9.2 x
Industry P/E Ratio	9 x		8 x

Alpha Ltd's popularity has in creased significantly with investors. The P/E ratio has increased in 1990 to *above* the industry average. All of the indicators are up. (Back in 1996, the P/E Ratio was below the industry average.)

Exercise #4A—Solution

$$\frac{\$300 + \$100}{1 - \left(\frac{\$900}{\$1,500}\right)} = \$1,000$$

$$\text{SafetyRatio} = \frac{\$1,500}{\$1,000} = 150\%$$

i.e., actual Sales exceed Break-Even Sales by 50%.

Exercise #4B—Solution

First we express the drop in Revenues as a percentage, i.e.:

$$\frac{\$12\text{ k}}{800\text{ k}} = 0.015 = 1.5\%\text{ change}$$

Then we multiply the percentage change by the DCL and the NIAT

$$\%\ \text{change in Rev} \times \text{DCL} \times \text{NIAT} = 1.5\% \times 2.7 \times \$54\text{ k} = \$2.19\text{ k}$$

Given the Income Statement in this exercise let's calculate the:

$$\text{Break-Even Sales} = \frac{\text{Fixed Operating Expenses + Interest Expenses}}{1 - \left(\dfrac{\text{Total Variable Costs}}{\text{Total Revenues}}\right)}$$

$$= \frac{\$128\text{ k} + \$53\text{ k}}{1 - \dfrac{\$512\text{ k}}{\$800\text{ k}}} = \frac{\$181\text{ k}}{1 - 0.64} = \frac{\$181\text{ k}}{0.36} = \$503\text{ k}$$

Knowing the BE Sales enables us to calculate the Safety Ratio

Safety Ratio

$$\frac{\text{Actual Sales}}{\text{Break} - \text{Even Sales}} = \frac{\$800\text{ k}}{\$503\text{ k}} = 1.58 \text{ or } 159\%$$

$$\text{Degree of Operating Leverage} = \frac{\%\text{ change EBIT}}{\%\text{ change Rev}}$$

$$= \frac{\text{Rev} - \text{VOE}}{\text{Rev} - \text{VOE} - \text{FOE}}$$

$$= \frac{\$800\text{ k} - \$512\text{ k}}{\$800\text{ k} - \$512\text{ k} - \$128\text{ k}} = \frac{288}{160} = 1.8$$

$$\text{Degree of Financial Leverage} = \frac{\%\text{ change NIAT}}{\%\text{ change EBIT}}$$

$$= \frac{\text{Rev} - \text{VOE} - \text{FOE}}{\text{EBIT} - \text{Int.Exp}}$$

$$= \frac{\text{EBIT}}{\text{NIBT}} = \frac{\$160\text{ k}}{\$107\text{ k}} = 1.50$$

$$\text{Degree of Combined Leverage} = \text{DOL} \times \text{DFL}$$

$$= 1.8 \times 1.5 = 2.7$$

Exercise #5A—Solution

Will the $300 sales increase cause a situation where there is Surplus Liquidity or External Financing needed?

$$
\begin{aligned}
(VA/S - VL/S)\cdot \sigma S - NPM \cdot PRR \cdot S_1 &= [(0.04 - 0.08) \times \$300\text{ k}] \\
&\quad - [0.08 \times (1 - 0.40) \times 1{,}300\text{ k}] \\
&= 0.32 \times \$300\text{ k} - 0.08 \times 0.06 \times 1{,}300\text{ k} \\
&= \$1{,}300\text{ k}(0.32 - 0.48) \\
&= \$33.6\text{ k} \\
&\quad \text{a positive value}
\end{aligned}
$$

Therefore external financing is needed.

If sales are estimated at \$1.1 million then the formula produces a negative answer:

$$(32\% \times \$100\text{ k}) - (4.8\% \times \$110\text{ k}) = \$32\text{ k} - \$52.8\text{ k} = (\$20.8\text{ k})$$

Remember that a negative answer indicates *surplus liquidity*. This example makes the point that slow growing corporations often have very high liquidity, whereas fast growth often causes severe liquidity problems. Good management requires an understanding of the cause of this phenomenon and strategies to deal with them. Now find the balanced growth figure in dollars.

$$
\begin{aligned}
(VA/S - VL/S)\cdot \sigma S - NPM \cdot PRR \cdot S_1 &= \text{Zero} \\
0.32 \times \sigma S - 0.048 \times (1{,}000 + \sigma S) &= \text{Zero} \\
0.272 \times \sigma S &= \$48\text{ k} \\
\sigma S &= \$176.5\text{ k}
\end{aligned}
$$

Conclusion a sales increase of \$176.5 k will cause neither EFN nor SL.

If we had used the formula from the top of page 95 we would have found that the g-value is \$176.5/\$1000 = 17.65%.

Exercise #8A—Solution

		1999	1998
Salaries Management	(11 people)	\$423	\$470
Wages Clerical	(6 people)	282	310
Employee Benefits	(20% × 423 + 282)	141	156
Computer Timeshare Costs		83	83
Stationery		24	27
Furniture & Office Equipment		32	36
Rents		5	5
Employee Expense Management		4	4
Miscellaneous	(all other)	20	19
		\$1,014	\$1,110

Exercise #8B—Solution

Changes in net sales, gross profit on sales and net income are all favourable. Cost of Goods Sold and expenses are unfavourable. I would prefer not to have a 94% increase in Cost of Goods Sold for a 66% increase in net sales. It appears that the relative increase in net income is too low compared to the increase in Cost of Goods Sold. This is a diseconomy of scale (i.e., "more expensive by the dozen").

Exercise #8C—Solution

Material—Minor

a) Unfavourable Variance.

b) 1. Possible extraordinary requirements of minor materials.
2. Inflation on regularly purchased materials could have been severe.
3. There could be an accounting error (bulk buying may have been expensed instead of capitalized).

c) 1. Issue a directive to control spending on minor materials (i.e., prior approval is required before any purchases).
2. Correct the accounting error if bulk purchases were made and expensed instead of capitalized.
3. Determine if there are any other areas where the over expenditure could be made up.

Engineering Services—Other

a) Favourable Variance.

b) 1. There were fewer projects than anticipated.
2. Expenses on projects were less than anticipated.
(This may also result in less depreciation expense and interest expense.)
3. Engineering was not available to do the work.

c) 1. Review the budget to see if the underrun could be used elsewhere to offset an overrun.
2. Consider whether the underrun will require an adjustment in related accounts.
3. Revise the budget to reflect current information.

Consultant Fees

a) Unfavourable Variance.

b) 1. More problems than anticipated requiring professional services came up.
2. Consulting projects required more work than was originally anticipated.
3. There could be an accounting coding error.

c) 1. A plan could be implemented to perform the consulting work in-house.
2. One could trace back to the original entry to verify correctness.
3. One can prepare supporting explanation to support the overrun and obtain necessary approval if further spending is necessary.

Exercise #8C—Solution (continued)

Employee Expense—Management/Clerical

a) Management—favourable/clerical—unfavourable.

b) 1. Less travelling for managers than originally anticipated.
2. More overtime expense than originally anticipated for clerical staff.
3. Fewer seminars approved for managers.

c) 1. Since managers' expense is controllable, decide whether to increase or reduce spending in accordance with plan.
2. For clerical expense, review the cause of the unfavourable variance, determine whether its controllable, and either control it or prepare to justify the expenditure.
3. Determine where it would be appropriate to revise your budget to make up any budget shortfalls.

Sales—Marketing Support/Plant Training

a) Favourable.

b) 1. Sales projects were fewer than planned.
2. The cost of sales activities was less than anticipated.
3. Not all costs associated with sales activities have yet been recorded.

c) 1. Determine that all the necessary sales projects have been implemented.
2. Check to see that all sales costs have been recorded.
3. Determine where the underspent budget could be reallocated to offset any overruns.

Exercise #8D—Solution

	1999 Budget ($000's)	1998 Budget ($000's)	1998 Actuals ($000's)
Salaries—Management	$795	$700	$750
Salaries—Clerical	2,268	2,000	2,140
Benefits	613	540	578
Material—Minor	100	100	300
Engineering Services—Other	800	800	500
Commercial Training	75	75	75
Consultant Fees	0	10	90
Employee Expense—Management	28	40	15
Employee Expense—Clerical	60	55	65
Sales—Marketing Support	250	250	200
Sales—Plant Training	620	780	670
Total Expenses	$5,616	$5,350	$5,383

Appendix B Case Studies 1.15 (Solutions to Case Studies 1, 4 and 14)

Case Studies

There are 15 Case Studies to be used in Conjunction with the Previous Material A complete analysis of three of these cases, #1, #4 and #14 appears at the end of this appendix,after case #15.

Case Study #1—All Cash Carpet Warehouse

The All Cash Carpet Warehouse was the largest volume dealer in the region. New management was installed five years ago when the original owner died. Looking over the past five years, you notice the following:

Income Statement	1998	1993
Sales (all Cash)	50.0 M	20.0 M
Cost of Goods Sold	35.0 M	16.0 M
Gross Profit	15.0 M	4.0 M
Operating Expenses*	8.0 M	1.6 M
EBIT	7.0 M	2.4 M
Interest Expenses	0.64 M	0.16 M
NIBT	6.36 M	2.24 M
Tax (35%)	2.226 M	0.784 M
NIAT	4.134 M	1.456 M

* Of which 60% were fixed expenses. This percentage has shrunk to 20% by 1998.

Balance Sheet	1998		1993
Inventory	8.0 M		2.0 M
Other Assets	2.0 M		0.5 M
Total assets	10.0 M		2.5 M
Debt @ 8%	8.0 M	@ 8%	2.0 M
Equity	2.0 M		0.5 M

Total NIAT earned in 1994, 1995, 1996, and 1997 amounted to $6 M. No other additions to Equity occurred.

