Working Capital and Strategic Debtor Management

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About the Author

With an eclectic record of University teaching, research, publication, consultancy and curricula development, underpinned by running a successful business, Alan has been a member of national academic validation bodies and held senior external examinerships and lectureships at both undergraduate and postgraduate level in the UK and abroad.

With increasing demand for global e-learning, his attention is now focussed on the free provision of a financial textbook series, underpinned by a critique of contemporary capital market theory in volatile markets, published by bookboon.com.

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Part One:
An Introduction

1 An Overview

1.1 Introduction

Throughout all the previous texts in my *bookboon* series (referenced at the end of this Chapter) we defined Strategic Financial Management in terms of two inter-related policies:

> The determination of a *maximum* net cash inflow from investment opportunities at an acceptable level of risk, underpinned by the acquisition of funds required to support this activity at *minimum* cost.

You will also recall that if management employ capital budgeting techniques, which *maximise* the expected net present value (NPV) of all a company's investment projects, these inter-related policies should conform to the normative objective of business finance, namely, the *maximisation of shareholders wealth*.

Having dealt comprehensively with the pivotal role of capital budgeting and fixed asset formation elsewhere in the "Strategic Financial Management" texts of the *bookboon* series, the initial purpose of this study is to focus on current asset investment and the *strategic* importance of working capital management. Not only do current assets comprise more than 50 per cent of many firms' total asset structure, but their financing is also an integral part of project appraisal that is frequently overlooked.

We shall then explain why the "terms of sale" (credit terms) offered to customers determine a company's sales turnover and hence the debtor, inventory and cash balances, which define its working capital requirements. Properly conceived, debtor (accounts receivable) policies should underpin the profitability of fixed asset formation, without straining liquidity or compromising a firm's future plans.

Comprehensive, yet concise, all the material is presented logically as a guide to further study, using the time- honoured approach adopted throughout all my *bookboon* series. Each Chapter begins with theory, followed by its application and an aprropriate critique. From Chapter to Chapter, summaries of the text so far are presented to reinforce the major points. Each Chapter also contains *Activities* (with indicative solutions) to test understanding at *your own pace*.

1.2 Objectives of the Text

The text assumes that you have *prior knowledge* of Financial Accounting and an ability to interpret corporate financial statements using ratio analysis. So, at the outset, you should be familiar with the following *glossary* of terms:

Working capital: a company's surplus of current assets over current liabilities, which measures the extent to which it can finance any increase in turnover from other fund sources.

Current assets: items held by a company with the objective of converting them into cash within the near future. The most important items are debtors or account receivable balances (money due from customers), inventory (stocks of raw materials, work in progress and finished goods) and cash or near cash (such as short term loans and tax reserve certificates).

Current liabilities: short term sources of finance, which are liable to fluctuation, such as trade creditors (accounts payable) from suppliers, bank overdrafts and tax payable.

On completion of this text you should be able to:

- Distinguish between the *internal* working capital management function and an *external* interpretation of a firm's working capital position revealed by its published accounts,
- Calculate the working capital *operating* cycle and *financing* cycle from published accounting data and analyse the inter-relationships between the two,
- Define the dynamics of a company's credit-related funds system,
- Explain how the terms of sale, which comprise the credit period, cash discount and discount period, affect the demand for a firm's goods and services,
- Understand the impact of alternative credit policies on the revenues and costs which are associated with a capital budgeting decision,
- Appreciate the disparities between the theory and practice of working capital management, given our normative wealth maximisation assumption.

1.3 Outline of the Text

The remainder of our study is divided into three sections.

Part Two begins by explaining the relationship between working capital management and financial strategy. You are reminded that the normative objective of financial management is the maximisation of the expected net present value (NPV) of all a company's investment projects. Because working capital is an integral part of project appraisal, we shall define it within this context.

We then reveal why the traditional accounting concept of working capital is of limited use to the financial manager. The long-standing rule that a firm should strive to maintain a 2:1 ratio of current assets to current liabilities is questioned. Using illustrative examples and Activities you will be able to confirm that:

- Efficient working capital management should be guided by *cash* profitability, which may conflict with *accounting* definitions of solvency and liquidity developed by external users of published financial statements,
- An optimal working capital structure may depart from accounting conventions by reflecting a balance of credit-related cash flows, which are unique to a particular company.