Required:

Through the use of key ratios, describe in a hundred words or less what has happened to the company in the last few years in terms of its operating/financial strategy. Has the overall trend been positive/negative? Given the trends that you observe, what could possibly lie in store for this company?

Case Study #2—Village Furniture Manufacture Ltd.

Village Furniture Manufacture Ltd. was a family owned medium sized producer of top quality maple furniture.

Five years ago the founding family sold the business to an Ontario based corporation.

Look back over the last five years, you notice the following trends:

Income Statement	1998	1993
Sales (all Credit)	3.20 M	2.0 M
Cost of Goods Sold	1.60 M	1.0 M
Gross Profit	1.60 M	1.0 M
Operating Expenses*	0.64 M	0.4 M
EBIT	0.96 M	0.6 M
Interest Expenses	0.27 M	NIL M
NIBT	0.69 M	0.6 M
Tax (35%)	0.241,5 M	0.21 M
NIAT	0.448,5 M	0.39 M
Dividends	0.320,0 M	0.04 M
Increase in Retained Earnings	0.128,5 M	0.35 M

* Of which 10 % were fixed expenses. This percentage rose to 70% by 1998.

Balance Sheet	1998		1993
Assets	3.0 M		2.0 M
Liabilities	1.8 M	@ 10%	0.2 M
Equity	1.3 M		1.8 M

Total NIAT earned during 1994, 1995, 1996, and 1997 amounted to $1.5 M. No other additions to Equity occurred.

Required:

Through the use of key ratios, describe what has happened to the company in the last few years in terms of its operating/financial strategy. Has the overall trend been positive/negative? Given the trends that you observe, what could possibly lie in store for this company?

Case Study #3—Acme Distributing Ltd.

Acme Distributing Ltd. wholesales industrial chemicals to processors and manufacturers. Competition form large chemical companies that sell direct have hurt the company's profits. The company has struggled to maintain its share of the region's product market of 8% in 1993 and 7% in 1998. This year the company has begun production of a chemical product that promises better profit margins.

Analyze and comment on the company's performance using the following financial results.

Finance Case

Acme Distributors Inc.
Financial Statements

Income Statements

All figures are multiples of 1 million	1998	1993
SALES (all on Credit)	$840	$540
– Costs of Sales	– 624	– 378
Gross Profits	216	162
– Fixed Operating Expenses	– 120	– 69
– Variable Operating Expenses	– 35.1	– 49.8
EBIT	60.9	43.2
– Interest Expenses	– 31.5	– 7.2
NIBT	29.4	36
– Taxes	– 0	– 14.4
NIAT	29.4	21.6
– Dividends Paid	– 0	– 6.6
Transferred to Retained Earnings	$29.4	$15.0

Balance Sheets

	1998	1993
Cash and Near Cash	$3	$30
Receivables	57	60
Inventories	120	90
Total Current Assets	$180	$180
Plant/Equipment	$270	$300
Accum. Deprec. (P/E)	(30)	(180)
P/E (Book Value)	240	120

* P/E (Net Realiz. Value) 120 in 1993; 330 in 1998		
Total Assets	$420	$300
Trade Payables	21	15
Other Current Debt	9	0
Long Debt	180	45
Total Liabilities	$210	$60
Contributed CAPITAL	60	30
Retained Earnings	150	210
Total Liabilities & Equity	$420	$300

* Not Part of The Totals.

Total NIAT earned during 1994, 1995, 1996 and 1997 amounted to a negative value of −$35 M.

Case Study #4—Number One Machine Fabricators Ltd.

Number One Machine Fabricators Ltd. Is a small 1993 manufacturing company that was sold by its elderly owner to its general manager in 1993. The company's financial results for 1993 and 1999 are portrayed on the attached financial statements (all figures are in multiples of one thousand). The new owner has dramatically changed various operational, financial and marketing aspects of the company. One important aspect of the company's performance is an increase in their share of the total regional product market from 3% to 15% during the 5 year period. Using financial statement analysis, comment on the changes in performance, strengths, weaknesses and strategies that have occurred during the last five years.

Finance Case

Number One Machine Fabricators Ltd.
Financial Statements

Income Statements

All figures are multiples of 1 million	1998	1993
Sales (all on Credit)	$240	$100
– Costs of Sales	– 120	– 60
Gross Profits	120	40
– Fixed Operating Expenses	– 39	– 12
– Variable Operating Expenses	– 60	– 4
EBIT	21	24
– Interest Expenses	– 3	– 14

NIBT	18	10
– Taxes	– 3.6	– 2
NIAT	14.4	8
– Dividends Paid	– 4.4	– 2
Transferred to Retained Earnings	$10	$6

	Balance Sheets	
	1998	1993
Cash and Near Cash	$10	$1
Receivables	20	20
Inventories	10	10
Total Current Assets	40	31
Plant/Equipment	130	250
Accum. Deprec. (P/E)	(26)	(131)
P/E (Book Value)	104	119
*P/E (Net Realiz. Value) 100 in 1993; 140 in 1998		
OTHER non-current assets (intangible)	0	50
Total Assets	$144	$200
Trade Payables	10	30
Other Current Debt	0	40
Long Debt	14	30
Total Liabilities	$ 24	100
Contributed Capital	60	60
Retained Earnings	60	40
Total Liabilities & Equity	$144	$200

* Not Part of the Totals.

Total NIAT earned during 1994, 1995, 1996 and 1997 amounted to $35 M.

Case Study #5—Allied Assemblers

This company, in spite of serious attempts to maintain its market share, has seen it fall from 15% to 9% of its regional product market. Cheaper foreign pre-assembled products have forced the company to rely more on foreign assembly. In an effort to diversify income sources, this company purchased in 1994 the building in which it operates and the company sublets 50% of its space. The company's 1993 and 1998 financial statements are attached. Analyze the company's financial data

and comment on the weaknesses, strengths, opportunities and dangers that you observe.

Finance Case

Allied Assemblers
Financial Statements

Income Statements

All figures are multiples of 1 million	1998	1993
SALES (all on Credit)	$800	$600
– Costs of Sales	– 512	– 312
Gross Profits	288	288
– Fixed Operating Expenses	– 44	– 140
– Variable Operating Expenses	– 50.4	– 40
Operating Inc.	193.6	108
+ Non-Operating Revenues	+ 36	+ 2
+ Non-Operating Expenses	– 12	– 2
EBIT	217.6	108
– Interest Expenses	– 153.6	– 48
NIBT	64	60
– Taxes	– 25.6	– 24
NIAT	38.4	36
– Dividends Paid	– 3.4	– 20
Transferred to Retained Earnings	$35	16

Balance Sheets

	1998	1993
Cash and Near Cash	$20	$40
Receivables	160	48
Inventories	160	72
Prepaid and Other Current Assets	60	160
Total Current Assets	400	$320
Plant/Equipment	1,400	$720
Accum. Deprec. (P/E)	(520)	(240)

P/E (Book Value)	880	480
* P/E (Net Realiz. Value)	1,280	480
Total Assets	1,280	800
Trade Payables	96	32
Other Current Debt	104	8
Long Debt	760	360
Total Liabilities	$960	$400
Contributed Capital	80	80
Retained Earnings	240	320
Total Liabilities & Equity	$1,280	$800

* Not Part of the Totals.

Total NIAT earned during 1994, 1995, 1996 and 1997 amounted to a negative value of—$68 M.

Case Study #6—Burnaby Manufacturing Ltd.

Five years ago in 1993, Burnaby Manufacturing Ltd.'s largest shareholder (40%) sold his interest to the four top managers of the company and retired. Since then, some significant changes in financial and operational policy have taken place. The overall result of these changes has been welcomed by the shareholders as evidenced by a near doubling of the share price in the five-year period. You are required to analyze the various attributes of the company through statement analysis and describe the changes that you observe. In particular, attempt to explain the positive trend in the share price.

Finance Case
Burnaby Manufacturing Ltd.
Financial Statements

	1993	1998
SALES (all on Credit)	$2,000	$3,400
– Costs of Sales	1,000	2,200
Gross Profits	1,000	1,200
– Fixed Operating Expenses	35	300
– Variable Operating Expenses	360	140
EBIT	605	760
– Interest Expenses	245	200
NIBT	360	560
– Taxes	180	280

NIAT	180	280
– Dividends Paid	100	80
Transferred to Retained Earnings	80	200
Cash and Near Cash	50	200
Receivables	500	300
* Inventories (RM + G in P)	175	150
* Inventories (FG)	75	350
Plant/Equipment	5,000	2,600
Accumulated Depreciation (P/E)	(2,800)	(300)
Total Assets	3,000	3,300
Payables	$1,150	600
Long Debt	800	1,200
Contributed Capital	250	300
Retained Earnings	$ 800	1,200
Total Liabilities/Equity	3,000	3,300
EPS	0.18¢	0.23 1/3¢
MV per Share	$2.00	$3.75
Industry P/E Ratio	12X	12X

* Raw Materials, Goods in Process and Finished Goods.

Total NIAT earned during 1994, 1995, 1996 and 1997 amounted to $700 k.

Case Study #7—Baker Company Ltd.

Given the following financial statements, historical ratios, and industry averages, calculate the financial ratios of the Baker Company Ltd. For the most recent year and its overall financial situation from both time-series and a cross-sectional viewpoint; evaluate the company's liquidity, debt and profitability by using the applicable ratios.

Income Statement—December 31, 19×2

Net Sales	
Cash	$300,000
Credit	9,700,000
Total	$10,000,000
Less: Cost of Goods Sold	7,500,000
	$2,500,000

Gross Profit		
Less: Operating Expenses		
Selling Expenses	$300,000	
General & Admin	700,000	
Depreciation	200,000	1,200,000
Operating Profit		$1,300,000
Less: Interest Expense		200,000
Profit Before Taxes		$1,100,000
Less: Taxes (40%)		400,000
Profit After Taxes		$660,000
Less: Preferred Share Dividends		50,000
Earning Available For Common		$10,000
Less: Common Share Dividends		200,000
To Retained Earnings		$410,000

Assets

Current Assets		$200,000
Cash		50,000
Marketable Securities		800,000
Accounts Receivable		950,000
Total Current Assets		$2,000,000
Gross Fixed Assets	$12,000	
Less: Accumulated Depreciation	3,000	
Net Fixed Assets		$9,000,000
Other Assets		1,000,000
Total Assets		$12,000,000

Liabilities and Shareholders' Equity	
Current Liabilities	
Accrued Liabilities	100,000
Notes Payable	200,000
Accounts Payables [a]	900,000
Total Current Liabilities	$1,200,000
Long-Term Debts [b]	$3,000,000

Shareholders's Equity	
Preferred Shares [c]	$1,000,000
Common Shares (40,000 shares at $75 par)	3,000,000
Paid-In Capital in Excess of Par Value	2,800,000
Retained Earnings	1,000,000
Total Shareholders' Equity	$7,800,000
Total Liabilities & Shareholders' Equity	$12,000,000

a Annual credit purchases of $6,200,000 were made.

b The annual principal payment on the long-term debt is $100,000.

c The company has 25,000 share of $2.00 preferred outstanding.

Historical Data

Baker Company Ltd.

Data	Year		Industry Average
	1990	1991	1992
Current Ratio	$1.40	$1.55	$1.85
Net Working Capital	$760,000	$720,000	$1,600,000
Acid-Test Ratio	1.00	0.92	1.05
Average Age of Accounts Receivable	45.0 days	36.4 days	35.0 days
Inventory Turnover	9.52	9.21	8.60
Average Age of Accounts Payable	58.53 days	60.75 days	45.75 days
Debt Ratio	0.20	0.20	0.30
Debt-Equity Ratio	0.25	0.27	0.39
Debt-to-Total-Capitalization Ratio	0.22	0.22	0.27
Gross Profit Margin	0.30	0.27	0.25
Operating Profit Margin	0.12	0.12	0.10
Net Profit Margin	0.067	0.067	0.058
Total Asset Turnover	0.74	0.80	0.74
Return on Investment	0.049	0.54	0.043
Return on Common Equity	0.078	0.85	0.084
Earnings per Share	$8.65	$11.05	$7.45
Dividends per Share	$2.60	$3.65	$2.46
Book Value per Share	$140	$150	$175
Times Interest Earned	8.2	7.3	8.0
Total Debt Coverage	4.8	4.5	4.5

Case Study #8—MFM

MFM was founded in 1930; its senior management retired in 1993 and the son of

the company's founder and its largest shareholder (20%) took the president's position.

This individual has extensive interests and holdings in other business. MFM shares have not performed well during the last five years and there was considerable shareholder dissatisfaction at the last annual general meeting. In defense, the president pointed to improved profitability ratios, increased use of manufacturing equipment and the company's much broader product line. He argued that investors had not grasped the significance of this and when they would, the stock's performance would show considerable improvement.

	1998	1993
Sales (all on Credit)	73 M	60 M
Cost of Sales	41.6 M	36 M
Gross Profit	31.4 M	24 M
Fixed Operating Expenses	18 M	5 M
Variable Operating Expenses	3.72 M	12.4 M
EBIT	9.68 M	6.6 M
Interest Expenses	1.68 M	0.6 M
NIBT	8 M	6 M
Taxes	4 M	3 M
NIAT	4 M	3 M
Dividends Paid	2 M	2 M
Transferred to Retained Earnings	2 M	1 M
EPS	40¢	30¢
MV per Share	$6.00	$5.10
P/E Ratio Prevailing in the Industry	18X	15X
Cash and Near Cash	1 M	3 M
Receivables	7.3 M	5 M
Inventories	12.7 M	3 M
Plant/Equipment	31 M	30 M
Accum. Deprec. (P/E)	(3) M	(9) M
Total Assets	49 M	32 M
Payables	9 M	4.5 M
Long Debt	9 M	0.5 M
Contributed Capital	10 M	10 M
Retained Earnings	21 M	17 M
Liability & Equity	49 M	32 M

Total NIAT earned during 1994, 1995, 1996 and 1997 amounted to $7.5 M.

MFM Requirement:

Analyze the 1993 and 1998 financial data. Briefly describe the various attributes

of the company, such as liquidity, leverage, activity, profitability and growth as they changed during this period and attempt to explain the lackluster performance of the company's share-price by using ratio analysis.

Case Study #9—BC Manufacturing Ltd. (BCM)

BCM was founded in 1960. Its senior management retired in 1985 and the son of the firm's founder and its largest shareholder (20%) took over the president's position.

This individual has extensive interests and holdings in other businesses. BCM shares have not performed well over the last five years and there was considerable shareholder dissatisfaction at the last annual general meeting. In defense, the president pointed to improved profitability ratios, increased use of manufacturing equipment and the firm's much broader product line. He argued that investors had not grasped the significance of these developments and when they would, the stocks performance would show considerable improvement.

Required:

Analyze the 1985 and 1990 financial data. Briefly describe the various attributes of the firm, such as liquidity, leverage, activity, profitability and growth as they changed during this period and explain the lackluster performance of the firm's share-price by using ratio analysis.

Bc Manufacturing Ltd.
Financial Data

All numbers are multiples of $1 k

Note: All Income Statement numbers have been expressed as a percentage of the Topline (Sales or Revenues). This is called commonsize analysis.

	1990	As % of Sales	1985	As % of Sales
Sales (all on Credit)	7,350	100%	5,000	100%
Cost of Sales	4,040	55%	2,500	50%
Gross Profit	3,310	45%	2,500	50%
Fixed Operating Expenses	1,281	17.4%	860	17.4%
Variable Operating Expenses	900	12.2%	820	16.4%
Operating Income	1,129	15.4%	820	16.4%
Interest Expenses	415	5.6%	220	4.4%
Net Income Before Tax	714	9.7%	600	12%
Tax	357	4.9%	300	6%
Net Income After Tax	357	4.9%	300	6%
Dividends Paid	200	2.7%	150	3%
Transfer to RE	157	2.2%	150	3%

Balance Sheets

Note: In the balance sheet, common size analysis 8, all items are expressed as a percentage of total assets.

	1990	As % of Assets	1985	As % of Assets
Cash & Mkt. Secs.	$96	2.0%	$296	7.7%
Receivables	900	18.3%	400	10.4%
Inventories	330	6.7%	250	6.5%
Plant/Equipment	3,590	73.0%	2,900	75.4%
Total Assets	4,916	100%	3,846	100%
Short Term Debt	1,266	25.8%	518	13.4%
Long Term Debt	1,700	34.6%	1,500	39.0%
Contrib. Capital (1 M Sh)	1,000	20.3%	1,000	26.0%
Retained Earnings	950	19.3%	831	21.6%
Total Equities	4,916	100%	3,846	100%
Market Value per Share	$2.80		$3.00	
Industry P/E Ratio	10 x		9 x	

* means, in Balance Sheet, expressing all figures as a percentage of total assets and in an Income Statement, expressing all figures as a percentage of total sales.

Case Study #10—RR Distributors Inc.

RR Distributors Inc., changed its operating style significantly in 1993. when the elderly "owner" brought his son-in-law into the business. The son-in-law had recently won a significant sum of money on the Lottery and bought part ownership of the business. The company's shares are publicly traded on a regional stock exchange. Sixty percent of the $10 M shares are widely held by many investors, the remainder is owned by the founding family, with the majority of those in the hands of the father-in-law.

All figures below are in multiples of $1 M

	1998	1993
Sales (all on credit)	$153	$120
Cost of Goods Sold	99.5	96
Gross Profits	53.5	24

Operating Expenses*	38.1	18.7
EBIT	15.4	5.3
Interest Expenses	6.7	0.3
NIBT	8.7	5
Taxes @ 40%	3.5	2
NIAT	5.2	3
Dividends Paid	4.0	1
Transfer to Retained Earnings	1.2	2
Cash + Market Secs.	0.6	2
Receivables	23.4	10
Inventories	18	5.3
Fixed Assets (Net Book Value)	87.4	8.4
Total Assets	129.4	25.7
Accounts Payable	18	1.9
Long Term Debt	43.3	2.4
Total Debt	61.3	4.3
Contributed Capital	46.1	10
Retained Earnings	22	11.4
Total	129.4	25.7
EPS	52 Cents	30 Cents
Industry PE Ratio	16 x	14 x
Market Value Per Share	$4.68	$5.10

* 30% of the Operating Expenses are fixed. This percentage rose to 70% in 1998.

Total NIAT earned during 1994, 1995, 1996 & 1997 amounted to $19 M.

Required:

Perform a four stage DuPont Analysis. As part of your Stage IV Analysis, include some of the valuation ratios that were mentioned in Chapters 3, 4, 5 and 9 of the material. Also perform a Flow of Funds Analysis.

RR Distributors Inc., changed its operating style significantly in 1993. when the elderly "owner" brought his son-in-law into the business. The son-in-law had recently won a significant sum of money on the 6/49 Lottery and bought part ownership of the business. The company's shares are publicly traded on a regional stock exchange. Sixty percent of the $10 million shares are widely held by many investors, the remainder is owned by the founding family, with the majority of those in the hands of the father-in-law.

All figures below are in multiples of $1 M

	1998	1993
Sales (all on credit)	$153	$120
Cost of Goods Sold	99.5	96
Gross Profits	53.5	24
Operating Expenses*	38.1	18.7
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Interest Expenses	6.7	0.3
NIBT	8.7	5
Taxes @ 40%	3.5	2
NIAT	5.2	3
Dividends Paid	4.0	1
Transfer to Retained Earnings	1.2	2
Cash + Market Secs	0.6	2
Receivables	23.4	10
Inventories	18	5.3
Fixed Assets (Net Book Value)	87.4	8.4
Total Assets	129.4	25.7
Accounts Payable	18	1.9
Long Term Debt	43.3	2.4
Total Debt	61.3	4.3
Contributed Capital	46.1	10
Retained Earnings	22	11.4
Total	129.4	25.7
EPS	52 Cents	30 Cents
Industry PE Ratio	16 x	14 x
Market Value Per Share	$4.68	$5.10

* 30% of the Operating Expenses are fixed. This percentage rose to 70% in 1998.