Part Three initially considers how the terms of sale offered by a company to its customers is a form of *price competition*, which can influence the demand for its goods and services. We shall begin by using the time value of money concept within a framework of "effective prices" to explain how the availability of credit periods and cash discounts for prompt payment provide customers with reductions in their cash price.

Items bought on credit will be shown to create a utility in excess of their eventual purchase price measured by the debtors' opportunity to utilise this amount during the credit period, or discount period. By conferring enhanced purchasing power upon its customers, a company's terms of sale will be seen to have true "marketing" significance. They represent an aspect of financial strategy, whereby the creditor firm can translate *potential* demand into *actual* demand and increase future profitability. Your Activities will confirm this.

For the provider of goods and services (the creditor firm) we then explain why the availability of trade credit is not without cost:

- Invoiced payments for accounts receivable, which are deferred or discounted, represent a claim to cash that has a value *inversely* related to the time period in which it is received,
- Credit policies are a key determinant of the structure, amount and duration of a firm's total working capital commitment tied to its price-demand function,
- Alternative credit policies, therefore, produce different levels of profit.

So, when a firm decides to sell on credit, or revise credit policy variables, it should ensure that the incremental benefits from any additional investment exceed the marginal costs.

Part Four challenges the extent to which companies adhere to *standard industry* terms based on empirical evidence. Given our critique of conventional working capital analysis compared to a time-honoured theoretical framework for analysing effective prices associated with different credit terms.

- Typical cash discounts confer unnecessary benefits on cash customers,
- Non-discounting customers often remit payment beyond the permitted credit period,
- Standard industry terms produce a sub-optimal investment in working capital, which do not make an efficient contribution to profit.

Having applied different credit policy variables to practical illustrations throughout the text to evaluate why adhering to existing terms or setting terms equal to those of competitors can fail to maximise the combined profit on output sold and the terms of sale extended to different classes of customer, we shall draw the following conclusion:

If a company is unique with respect to its revenue function, cost function, access to the capital market and customer clientele, it is possible to prove mathematically, that its optimal debtor policy will be unique. And so too, will be its net investment in working capital.

Review Activity

Because it is a theme that we shall develop throughout the text, using your previous knowledge of published company financial statements:

Briefly explain the overall limitations of a Balance Sheet as a basis for analysing the data it contains.

Balance Sheets only show a company's position on a certain date. Moreover, each represents a "snapshot" that is also several months old by the time it is published. For these reasons, they are a record of the past, which should not be regarded as a reliable guide to current activity, let alone the future. For this we need to turn to stock market analysis, press and media comment.

Moreover, a Balance Sheet does not even provide a true picture of the past. It shows historically, how much money was spent (equity, debt and reserves) but not whether it has been spent wisely.

Fixed assets recorded at "cost" do not give any indication of their current realisable value, nor their future worth in terms of income earning potential.

Working capital data may be equally misleading. Stocks, debtors, cash, creditors, loans and overdrafts may change considerably over a short period.

Finally, a Balance Sheet reveals little about market conditions, the true value of goodwill, brand names, intellectual property, or the quality of management and the workforce.

1.4 Summary and Conclusions

In reality we all understand that firms pursue a variety of objectives, which widen the *neo-classical profit motive* to embrace different goals and different methods of operation. Some of these dispense with the assumption that firms maximise anything, particularly in an overcrowded, small company sector. Invariably, even where objectives exist, *short term survival* not only takes precedence over profit maximisation but also management's *satisficing* behaviour. And in such circumstances, *mimicking* the sector's working capital structure and setting credit terms equal to competitors may be all that seems feasible.

Similarly, in the case of oligopolistic sectors, much larger firms may feel the need (or are forced) to react to the policy changes of major players. But here fear, rather than desperation, may be the incentive to adhere to over-arching working capital profiles and industry terms.

As we shall discover, therefore, for most firms across the global economy:

- Debtor policy still represents an institutionalised, supportive function of financial management, which may inhibit profitability and be suboptimal.
- As a corollary, the efficient management of working capital, which should determine optimum net investments in inventory, debtors and cash associated with the terms of sale, may be way off target.
- As a consequence, the derivation of anticipated net cash inflows associated with a firm's capital investments, which justifies the deployment of working capital, may fail to maximise shareholder wealth.

1.5 Selected References

Hill, R.A., bookboon.com.

Text Books:

Strategic Financial Management, (*SFM*), 2008.
Strategic Financial Management: Exercises (*SFME*), 2009.
Portfolio Theory and Financial Analyses (*PTFA*), 2010.
Portfolio Theory and Financial Analyses: Exercises (*PTFAE*), 2010.
Corporate Valuation and Takeover, (*CVT*), 2011.
Corporate Valuation and Takeover: Exercises (*CVTE*), 2012.

Business Texts:

Strategic Financial Management: Part I, 2010.

Strategic Financial Management: Part II, 2010.

Portfolio Theory and Investment Analysis, 2010.

The Capital Asset Pricing Model, 2010.

Company Valuation and Share Price, 2012.

Company Valuation and Takeover, 2012

Part Two:
Working Capital Management

2 The Objectives and Structure of Working Capital Management

2.1 Introduction

For those familiar with my *bookboon* series, we have consistently defined the normative objective of financial management as the determination of a *maximum* inflow of project cash flows commensurate with an acceptable level of risk. We have also assumed that the funds required to support acceptable investment opportunities should be acquired at *minimum* cost. You will recall that in combination, these two policies conform to the normative objective of business finance, namely, *shareholders wealth maximisation.*

As we first observed in Chapter Two (Section 2.1) of "Strategic Financial Management" (*SFM* 2008) any analyses of investment decisions can also be conveniently subdivided into two categories: long-term (strategic) and short-term (operational).

The former might be unique, irreversible, invariably involve significant financial outlay but uncertain future gains. Without sophisticated forecasts of periodic cash outflows and returns, using capital budgeting techniques that incorporate the time value of money and a formal treatment of risk, the financial penalty for error can be severe.

Conversely, operational decisions tend to be divisible, repetitious and may be reversible. Within the context of capital investment they are the province of *working capital management*, which lubricates a project once it is accepted.

You should also remember, from your accounting studies (confirmed by the previous Chapter) that from an *external* user's perspective of periodic published financial statements:

> Working capital is conventionally defined as a firm's current assets minus current liabilities on the date that a Balance Sheet is drawn up.
>
> Respectively, current assets and current liabilities are assumed to represent those assets that are soon to be converted into cash and those liabilities that are soon to be repaid within the next financial period (usually a year).

From an *internal* financial management stance, however, these definitions are too simplistic.

> Working capital represents a firm's *net investment* in current assets required to support its *day to day* activities.
>
> Working capital arises because of the disparities between the cash inflows and cash outflows created by the supply and demand for the physical inputs and outputs of the firm.

For example, a company will usually pay for productive inputs before it receives cash from the subsequent sale of output. Similarly, a company is likely to hold stocks of inventory input and output to solve any problems of erratic supply and unanticipated demand.

For the technical purpose of investment appraisal management therefore incorporate initial working capital into NPV project analysis as a cash *outflow* in year zero. It is then adjusted in subsequent years for the *net* investment required to finance inventory, debtors and precautionary cash balances, less creditors, caused by the acceptance of a project. At the end of the project's life, funds still tied up in working capital are released for use, elsewhere in the business. This amount is treated as a cash *inflow* in the last year, or thereafter, when available.

The net effect of these adjustments is to charge the project with the interest foregone, i.e. the *opportunity cost* of the funds that were invested throughout its entire life. All of which is a significant departure from the *conventional* interpretation of published accounts by *external* users, based on the *accrual* concepts of Financial Accounting and generally accepted accounting principles (*GAPP*) which we shall explore later (and which you should be familiar with).