Total NIAT earned during 1994, 1995, 1996 & 1997 amounted to $19 M.

Required:

Perform a four stage DuPont Analysis. As part of your Stage IV Analysis, include some of the valuation ratios that were mentioned in Chapters 3, 4, 5 and 9 of the material. Also perform a Flow of Funds Analysis.

Case Study #11—Parmar Home Details

Parmar Home Details is a ten year old manufacturer of metal, wood and plastic indoor and outdoor decorating ornaments for the home. Its sales are exclusively wholesale to retail home furnishings stores. In the mid 1990s price competition from Asian sources put serious stresses on the company's margins and the company's management decided to radically alter certain operating strategies. You are provided below with two sets of financial data relating to this company for 1996 and 2001.

Required:

Analyze these figures and describe the strategic chances that this data reflects. Comment on the success or failure of change in strategy and dangers and opportunities that may lie ahead.

All figures use multiples of $1 M	**1996**	**2001**
Cash + Market Securities	52	5
Receivables	46	111
Inventories	53	76
Plant/Equipment (Gross)	280	660
Accumulated Depreciation	(131)	(92)
Plant/Equipment (Net)	149	568
NRV (Plant/Equip) (not part of totals)*	150	700
Total Assets	**300**	**760**
Trade Payables	50	70
Other Short Term Debt	0	7
Long Term Debt	0	283
Contributed Capital	50	110
Retained Earnings	200	290
Total Liabilities and Equity	**300**	**760**
Sales (all on credit)	1,125	965
Cost of Goods Sold	923	618
Gross Profits	202	347
Variable Operating Expenses	80	90
Fixed Operating Expenses	54	136
EBIT	68	121
Interest Expense	3.5	29
NIBT	64.5	92
Taxes @ 30%	19.3	27.6
NIAT	45.2	64.4
Dividends Paid	25	14
Transfer to Retained Earnings	20.2	50.4

* NVR = Net realisable value.

Total NIAT earned during 1997, 1998, 1999 and 2000 amounted to $76 M.

Case Study #12—Trident Enterprises

This company, founded in 1988, manufactures components for the telecommunications industry. Although a relatively small player in an industry in which most firms are many times larger, this firm has managed to hold its own fairly well although its share of the overall market has decreased somewhat from 8% to 7%.

Required: Analyze the data from 1998 and 2003 and try to draw some conclusions about the firm's performance during this period. Try to discover if the management made some changes to its operating strategies.

Trident Enterprises Ltd.

All numbers are a multiple of $1 M.

	1998	2003
Sales (all on credit)	$244.44 M	240.00 M
Costs of sales	183.33	156.00 M
Gross profits	61.11	84.00
Operating expenses	42.779	60
(of which fixed operating expense %)	30%	55%
Operating income (EBIT)	18.331	24.001
Interest expenses	5.76	8.573
NIBT	12.571	15.428
TAXES	3.771	4.628
NIAT	8.8	10.8
DIV. PAID	4.4	3.8
Transfer to R.E.	4.4	7.0
* Cash and market secs	2.116 M	1.485 M
Receivables	38.843	18.441
Inventories	9.041	14.104
Plant and equipment (gross)	216.00	223.83
Accumulated Depreciation P/E	(162.00)	(83.53)
Pl. and equipment (B/V)	54.00	140.3
* Pl. and equipment (N.R.V.)	75.00	141
Total assets	104.00	174.33
Accounts payable	24.109	8.975
Other S.T. debt	3.891	21.025
Long-term debt	36.00	84.00
Contrib. capital	25.00	30.00
Retained earnings	15 M	30.00
Total liability and equity	104.00	174.3

Total NIAT for 1999, 2000, 2001, 2002 = 42.

* Not Part Of The Totals.

Case Study #13—Hi-Tek Components

HTC is a manufacturer of components for the information technology industry. HTC is still a small player in this industry; it has managed to double its regional market share from 3% to 6% during the last five years.

During this period, the management has made some significant changes in the way that it does business. Although the firm went through some difficult times, the situation has turned around recently and the management is optimistic about the future.

Analyze the financial data and assess the firm's performance and describe some of the changes and strategies that you observe. Close your analysis by assessing the firm's viability in the near future.

Hi-Tek Components Inc (Htc) Financial Information

All figures are multiples of $1 M

Account	**1998**	**2003**
Cash and Market Securities	32	13
Receivables	62	420
Inventories	65	42
Plant/Equipment—Gross	910	230
P/E Accum. Depreciation	-637	-35
P/E Net	273	195
P/E NRV *not part of totals	500	*200
Goodwill	N/A	100
Total Assets	**432**	**770**
Accounts Payable	14	208
Other Short Term Debt	0	34
Long Term Debt	58	162
Contribution to Capital	60	90
Retained Earnings	300	276
Total Liabilities and Equity	**432**	**770**
Revenues (all on credit)	800	2,440
Cost of Goods Sold	480	1,903
Gross Profits	320	537
Variable Operating Expenses	59.8	341.4

Fixed Operating Expenses	153.8	86
Operating Inc. EBIT	106.4	109.6
Interest Expenses	3.5	36.4
NIBT	102.9	73.2
Tax	30.9	21.96
NIAT	72	51.24
Dividends	40	0
Transfer to Retained Earnings	32	51.24

Total NIAT for the years 1999, 2000, 2001 and 2002 is (55 M)

Case Study #14—Parmar Home Details

Parmar Home Details is a ten-year-old manufacturer of metal, wood and plastic indoor and outdoor decorating ornaments for the home. Its sales are exclusively wholesale to retail home furnishings stores. In the mid 1990s competition from Asian sources significantly changed market conditions for Parmar and the company's management decided to radically alter certain operating strategies. You are provided below with two sets of financial data relating to this company for 1998 and 2003.

Required: Analyze these figures and describe the strategic changes that this data reflect. Comment on the success or failure of the change in strategy and dangers and opportunities that may lie ahead.

All figures use multiples of $1 M	**1998**	**2003**
Cash + Market Securities	52	5
Receivables	46	111
Inventories	53	76
Plant/Equipment (Gross)	280	660
Accumulated Depreciation	(131)	(92)
Plant/Equipment (Net)	149	568
NRV (Plant/Equip) (not part of totals)	150	700
2 Total Assets	**300**	**760**
Trade Payables	50	70
Other Short Term Debt	0	7
Long Term Debt	0	283
Contributed Capital	50	110

Retained Earnings	200	290
3 Total Liabilities and Equity	**300**	**760**
Sales (all on credit)	1,125	965
Cost of Goods Sold	923	618
Gross Profits	202	347
Variable Operating Expenses	80	90
Fixed Operating Expenses	54	136
EBIT	68	121
Interest Expense	3.5	29
NIBT	64.5	92
Taxes @ 30%	19.3	27.6
NIAT	45.2	64.4
Dividends Paid	25	14
Transfer to Retained Earnings	20.2	50.4

Total NIAT earned during 1998, 2000, 2001 and 2002 amounted to $76 M.

Case Study #15—Compu Maintain Inc.

Compu Maintain Inc. (CMI) is a firm that services and troubleshoots sophisticated I.T. equipment. Its client base consists of approximately 90 software design firms. Of these firms, there are 15 large (identified as "B") and 75 small to medium (identified as "S") firms. This represents 20% of the large firms and 70% of the small/medium software firms located in the region in which CMI operates. CMI is an 8-year-old firm that started humbly but has built an enviable reputation for unsurpassed service to its clients. Their service vehicles carry the slogan "7/24—we'll be at your door in 60 minutes".

Recently the software industry that CMI services has experienced a slowdown and CMI management anticipates a margin squeeze accompanied by some closures among its software clients. CMI believes that in this tough market the larger firms may be more vulnerable than the smaller/medium sizes ones as the latter seem more able to adjust to the difficult times ahead.

You are provided with two sets of financial data of CMI. Analyze these data and formulate some advice to CMI's management how best to cope with the difficult times ahead.

1) First complete a Flow of Funds Analysis.
2) Second complete a Four Stage DuPont Analysis.
3) Perform DOL, DFL, DCL, BE, and Safety Ratio Analysis.
4) Perform EVA Analysis.

CMI

Account	**1998**	**2003**
Cash and Market Securities	9,500	7,500
Receivables (B)	85,000	278,200
Receivables (S)	50,500	288,800
Service Equipment (B.V.)	350,000	1,155,000
Vehicles (B.V.)	70,000	130,000
Real Estate (B.V.)	587,000	1,254,000
Total Assets	**1,152,000**	**3,113,500**
Short Term Debt	193,200	560,500
Long Term Debt	358,800	913,400
Contributed Capital	380,000	650,000
Retained Earnings	220,000	998,600
Total Liabilities and Equity	**1,152,000**	**3,113,500**
Revenues (B)	886,100	2,671,400
Revenues (S)	498,500	3,399,900
Operating Expenses (B)	747,900	2,592,600
Operating Expenses (S)	478,100	2,923,700
EBIT	158,600	555,000
Interest	38,600	118,000
NIBT	120,000	437,000
Taxes	30,000	109,300
NIAT	90,000	327,700
Dividends Paid	40,000	60,000
Transfer to Retained Earnings	50,000	267,700

Total NIAT for the years 1999, 2000, 2001 and 2002 = $728,000.

The Revenues, Operating Expenses, and Receivables have been segregated to show the amount of business done with the big customers (B) and the smaller/medium customers (S).

In 1998, 35% of the Operating Expenses were fixed; this percentage rose to 75% in 2003.

Try to determine the profitability of each segment of this company's customers, i.e. both "B" and "S".

Analysis of Case #1—Gentlemen's Wear Ltd.

Stage One—DuPont Numbers

	(Sales/Assets)	×	(NIAT/Sales)	×	(Assets/Equity)	=	ROE
1993	800/320		95.4/800		320/160		
	2.5 x		12%		2 x	=	60%
1998	2,400/800		159.75/2,400		800/500		
	3 x		7%		1.6 x	=	33.6%
% change	+ 20%		– 42%		– 20%		– 44%

Comment: The ROE in 1993 is extremely high. The firm followed a volume strategy in which the volume factor rose 20% at a cost of 42% in margin; the firm strengthened its balance sheet by lowering its financial leverage factor by 20%. The end result is an ROE of nearly 34% which is still a very impressive figure.

Note: Companies that earn very high ROE levels such as the 60% in 1993, often attract competition. This may explain the company's decision to boost volume and strengthen its balance sheet while still maintaining a good ROE level. We finally note that this firm's sales tripled and its asset base is 2.5 x higher during this 5 year period—another positive trend.

Stage Two—Asset Management

(using a 360 day year)

	Receivables T.O.	Inventory T.O.	Asset T.O.	Operating Cycle
1993	50% $800/100	400/100	800/320	
	4 x	4 x	2.5 x	
	Receiv. 90 days unpaid	Inv. 90 days unsold		180 days
1998	50% $2,400/400	1,560/260	2,400/800	
	3 x	6 x	3 x	
	Receiv. 120 days unpaid	Inv. 60 days unsold		180 days
% change	T.O. 25% slower	T.O. 50% faster		

The slowdown in receivables can be caused by a more generous credit policy. If not, it is a bad trend. The improvement in inventory management is good. Note that the operating cycle remains unchanged at 180 days.

Stage Three—Margin Analysis

	G.P.M.	O.P.M.	O.C.E.	Interest Burden	N.P.M.
	G.P./S	EBIT/S	Op.Exp./S	INT/S	NIAT/S
1993	400/800 50%	140/800 17.5%	260/800 32.5%	12.8/800 1.6%	95.4/800 11.9%
1998	840/2,400 35%	240/2,400 10%	600/2,400 25%	27/2,400 1.1%	159.75/2,400 67%
% change	−30%	−43%	−23%	−31%	−44%

Analysis: As noted in the Stage 1 comments, it is possible that prices were deliberately lowered to pursue a volume strategy. This caused a large drop in the Gross Profit Margin. Two positive percentage changes are the lower operating cost efficiency (O.C.E.). The lower the percentage, the higher the operating efficiency and the lower interest burden (Interest/Sales). Nevertheless, the 44% lower Net Profit Margin (NPM) is quite significant.

Stage Four—Debt Management

	EBIT/INT	INT/S	Debt/Assets	Average Borrowing Rate INT/Debt
1993	140/12.8 11 x	12.8/800 1.6%	160/320 50%	12.8/160 8%
1998	240/27 8.9 x	27/2,400 1.1%	300/800 37.5%	27/300 9%
% change	–19%	–31%	–25%	+12.5%

The interest coverage of 8.9 x is still very strong; it is only when this number falls below two times (2 x) that this becomes a concern.

The interest burden (INT/S) is very low and the (Debt/Assets) ratio shows a good reduction of 25%.

The 12.5% increase in the average borrowing rate is disappointing because the company's balance sheet has strengthened. Perhaps the lenders are concerned about the weaker credit quality of the company's receivables. Changes in general borrowing rates could also have been a factor.

Analysis of various degrees of leverage

DOL = (REV – VOE)/EBIT DFL = EBIT/NIBT

DCL = (REV – VOE)/NIBT

Break-even Sales = (FOE + INT) / (1 – (VOE/REV))

Safety or Comfort Ratio = (Actual Sales/Break-Even Sales)

	1993	1998
DOL =	(800 – (400 + 80% 260))/140 1.37 x	(2,400 – (1,560 + 40% 600))/240 2.5 x
DFL =	140/127.2 = 1.1 x	240/213 = 1.13 x
DCL =	1.51 x	2.82 x
B.E. Sales =	(20% 260 + 12.8)/(1 – (608/800)) $270 k	(60% 600 + 27)/(1 = (1,800/2,400)) $1,548 k
This 1998 number is more than 5.7 times larger than the 1993 number!!		
Safety Ratio	800/270 = 2.96 x	2,400/1,548 = 1.55 x

Comment: The company has become much higher levered, largely due to the large increase in fixed operating expenses, which caused DOL to increase more than 47% (from 1.37 to 2.5). The result is that this company's bottom line NIAT will fluctuate much more as a result of fluctuating sales.

The company's break-even sales are also 5.73 times larger in 1998 compared to 1993, causing the comfort ratio to fall strongly from 2.96 x to 1.55 x, a drop of almost 48%. This increased vulnerability of this company to fluctuating sales could well explain the increase in the average borrowing rate from 8% to 9%.

Please note: There is insufficient information to perform an analysis of this company's vulnerability to its liquidity position as a result of strong sales growth as explained in Chapter 5.

EVA — Analysis

Before Tax Borrowing Rate = INT/Debt = BTBR
Cost of Debt = BTBR × (1 – tax%) = COD
Cost of Equity = COD + 10% = CoEq
WACC% = (Debt/Assets × COD) + (Equity/Assets) × CoEq
EVA = NOPAT – WACC$
EVA = (EBIT – TAX) – (WACC% × Assets)

1993	1998
BTBR = 12.8/160 = 8%	27/300 = 9%
COD = 8% × (1 − 25%) = 6%	9% × (1 − 25%) = 6.75%
CoEq = 8% + 10% = 18%	9% + 10% = 19%
WACC% = (160/320 × 6%) + (160/320 × 18%)	(300/800 × 6.75%) + (500/800 × 19%)
WACC% = 3% + 9% = 12%	2.53% + 11.875% = 14.4%
EVA = (140 − 31.8) − (12% × 320)	(240 − 53.25) − (14.4% × 800)
EVA = 108.2 − 38.4 = $69.8 k	186.75 − 115.24 = $71.5 k

Finally, we can express the dollar value of EVA as a percentage of the company's assets. This allows us to judge the assets' ability to produce EVA, which measures the management's skill in obtaining benefits from the company's asset base. It is called the "Assets' EVA Productivity" or AEP = EVA/Assets.

1993	1998	
AEP = (69.8/320) = 21.8%	(71.5/800) = 8.9%	% change = −59%

Analysis: While the dollar value of EVA rose $2.6 k or 3.7%, this is rather low when you consider the fact that the firm's assets grew from $320 k to $800 k. This reflects very poor asset management—the management did a poor job. This is also reflected in the 59% fall in the AEP from 21.8% to 8.9%. This poor performance can be explained when we look at the change in NOPAT numbers and compare them with the change in WACC.

	NOPAT	WACC$
1993	108.2	38.4
1998	186.75	115.24
$ change	+$78.55	$76.84
% change	+72.6%	+200%!!!

Notice that the impressive increase in NOPAT of nearly 73% is almost entirely nullified by the shocking 200% increase in WACC$. It indicates that the NOPAT produced by $480 k increase in assets (800 − 320) produced virtually zero net benefit to the company as it was almost totally absorbed by $76.84 k dollar cost of capital required to obtain those assets.

Overall Conclusion:

In Stage 1 of our DuPont analysis, we found that the firm's very high ROE of 60% was sacrificed to pursue a volume strategy, producing lower margins but

simultaneously strengthening the balance sheet by reducing reliance on debt. The ROE was still a very respectable 33.6%.

Further analysis revealed poor receivable management but better inventory management leaving the operating cycle unchanged at 180 days, which is far too long.

While interest coverage was very strong (EBIT/INT), the borrowing rate went up, which suggests lenders lowered the company's credit rating.

The real bad news was reflected in the company's EVA numbers which indicate poor asset management.

A final step: examining the change in Equity, Total NIAT and Dividends for the 5 year period.

Total NIAT for the period 1994 to 1998 = 380 + 159.75 = 539.75.

Net change in Equity for the period (500 – 160) = 340.

Therefore, total dividends paid during the period equals (539.75 – 340) = 199.75.

This works out to an average dividend payout ratio of (199.75/539.75) = 37% and a profit retention ratio of 63%. These are conservative numbers that suggest prudent dividend policies.

Analysis of Case #4—Electronics Distributors Inc.

Stage One—DuPont Numbers

	(Sales/Assets)	×	(NIAT/Sales)	×	(Assets/Equity)	=	NIAT/Eq
1993	(750/300)		(22.5/750)		(300/75)	=	(22.5/75)
	2.5 x		3%		2 x	=	30%
1998	(960/480)		(57.6/960)		(480/267)	=	(57.6/267)
	2.0 x		6%		1.8 x	=	21.6%
% change	−20%		+100%		−10%		−28%

Analysis: While the drop of 28% in ROE may be viewed negatively, these are in fact a very positive set of numbers. A very successful margin strategy was pursued in which margins doubled, paid for with a modest 20% drop in the volume factor. The product of the volume and margin factors is the Return on Assets or ROA. Comparing the ROA values.

	(Sales/Assets)	×	(NIAT/Sales)	=	(NIAT/Assets)
ROA 1993	2.5 x	×	3%	=	7.5%
ROA 1998	2.0 x	×	6%	=	12.0%
% change				=	+60%

We note an impressive 60% increase in ROA. This success enabled the company to lower its reliance on debt and still obtain quite a respectable ROE of

21.6%. The balance sheet is stronger and the company is better positioned for future growth.