Activity 1

If you are unsure about the treatment of a project's working capital using discounted cash flow (DCF) analyses, you should read the following chapters from my bookboon series:

a) Chapter Two (Section 2.1) "Strategic Financial Management" (*SFM 2008*).
b) Chapter Three "Strategic Financial Management: Exercises" (*SFME 2009*) and work through the Review Activity.

2.2 The Objectives of Working Capital Management

The internal management of working capital can be distinguished from the capital budgeting decision that it underpins by:

a) The Production Cycle
Unlike fixed asset investment, the working capital planning horizon, which defines the cyclical conversion of raw material inventory to the eventual receipt of cash from its sale, can be measured in months rather than years. Working capital can also be increased by smaller physical and monetary units. Such divisibility has the advantage that average investment in current assets can be minimised, thereby reducing its associated costs and risk.

b) The Financing Cycle
Because the finance supporting working capital input (its conversion to output and the receipt of cash) can also be measured in months, management's funding of inventory, debtors and precautionary cash balances is equally flexible. Unlike fixed asset formation, where financial prudence dictates the use of long-term sources of finance wherever possible, working capital cycles may be supported by the long and short ends of the capital market. Finance can also be acquired piecemeal. Consequently, greater scope exists for the minimisation of capital costs associated with current asset investments.

Despite these differences arising from the time horizons of capital budgeting and working capital management, it is important to realise that the two functions should never conflict. Remember that the unifying objective of financial management is the maximisation of shareholders wealth, evidenced by an increase in a corporate share price. This follows logically from a combination of:

- *Investment* decisions, which identify and select investment opportunities that *maximise* anticipated net cash inflows in NPV terms,
- *Finance* decisions, which earmark potential funds sources required to sustain investments, evaluate the return expected by each and select the optimum mix which *minimises* their overall capital cost.

The inter-relationships between investment and financing decisions are summarised in Figure 2.1.

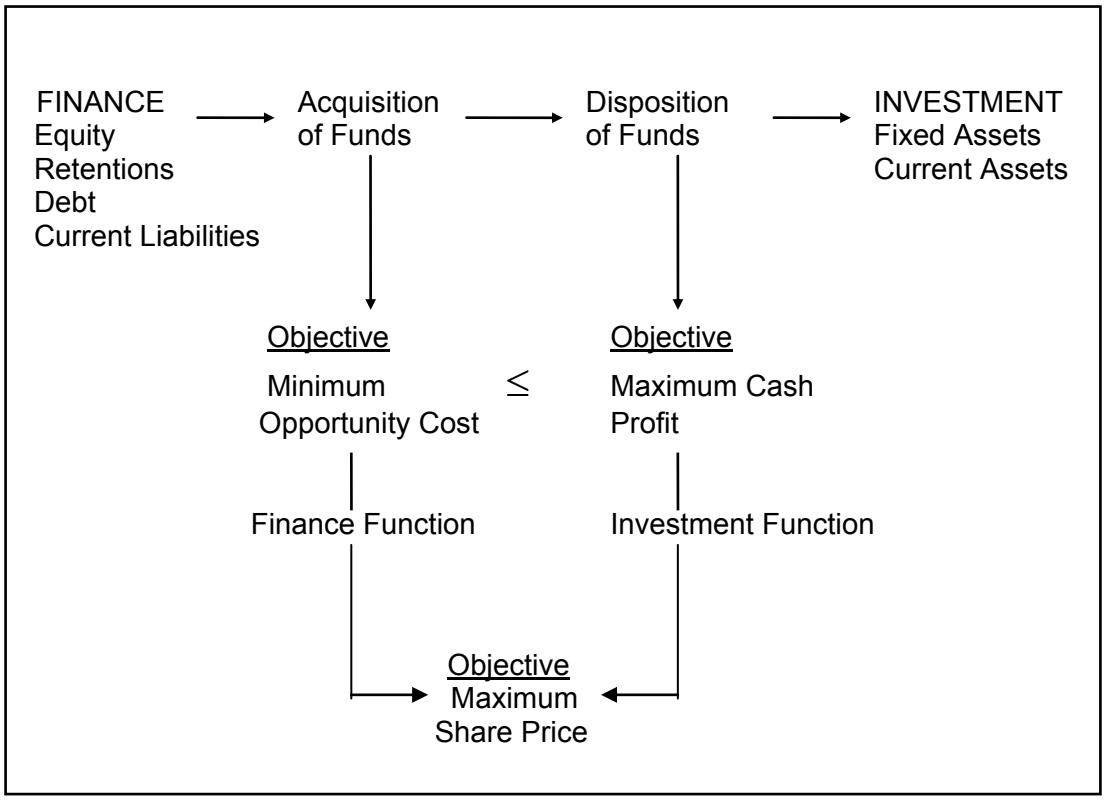

Figure 2.1: Corporate Financial Objectives

The diagram reveals that a company wishing to maximise its market price per share would not wish to employ funds unless their *marginal* yield at least matched the rate of return its investors can earn elsewhere. The *efficient* management of current assets and current liabilities within this framework therefore poses two fundamental problems for financial management:

- Given sales and cost considerations, a firm's *optimum* investments in inventory, debtors and cash balances must be specified.
- Given these amounts, a *least-cost* combination of finance must be obtained.

2.3 The Structure of Working Capital

Ultimately, the purpose of working capital management is to ensure that the operational cash transactions to support the demand for a firm's products and services actually take place. These define a firm's working capital *structure* at any point in time, which is summarised in Figure 2.2 below. We shall refer to aspects of this diagram several times throughout the text, but for the moment, it is important to note the three *square* boxes and two *dotted* arrows.

- The cash balance at the centre of the diagram represents the total amount available on any particular day.

- This will be depleted by purchases of inventory, plus employee remuneration and overheads, which are required to support production.
- The receipt of money from sales to customers will replenish it.
- A cash deficit will require borrowing facilities.
- Any cash surplus can be retained for reinvestment, placed on deposit or withdrawn from the business.