Stage Two—Asset Management

(using a 360 day year)

	Receivables T.O.		Inventory T.O.	Fixed Asset T.O.	Operating Cycle (days)
1993	750/100 7.5 x		540/120 4.5 x	750/70 10.7 x	
	48 days	+	80 days		128 days
1998	960/90 10.67 x		634/50 12.68 x	960/280 3.43 x	
	33.7 days	+	28.4 days		62 days
% change	T.O. 42% faster		T.O. 64% faster	68% slower	52% faster

The improvement in receivable and inventory management is very impressive; the operating cycle has been speeded up by more than half. Note the impressive rise in the cash balance from $5 to $40. The dramatic drop in fixed asset turnover reflects the purchase of newer capital assets as shown by the lower level of accumulated depreciation. Overall a good set of numbers.

Other evidence of strong liquidity is the strong increase in the payables turnover (C of G.S./Pay).

1993 (540/120) = 80 days unpaid
4.5 x

1998 (634/50) = 28 days unpaid
12.7 x

This signifies that suppliers get paid more quickly thereby helping the company's credit rating.

Stage Three—Margin Analysis

	G.P.M.	O.P.M.	O.C.E.	Interest Burden	N.P.M.
	G.P./S	EBIT/S	Op.Exp./S	INT/S	NIAT/S
1993	210/750 28%	73.5/750 9.8%	136.5/750 18.2%	36/750 4.8%	22.5/750 3%
1998	326/960 34%	124/960 12.9%	202/960 21.1%	28/960 2.9%	57.6/960 6%
% change	+21.4%	+31.8%	+16%	−39.6%	+100%

The rise in the gross profit margin indicates "pricing power" and even though the operational cost efficiency (O.C.E) worsened by 16%, it still left enough room for an impressive rise in the operating profit margin of nearly 32%.

Another significant change was the lower interest-burden of nearly 40% caused by the lower reliance on debt. The overall effect was an impressive doubling of the net profit margin. A very good set of numbers.

The data show that the strategic marketing shift from being a small national player to becoming a much stronger regional player has served the company well. The strong 25% annual sales growth (pre-1983) had left this company with high levels of debt and poor liquidity as shown by a very long operating cycle and low cash levels in 1993.

Stage Four—Debt Management

	EBIT/INT.	INT./S	Debt/Assets	Average Borrowing Rate INT/Debt
1993	73.5/36 2.04 x	36/750 4.8%	225/300 75%	36/225 16%
1998	124/28 4.43 x	28/960 2.9%	213/480 44.4%	28/213 13.1%
% change	+117%	−40%	−40%	−18%

Analysis: The 1993 figures show a company that was very deep in debt and paying high interest rates. The interest coverage ratio (EBIT/INT) is barely above the danger level of 2 x.

The 1998 numbers show a significant reduction in financial leverage with interest coverage in "safe" territory. The company's reliance on debt is still quite high even after a 40% drop, and its borrowing rate is still quite high, even after an 18% relative fall in the borrowing rate.

Overall, there is still too much reliance on expensive debt. Dividends paid during the 5 year period are \$160 k (for 1994, 1995, 1996, 1997) plus \$17.6 k for 1998 for a total of \$177.6 k for the 5 years. Since the retained earnings for that period rose by $(117 - 25) = \$92$ k, the total profits after taxes were \$177.6 k + \$92 k = \$269.6 k.

This indicates an average dividend payout ratio of $(177.6/269.6) = 66\%$. This rather generous level confirms the surplus liquidity generation that we shall observe in the following pages of this analysis.

Analysis of various degrees of leverage

$$DOL = (REV - VOE)/EBIT \qquad DFL = EBIT/NIBT$$

$$DCL = (REV - VOE)/NIBT$$

$$\text{Break-even Sales} = (FOE + INT)/(1 - (VOE/REV))$$

$$\text{Safety or Comfort Ratio} = (\text{Actual Sales/Break} - \text{Even Sales})$$

	1993	1998
DOL =	(750 – (540 + 50))/73.5 2.18 x	(960 – (634 + 102))/124 1.81 x
	% change – 17%	
DFL =	73.5/37.5 = 1.96 x	124/96 = 1.29 x
	% change – 34%	
DCL =	2.18 × 1.96 = 4.27 x	1.81 × 1.29 = 2.33 x
	% change – 45%	
B.E. Sales =	(86.5 + 3.75)/(1 – (540 + 50)/750)	(100 + 28)/(1 – (634 + 102)/960)
B.E. Sales =	$581.25 M	$548.57 M
Safety or Comfort Ratio	750/581.25 = 129%	960/548.57 = 175%
	% change + 36%	

Analysis: All measures of leverage fell, meaning the profit levels will fluctuate less as a result of sales volatility thereby making for a more stable company. The safety ratio grew from a fairly comfortable 129% to a very conservative 175%, a rise of 36%.

Note that during the 5 year period the increase in fixed operating expenses of $13.5, or nearly 16%, was far less than the $52 rise in variable operating expenses, or 104%. This too makes the company less vulnerable should sales levels fall.

The 34% reduction in DCL is of course a by-product of the nearly 40% drop in the interest burden as shown in Stage III and IV of this analysis.

There is little doubt that the creditors feel a lot better about this company.

How vulnerable is the company to liquidity problems caused by high sales growth?

(see chapter 5).

$$(VA/S - VL/S) - ((NIAT/S) \times (\text{Tfr. to R.E./NIAT}) \times (1 + g)/g) = \text{zero}$$

Solve for "g"; this reveals the annual sales growth percentage that produces neither "surplus liquidity" nor "external financing needed". i.e. SL or EFN

VA = Receivables + Inventories VL = Trade Payables

1993	1998
VA − VL = (100 + 120 − 100) = 120	(90 + 50 − 40) = 100
NIAT/S = NPM = 22.5/750 = 3%	57.6/960 = 6%
Tfr. to RE/NIAT = PRR = 10/22.5 = 44.4%	40/57.6 = 69.4%
(VA − VL)S = 120/750 = 16%	100/960 = 10.4%
NPM × PRR = 3% × 44.4% = 1.3%	6% × 69.4% = 4.2%
solving for "g" when we set the formula to zero	
16% − (1.3% × (1 + g)/g) = zero	10.4% − (4.2% × (1 + g/g)) = zero
produces a "g" value of 8.8%	produces a "g" value of 67.7%

This "g" value is called the "Balanced Growth Percentage". It is the percentage by which sales can grow without causing "surplus liquidity" or "external financing needed".

Note that in 1993 any sales growth higher than 8.8% would have created the need for external financing. We know that 25% growth rates were recorded before 1993 therefore considerable amounts of financing were required.

This explains why in 1993 the banks forced the company to change its marketing strategy.

Please note that the 5 year sales growth from $750 to $960 works out to a modest 5.06% average annual growth rate. This slow sales growth obviously generated a fairly large amount of surplus liquidity as evidenced by the large cash balance in 1998 and the drop in trade payables and other current debt.

EVA — Analysis

Before Tax Borrowing Rate = BTBR = INT/Debt

Cost of Debt = COD = BTBR × (1 − tax%)

Cost of Equity = CoEq = BTBR + 10%

WACC% = (Debt/Assets) × COD + (Equity/Assets) × CoEq

EVA = NOPAT − WACC$

EVA = (EBIT − Tax) − (WACC% × Assets)

1993	1998
BTBR = 36/225 = 16%	28/213 = 13.1%
COD = 16% (1 – 40%) = 9.6%	13.1% (1 – 40%) = 7.86%
CoEq = 16% + 10% = 26%	13.1% + 10% = 23.1%
WACC% = (225/300 × 9.6%) + (75/300 × 26%)	(213/480 × 13.1%) + (267/480 × 23.1%)
WACC% = 7.2% + 6.5% = 13.7%	5.81% + 12.85% = 18.66%
Note the unusually high WACC% which is caused by very high before tax borrowing rates. No reasons are given why this was the case; it will obviously have very bad consequences for the EVA values.	
EVA = (73.5 – 15) – (13.7% × 300)	(124 – 38.4) – (18.66% × 480)
EVA = 58.5 – 41.1 = $17.4 M	85.6 – 89.6 = – $4 M

As observed before, the unusually high cost of capital (WACC%) caused the EVA value to fall by $21.4 M. The significant reduction in debt, whose cost (due to tax deductibility) is a lot less than the cost of equity, made WACC% even higher.

NOPAT rose quite nicely, by $27.2 M or 46%, however, this performance was overwhelmed by the $48.5 M rise in the WACC$. One of the most important tasks for this company is the search for more reasonably priced debt financing.

One possible explanation for this situation could be that the loans are made on a “non-arms length” basis and the unusually high interest rates are used to transfer benefits to another company or individual.

Overall Assessment

Prior to 1993, this very rapidly growing company pursued a national sales strategy that left the company deep in debt. The shift to a regional role transformed the company into a “cash-generator”. The absolute amount of debt rose from $50 k to $160 k even though relative reliance on debt financing fell and cash levels rose 8 fold.

In 1990, this company is stronger, richer in fixed assets, and more stable. Its ability to generate cash in the form of dividends and interest obviously benefit the owners and lenders who are possibly related.

Analysis of Case #14—CAP Distributors Ltd.

Stage One—DuPont Numbers

	(Sales/Assets)	×	(NIAT/Sales)	×	(Assets/Equity)	=	ROE
1995	1300/600		60/1300		600/545	=	60/545
	2.17 x		4.6%		1.10 x	=	11%
2000	1730/771.9		68.64/1730		771.9/528.72	=	68.64/528.72
	2.24 x		4%		1.46 x	=	13%
% change	+3.2%		−13%		+32.7%	=	+18.2%

Comment: The increase in ROE was due to the increase in financial leverage of nearly 33%. It looks like a volume strategy was pursued that produced an unfavourable trade off. The 13% drop in margins is a lot more painful than the meager increase in the volume factor of only 3.2%.