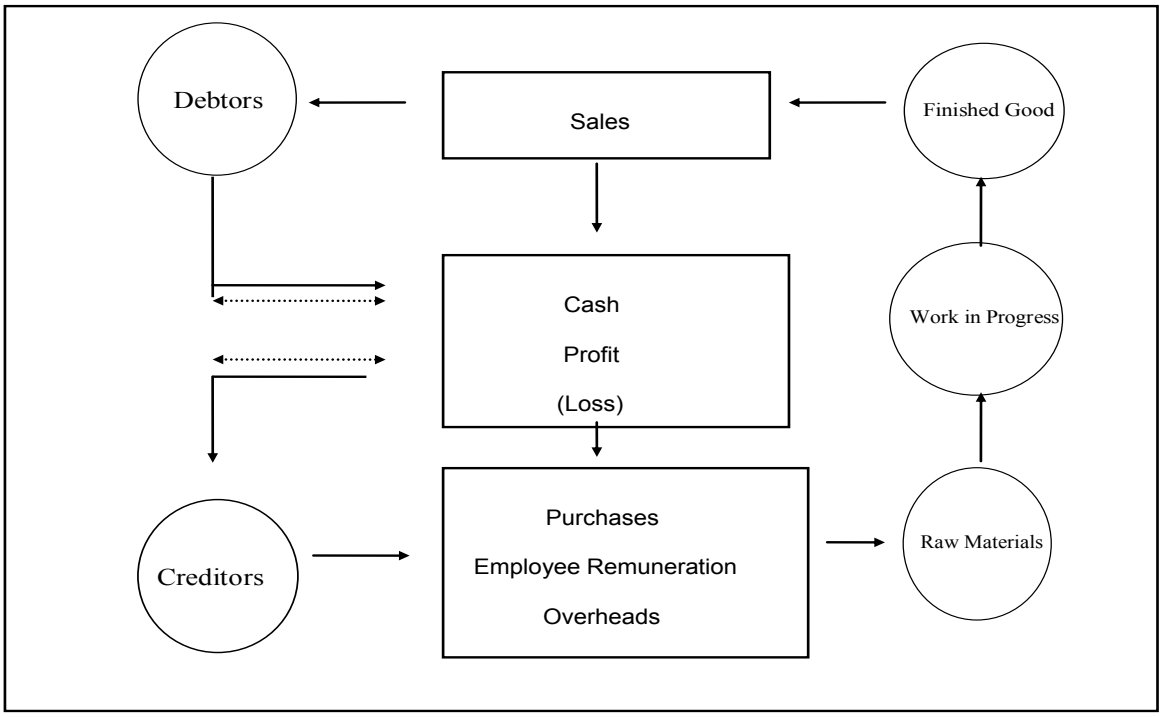

Figure 2.2: The Structure and Flow of Working Capital

If the cycle of events that defines the conversion of raw materials to cash was instantaneous, there would never be a cash surplus (or deficit) providing the value of sales matched their operational outlays, plus any allowances for capital expenditure, interest paid, taxation and dividends. For most firms, however, this cycle is interrupted as shown by the *circles* in the diagram.

On the *demand* side, we can identify two factors that affect cash transactions adversely. Unless the firm requires cash on delivery (COD) or operates on a cash and carry basis, customers who do not pay immediately represent a claim to cash from sales, which have already taken place. These define the level of debtors outstanding at a particular point in time. Similarly, stock purchases that are not sold immediately represent a claim to cash from sales, which have yet to occur. For wholesale, retail and service organisations these represent finished goods. For a manufacturing company there will also be raw materials and items of inventory at various stages of production, which define work in progress.

On the *supply* side, these interruptions to cash flow may be offset by delaying payment for stocks already committed to the productive process. This is represented by creditors. The net effect on any particular day may be a cash surplus, deficit or zero balance.

- *Surpluses* may be invested or distributed, *deficits* will require financing and *zero* balances may require supplementing.

Thus, we can conclude that a firm's working capital structure is defined by its forecast of overall cash requirements, which relate to:

- Debtor management
- Methods of inventory (stock) control
- Availability of trade credit
- Working capital finance
- Re-investment of short-term cash surpluses.

In fact, if you open any management accounting text on the subject you will find that it invariably begins with the preparation of a cash budget. This forecasts a firm's appetite for cash concerning the period under review, so that action can be planned to deal with all eventualities. The conventional role of the financial manager is then to minimise cash holdings consistent with the firm's needs, since idle cash is unprofitable cash.

You will recall from your accounting studies that the cash budget is an amalgamation of information from a variety of sources. It reveals the expected cash flows relating to the operating budget, (sales minus purchases and expenses), the capital budget, interest, tax and dividends. Long or short term, the motivation for holding cash is threefold.

- The *transaction* motive ensures sufficient cash to meet known liabilities as they fall due.
- The *precautionary* motive, based on a managerial assessment of the likelihood of uncertain events occurring.
- The *speculative* motive, which identifies opportunities to utilise cash temporarily in excess of requirements.

Given sales and cost considerations, the minimum cash balances required to support production are therefore identified. Within the context of working capital these depend upon the control of stocks, debtors and creditors, plus opportunities for reinvestment and borrowing requirements.

Review Activity

Again using your knowledge from previous *accounting* studies, it would be useful prior to Chapter Three if you could:

a) Define a company's working capital and its *minimum* working capital position.
b) Explain how *external* users of published accounts interpret the working capital data contained in corporate annual statements using *conventional* ratio analysis based on *solvency* and *liquidity* criteria.

We shall then use this material as a basis for further discussion.

2.4 Summary and Conclusions

Having surveyed the management of working capital management and the pivotal role of cash budgeting, we have observed that most textbooks covering the subject then proceed to analyse its component parts individually. Invariably they begin with inventory (stock) control decisions, before moving on to debtors, creditors and short-term finance, including the reinvestment of cash surpluses. Your conclusion might well be that "real world" working capital management is also divisible and therefore less problematical than any other finance function.

On both counts this is a delusion. For the purposes of simplicity, illustrations of working capital and investments in current assets and liabilities throughout the literature tend to regard market conditions, demand and hence sales and cost considerations as *given*. Unfortunately, this is tantamount to trading within a closed environment, oblivious to the outside world. Yet, we all know that business is a *dynamic* process, susceptible to change, which is forged by a continual search for new external investment opportunities. So, there is no point in companies holding more cash and inventory, or borrowing, if the aim is not to increase sales. And even then, the only reason to increase sales is to enhance cash profitability through new investment.

Thus, the key to understanding the structure and efficient management of working capital does not begin with a cash budget followed up by inventory control and a sequential analysis of other working capital items. On the contrary, like all other managerial functions, it should be *prefaced* by an appreciation of how the demand for a company's goods and services designed to maximise corporate wealth is created in the first place. And as we shall discover in future Chapter's from a working capital perspective, the strategic contributory factor relates to debtor policy, namely:

> How the *terms of sale* offered by a company to its customers can influence demand and increase turnover to produce maximum profit at minimum cost.

2.5 Selected References

1. Hill, R.A., bookboon.com.

Strategic Financial Management, (*SFM*), 2008.
Strategic Financial Management: Exercises (*SFME*), 2009.

3 The Accounting Concept of Working Capital: A Critique

3.1 Introduction

We concluded Chapter Two by observing that the key to understanding efficient working capital management requires an appreciation of how a company's terms of sale can increase the demand for its products and services to produce maximum profit at minimum cost. Before developing this theme throughout the remainder of the text, the purpose of this Chapter is to reveal in greater detail why:

> The traditional accounting definition and presentation of working capital in published financial statements and its conventional interpretation by external users of accounts reveals little about a company's "true" financial position, or managerial policy.

If proof were needed, I suspect one of the first things that you learnt from your accounting studies and rehearsed in the answer to the first part of the previous Chapter's Review Activity is that using Balance Sheet analysis:

> The conventional concept of working capital is defined as an *excess* of current assets over current liabilities revealed by financial reports. It represents the *net* investment from longer-term fund sources (debt, equity or reserves) required to finance the day to day operations of a company.

This definition is based on the traditional accounting notions of *financial prudence* and *conservatism*. Because current liabilities must be repaid in the near future, they should not be applied to long term investment. So, they are assumed to finance current assets.

Yet we all know that in reality (rightly or wrongly) new issues of equity or loan stock and retentions are often used by management to finance working capital. Likewise, current liabilities, notably permanent overdraft facilities and additional bank borrowing may support fixed asset formation.

None of this is revealed by an annual Balance Sheet, which is merely a *static* description and classification of the acquisition and disposition of long and short term funds at one point in time, prepared for stewardship and fiscal purposes, based on generally accepted accounting principles (GAPP).

Not only do Balance Sheets fail to identify the *dynamic* application of long and short-term finance to fixed and current asset investment. But because they are *a cost-based* record of *current* financial position, they provide no *external* indication of a firm's *value* or *future plans* (which are the bedrock of *internal* financial management).

3.2 The Accounting Notion of Solvency

For the external user of published accounts interested in assessing a company's working capital position and credit worthiness, you should also have noted in your answer to the first part of Chapter Two's Review Activity that:

> Within the context of traditional financial statement analysis, without access to better information (insider or otherwise) any initial interpretation of a firm's ability to pay its way is determined by the relationship between its current assets and current liabilities.

Analytically, this takes the form of the working capital (current asset) ratio, with which you should be familiar.

$$\text{(1) The Working Capital (Current Asset) Ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}$$

> Convention dictates that the higher the current ratio, the easier it should be for a company to meet its short term financial obligations (*i.e.* pay off its current liabilities) which are more susceptible to fluctuation.test

Positive working capital is conventionally interpreted as an indicator of financial strength. The ratio should be consistent within the company over time, yet stand up against competitors or the industry average at any point in time. There is also a textbook consensus (with which you should be familiar) that an upper *2:1 ratio* limit is regarded as financially sound. Otherwise, current asset investment may be wasteful (although if business conditions improve or deteriorate, companies may periodically depart from convention).

Zero working capital defines a company's *minimum* working capital position, calibrated by a 1:1 ratio of current assets to current liabilities.