The sales increase of $1,300 k to $1,730 k over 5 years works out to an annual average sales growth of only 5.88%. This is less than half the industry growth rate of 12%.

It looks like the company lowered its prices to keep up with the industry sales growth but it was unsuccessful in achieving this. This is not an attractive set of numbers.

Stage Two—Asset Management

(using a 360 day year)

	Receivables T.O.		Inventory T.O.	Fixed Asset T.O.	Operating Cycle
1995	1,300/108.49		720/39.45	1,300/330.06	
	11.98 x		18.25 x	3.94 x	
	30 days	+	19.7 days		49.7 days
2000	1,730/135.71		1,114/108.7	1,730/462.29	
	12.75 x		10.25 x	3.74 x	
	28.2 days	+	35.1 days		63.3 days
% change	T.O. 6.4% faster		T.O. 44% slower	5% slower	27% slower

A disappointing set of numbers; the slight improvement in receivables management is overshadowed by the 44% slowdown in inventory turnover.

When we combine that with the firm's poor sales growth of less than half the industry average, we can conclude that this company's product mix is not attractive to customers.

The 27% slowdown in the operating cycle reflects this poor picture.

The 5% slowdown in the fixed asset turnover is not very significant, but when we compare the book value and the net realizable values of these assets:

	1995	2000
NRV/BV (Fixed Assets)	680/330.06 206%	500/462.29 108%
and we compare accumulated depreciation and the original cost of the fixed assets:		
(Accum. Depr./Orig. Cost)	419.94/750 56%	37.71/500 7.5%

We can see that during the 5 year period the company sold fixed assets that had increased in value and that the new fixed asset base is much younger and little depreciated.

Another figure requires watching and that is the accounts payable turnover (C. of G.S./Accts.Pay.) converted into "average number of days that the company waits before paying its suppliers" = (Accts.Pay./C. of G.S.) × 360 days.

1995	2000
(55/720) × 36 days 27.5 days unpaid	(144.18/1730) × 360 days 30 days

It indicates that the company pays its bills a bit slower. It should be noted, however, that this is still quite a respectable number.

Stage Three—Margin Analysis

	G.P.M.	O.P.M.	O.C.E.	Interest Burden	N.P.M.
	G.P./S	EBIT/S	Op.Exp./S	INT/S	NIAT/S
1995	580/1,300 44.6%	102.75/1,300 7.9%	477.25/1,300 36.7%	2.75/1,300 0.2%	60/1,300 4.6%
2000	616/1,730 35.6%	133.85/1,730 7.7%	482.15/1,730 27.9%	19.75/1,730 1.1%	68.64/1,730 4%
% change	−20.2%	−2.5%	−24%	+45%	−13%

The 20.2% drop in the gross profit margin suggests that the company lowered prices to help sales. The fact that the industry enjoyed a strong 12% 5 year average sales growth suggests that competitive pricing pressure was not severe in this industry. It is, therefore, more likely that this company lowered prices trying to match its industry sales growth.

There is one very positive number; the 24% improvement in the operating cost efficiency is quite impressive. Remember " the lower the O.C.E. percentage, the better". This positive factor protected the operating profit margin (OPM) from falling very much.

Although the absolute amount is quite small, the 45% rise in the interest burden should be noted.

Overall, a fair set of numbers.

Stage Four—Debt Management

	EBIT/INT	INT/S	Debt/Assets	Average Borrowing Rate INT/Debt
1995	102.75/2.75 37.4 x	2.75/1,300 0.2%	55/600 9.2%	2.75/55 5%
2000	133.85/19.45 6.9 x	19.45/1,730 1.1%	243.18/771.9 31.5%	19.45/243.18 8%
% change	−82%	+450%	+242%	+60%

Analysis: This company uses relatively little debt. It was virtually debt free in 1995, and in 2000 the first three ratios are all quite acceptable. The increase of the average borrowing rate of 5% to 8% probably reflects this company's relatively poor performance rather than its excessive use of debt.

In spite of the large percentage changes, the company is not excessively relying on debt financing.

Looking at the dividend policy, we see that dividends paid in the period 1996, 1997, 1998, and 1999 totalled $40 k and when added to the year 2000 dividends of $5 k, we have total dividends of $45 k.

Since the retained earnings FELL from $345 k to $278.72 k, a drop of $66.28 k, we discover that the company lost $21.28 k during the 5 year period and had losses of (21.28 + 68.64 (NIAT for 2000)) $89.92 k for the 4 year period 1996, 1997, 1998 and 1999. We should definitely question the wisdom of paying out $45 k in dividends during that same 4 year period.

Case Study #14 Cont'd

Analysis of various degrees of leverage

$$DOL = (REV - VOE)/EBIT \qquad DFL = EBIT/NIBT$$

$$DCL = (REV - VOE)/NIBT$$

$$\text{Break-even Sales} = (FOE + INT)/(1 - (VOE/REV))$$

$$\text{Safety or Comfort Ratio} = (\text{Actual Sales}/\text{Break-Even Sales})$$

	1995	2000
DOL =	(1,300 – (720 + 300)/102.75)	(1,730 – (1,114 + 200)/133.85)
	2.725 x	3.11 x
	% change + 14%	
DFL =	(102.75/100) = 1.03 x	(133.85/114.4) = 1.17 x
	% change + 14%	
DCL =	2.725 × 1.03 = 2.81 x	3.11 × 1.17 = 3.64 x
	% change + 29.5%	
B.E. Sales =	(177.25 + 2.75)/(1 – (1,020/1,300))	(282.15 + 19.45)/(1 – (1,314/1,730))
	$835.7 k	$1,254.2 k
	% change + 50%	
Safety or	(1,300/835.7) = 156%	(1,730/1,254.2) = 138%
Comfort Ratio	% change – 11%	

Analysis: Both the operating and financial leverage rose by the same 14% resulting in a 29.5% increase in the overall or combined leverage. The overall leverage levels are quite moderate. The profits should change only moderately as a result of sales fluctuations.

Similarly, the safety or comfort ratio fell moderately by 11% to 138% which is still a reasonably safe level.

How vulnerable is the company to liquidity problems caused by high sales growth?

(see chapter 5).

$$(VA/S - VL/S) - (NIAT/S) \times (\text{Tfr. to RE}/NIAT) \times ((1 + g)/g) = \text{zero}$$

Solve for "g"; this reveals the annual sales growth percentage that produces neither "surplus liquidity" nor "external financing needed". i.e. SL or EFN

The higher "g", the less chance for liquidity shortages.

VA = Receivables + Inventories + Other Current Assets
VL = Accounts Payable

1995
VA – VL = 108.49 + 39.45 + 30 – 55 = 122.94
(VA – VL)/S = 122.94/1,300 = 9.5%
NIAT/S = 60/1,300 = 4.6% = NPM
Tfr. To RE/NIAT = 35/60 = 58.3% = PRR
NPM × PRR = 2.7%
Solving for "g" = 9.5% – 2.7% (1 + g)/g = 0
g = 2.7/6.8 = 40%

2000
VA – VL = 135.71 + 108.7 + 20 – 144.18 = 120.23
(VA – VL)/S = 120.23/1,730 = 6.9%
NIAT/S = 68.64/1,730 = 4% = NPM
Tfr. To RE/NIAT = 63.64/68.64 = 92.7% = PRR
NPM × PRR = 4% × 92.7% = 3.7%
Solving for "g" = 6.9% – 3.7% (1 + g)/g = 0
g = 3.7%/3.2% = 116%

Both "g" values are very high percentages, well in excess of the company's and the industry's average sales growth of 5.88% and 12%. It is unlikely that this company will have liquidity problems. In fact, significant levels of surplus liquidity will be produced given current conditions.

Case Study #14 Cont'd

EVA — Analysis

Before Tax Borrowing Rate = INT/DEBT = BTBR

Cost of Debt = BTBR × (1 – tax%) = COD

Cost of Equity = BTBR + 10% = CoEq

WACC% = (Debt/Assets) × COD + (Equity/Assets) × CoEq

EVA = NOPAT – WACC$

EVA = (EBIT – Tax) – (WACC% × Assets)

1995	2000
BTBR = (2.75/55) = 5%	(19.45/243.18) = 8%
COD = 5% (1 − 40%) = 3%	8% (1 − 40%) = 4.8%
CoEq = 5% + 10% = 15%	8% + 10% = 18%
WACC% = (55/600×3%)+(545/600×15%)	(243.18/771.9)×4.8%+(528.72/771.9)×18%
WACC% = 0.275% + 13.625% = 13.9%	1.512% + 12.329% = 13.8%
13.9%	13.8%
EVA=(102.75 − 40) − (13.9% × 600)	(133.85 − 45.76) − (13.8% × 771.9)
EVA = 62.75 − 83.4	88.09 − 106.52
EVA = − $20.65 k	− $18.43 k

Finally, we can express EVA's dollar value as a percentage of the company's assets. This allows us to judge the assets' ability to produce EVA and the managers' skill in obtaining benefits from the company's asset base. It is called the Asset's EVA Productivity or AEP = EVA/Assets.

1995	2000
AEP = (−20.65/600) = −3.4%	AEP = (−18.43/771.9) = −2.4%

Analysis: Again a rather poor set of numbers. The management is unable to make this company's assets produce benefits, i.e. net operating profits after taxes (NOPAT) that exceed the dollar cost of capital that was paid for the use of those assets. One can say that shareholder value is being destroyed. While the AEP did show a slight improvement, i.e. its negative value of −3.4% fell to a slightly lower negative of −2.4%, an examination of the changes in NOPAT and WACC$ levels shows the following:

	NOPAT	−	WACC$	=	EVA
1995	62.75	−	83.4	=	−20.65
2000	88.09	−	106.52	=	−18.43
$ change	+$25.34 k	−	+$23.12 k	=	+$2.22 k

This shows that the higher NOPAT barely exceeds the increase in WACC$.

We note that this company's rather low level of debt financing causes its WACC% to be higher than it would be if more debt was used. However, we noted that the rise of BTBR from 5% to 8% suggests that lenders probably were reluctant to provide more credit. Another factor that did not help the situation was the unusually high tax rate, which makes the use of debt financing especially attractive.

A Look at 5 Year Earnings, Dividends and Share Values

Total dividends for the period 1996 to 2000 equals \$40 k (given) plus \$5 k in 2,000 = \$45 k.

The net change in retained earnings during that period was \$278.72 k – \$345 k = –\$66.28k.

Therefore, the company suffered net losses of \$66.28 k – \$45 k = \$21.28 k during the 5 year period confirming the rather poor picture of the other data. Another negative factor to consider is management's decision to pay \$45 k in dividends while total 5 year losses of \$21.28 k were suffered.

The book values of the company's shares are calculated as follows:

(Total Equity/Number of Shares outstanding)

	1995	2000
Book value per share =	(200 + 345)/800	(250 + 278.72)/1,000
	68 cents per share	53 cents per share

(Market Value/BV per share) measures the degree to which investors value their investment in the company.

(MV/BV) 1.25/0.68 = 184% 0.60/0.53 = 113%

This indicates a considerable loss of investors' confidence in the company's shares.

Overall Analysis:

CAP Distributors' 5 year performance is quite unsatisfactory in spite of an 18% increase in ROE. A slight increase in the volume factor was far exceeded by a large drop in margin and the rise in ROE was caused by a nearly 33% rise in financial leverage. Asset management was poor resulting in a slower operating cycle by 27%. The sale of fixed assets brought in a significant amount of cash; unfortunately it was not put to good use.

Margin analysis also showed poor results. The one positive noted was a 24% improvement in operating cost efficiency; perhaps this could lay the groundwork for future improvements in the company's financial performance. Note that the fixed asset base is rather new as shown by the low level of accumulated depreciation.

Debt management analysis reveals a sharp rise in interest rates even though debt levels are not excessive. Interest coverage (EBIT/INT) is still in safe territory even after a sharp decline. It suggests that lenders are not keen on this borrower.

Leverage analysis shows moderate levels; even though the degree of combined leverage rose nearly 30% and the safety or comfort ratio (Actual Sales/Break-even

Sales) declined moderately to a still comfortable level of 138%. Potential liquidity problems caused by rapid sales growth are not a problem.

What is a problem is the slow growth in sales which is less than half the industry average of 12% per year.

The EVA analysis confirms the management's inability to get its assets to generate benefits for its owners, which in turn keeps its cost of capital too high and destroys value.

The overall negative factors are all brought together in the company's "Market to Book" ratio.

MV/BV per share, which fell from 184% to 113%, indicates that investors have a significantly lower opinion of their investment in this company.

Appendix C Glossary

Accumulated Depreciation	The cumulative amount of depreciation expense recorded against an asset or group of assets during the entire period of time the asset(s) has been owned.
Assets	A bundle of resources which are owned by the company and whose purpose is to generate revenue either directly or indirectly.
Asset Turnover	$\text{Annual Asset Turnover} = \dfrac{\text{Annual Sales}}{\text{Total Assets}}$ $\text{Asset Turnover in Days} = \dfrac{360}{\text{Asset Turnover}}$
Asset Yield (A.Y.)	$\dfrac{\text{Earnings Before Interest \& Taxes (EBIT)}}{\text{Total Assets}}$
Balance Sheet	A report which states the affairs of the company at a given point in time; contains the permanent accounts—the assets, the liabilities and the equities.
Banker's Ratio or Interest Coverage	$\dfrac{\text{Earnings Before Interest \& Taxes (EBIT)}}{\text{Annual Interest Charges}}$
Break-Even Point	The point at which Sales dollars = Expense dollars; that is, where there is no profit and no loss. $\dfrac{\text{Total Fixed Costs}}{1 - (\text{Total Variable Costs}/\text{Total Revenue})}$
Contributed Capital	Money that the owners actually invested in the company, i.e., shares sold.
Current Assets	Those assets which are most easily converted to cash; will usually be sold or consumed in the course of doing business.
Current Liability	A debt which must be paid within the next year; includes trade accounts payable, payroll liabilities, and some bank debt.
Current Ratio	$\dfrac{\text{Current Assets}}{\text{Current Liabilities}}$

Cut-off Dates	Accounting month ends are cut-off a few days before the actual end of the month to allow the accounting data to be processed for the month end.
Defensive Strategy	Decisions that cause fixed expenses as well as the break-even levels to fall.
Depreciation Expense	The accountant's attempt to allocate (or expense), over time, the purchase cost of a fixed asset. It is not an attempt to record deterioration nor lower market value of the capital asset; this is a non-cash expense. Depreciation may also be called amortization.
Dividends	The rent paid to the investors in the company for the use of their money. It is paid out of after tax profits.
Earnings Before Interest & Taxes (EBIT)	Also called Operating Income or the Middle Line. Of the Income Statement.
Equity	Funds which are provided by the company' owners (also called capital); includes both Contributed Capital and Retained Earnings.
Financial Leverage	The degree to which NIAT changes as a result of changes in EBIT, it depends on the relative size of Interest Expense vs. EBIT.
Fiscal Year	A period of any 12 consecutive months used as an accounting period.
Fixed Assets	Those assets which enable the company to conduct business, which are not sold, but to be used, normally over a long period of time (also called Capital Assets).
Fixed Cost	A cost that remains unchanged in total amount over a wide range of production or sales levels (most overheads are fixed).
Fixed Operating Expenses (FOE)	Operating expenses that do not fluctuate as Sales or Revenues vary. Under a defensive strategy, should be minimized.
Income Statement (I/S)	A financial report which states how well (or poorly) the company has done over a given period (also called the Profit and Loss Statement or Statement of Earnings).
Intangible Assets	Assets which have value but no physical substance (such as Goodwill, Copyrights, Trademarks) and will be amortized over a period of time.

Interest	The rent paid to the lenders for the use of their money.
Inventory Turnover	$\text{Annual Inventory Turnover} = \frac{\text{Annual Cost of Goods Sold}}{\text{Average Inventory}}$ $\text{Inventory Turnover in Days} = \frac{360}{\text{Inventory Turnover}}$ Within reason, inventory should turnover as often as possible.
Liabilities	Funds which come form lenders; also amounts owing to suppliers, employees and government (also called debt).
Liquidity	The company's ability to meet sudden cash demands or the ability to pay its bills.
Marketing Multiplier	The relationship between the amount of money spent on advertising and the additional revenue generated from that advertising.
Market Value/Book Value Ratio	$\frac{\text{Market Value per Common Share}}{\text{Book Value per Common Share}}$
Dupont System	A system of expressing return on equity (NIAT/Equity) as the product of Asset Turnover (Sales/Assets); Net profit margin (NIAT/Sales) and the Financial Leverage Multiplier (Assets/Equity).
Net Book Value (NBV)	The cost of a fixed asset less its accumulated depreciation. Not to be confused with the Market Value or Net Realizable Value or Replacement Cost.
Net Profit Margin (NPM)	$\frac{\text{Net Income After Taxes (NIAT)}}{\text{Total Annual Sales}}$
Net Realizable Value	The estimated selling price of a fixed asset less any disposal costs.
NIAT	Net Income After Taxes (also called the Bottom Line).
NIBT	Net Income Before Taxes.
Operational Leverage	The degree to which EBIT changes as a result of changing Revenue or Sales. It depends on the mix of Fixed Operating Expenses versus Variable Operating Expenses.
Payables Cycle—expressed in days	The average number of days that the company's accounts payable remain unpaid.

Payables Turnover	$\text{Annual Payables Turnover} = \frac{\text{Annual Cost of Goods Sold}}{\text{Average Accounts Payable}}$ $\text{Inventory Turnover in Days} = \frac{360}{\text{Payables Turnover}}$ The optimum Payables Turnover would be to pay bills within (just barely) the supplier's terms and taking advantage of supplier's discounts, bearing in mind cash flow and the cash coming in from the customers.
Permanent Accounts	The Balance Sheet accounts: assets, liabilities and equity.
Prepaid Expenses	Expenses which have been paid for by you in advance, thus, someone owes you a service in the future, e.g., insurance coverage.
Price Earnings Ratio (P/E)	$\frac{\text{Market Value per Common Share}}{\text{Earnings Available per Common Share}}$
Quick Ratio	$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$
Receivables Turnover	$\text{Receivables} - \text{Turnover} = \frac{\text{Annual Credit Sales}}{\text{Average Accounts Receivable}}$ $\text{Receivables Turnover in Days} = \frac{360}{\text{Receivables Turnover}}$ The optimum Receivables Turnover would be equal to your terms of sale.
Retail Cycle	The relationship between your company and your customers, which includes the Inventory Turnover and the Receivables Turnover in days (is also called the Operating Cycle).
Retained Earnings	Profits earned in the past which have been re-invested in the business on behalf of the owners.
Return on Net Assets (ROA)	$\frac{\text{Net Income After Taxes (NIAT)}}{\text{Total Assets}}$
Return on Equity (ROE)	$\frac{\text{Net Income After Taxes (NIAT)}}{\text{Equity (of Common Shareholders)}}$
Temporary Accounts	The Income Statement accounts which include revenues and expenses.

Unearned Revenues	Money which you have received in advance for which you have to provide a future service, e.g., gift certificates.
Variance	$\frac{\text{Budget dollars} - \text{Actual dollars}}{\text{Budget dollars}}$
Variable Operating Expenses (VOE)	Costs that change in proportion to production and/or sales changes. Under a defensive strategy, should replace FOE for greater managerial discretion.
Working Capital	The excess of a company's current assets over its current liabilities.
Zero Based Budgeting	Budgeting method in which every expenditure is justified. It forces the manager to re-examine all expenses, personnel, and procedures for every budget cycle.