Moving on to the second part of Chapter Two's Review Activity:

From a traditional accounting perspective, a 1:1 ratio of current assets to current liabilities (zero working capital) defines corporate *solvency*. This arithmetic *minimum* is justified by a fundamental corporate objective, namely *survival*.

> To survive, a firm must remain *solvent*. Solvency is a question of fact, since it is maintained as long as current financial obligations can be met. *Insolvency* arises when debts due for payment cannot be discharged.

Activity 1

Using the following data (£000) calculate the current ratios for Sound Garden plc and interpret their solvency implications:

	Year 1	Year 2
Current assets:		
Stocks	500	900
Debtors	300	600
Cash	80	280
	880	1,780
Current liabilities:		
Creditors	290	540
Bank Overdraft	-	1,000
	290	1,540

Referring back to Chapter Two (Figure 2.2) you will recall that current assets are continuously transformed into cash as operating cycles run their course, whilst current liabilities represent imminent capital repayments that are assumed to fall due within one year. So, taking either year as the *current* period, the working capital (current) ratio is assumed to reflect solvency (or otherwise) at Sound Garden's annual Balance Sheet publication date.

The corresponding figures in Activity 1 show an ability to meet current liabilities out of current assets, however they are compared. The theoretical *minimum* limit to solvency is a current ratio of 1:1, or net working capital of zero (defined as an excess of current assets to current liabilities).

Assuming the overdraft facility is used to finance increased working capital commitments, (stocks, debtors and precautionary cash balances), the current ratios for each year are:

Year 1			**Year 2**		
$\frac{880}{290}$	=	3:1	$\frac{1,780}{1,540}$	=	1.2:1

So which ratio is preferable?

Conventional accounting analysis dictates that the higher the current ratio, the better Sound Garden plc can meet its impending financial obligations. As we mentioned earlier, the ratio should also be consistent within the company over time, yet stand up against competitors or the industry average at any point in time. There is a textbook consensus that a 2:1 ratio is financially sound, although if business conditions improve or deteriorate, companies may periodically depart from convention.

Thus, without more detailed information, we might conclude that the current ratio for Year 1 is unduly cautious, whilst that for Year 2 indicates possible bankruptcy if trends continue.

But all is still not revealed

3.3 Liquidity and Accounting Profitability

Whilst solvency is a question of fact, we have also observed that it is also a dynamic *cash flow* concept. As long as a business consistently has greater cash receipts than payments, it should always be able to repay its debts whenever they fall due. Thus, you will appreciate that neither *today's* amount of working capital, nor the current ratio, are sufficient indicators of a company's *future* debt paying ability.

The extent to which the *composition* of a firm's current asset structure comprises cash or legal claims to cash, in the form of debtors and marketable securities, rather than highly un-saleable part-finished inventory or bad debts are also important. If stocks cannot be converted into cash to meet the time scale of payments to creditors, the business must look to its debtors and cash balances to meet its current liabilities, or else borrow still further.

The *liquidity* concept therefore serves as a *complement* to a conventional Balance Sheet analysis of *solvency*. It allows the external observer to assess more accurately the risk of working capital investment formulated by the relationship between a firm's current assets (which now excludes inventory) and its total current liabilities. This metric is defined by:

$$\text{(2) The Liquidity or "Quick" Ratio} = \frac{\text{Total liquid assets}}{\text{Total current liabilities}}$$

where the theoretical lower limit to liquidity is still measured by a ratio of 1:1.

Activity 2

(a) Calculate the liquidity ratios for Year 1 and Year 2 using Sound Garden's data from Activity 1.
(b) How do the results complement your previous interpretation of the data?

With liquidity ratios of 1.3:1 and 0.57:1 respectively, the above Activity would appear to confirm possible bankruptcy for Sound Garden plc, even though total current assets exceed total current liabilities for both years. On the other hand, given the enormous variety and quality of realisable inventory and liquid assets, both within and between industries, let alone individual companies, this may be a gross misinterpretation of the data. Neither investment in working capital, nor liquidity, is an end in itself. Many companies operate extremely successfully with solvency ratios well below 1:1. Conversely, there is a well documented history of companies that have become insolvent whilst publishing accounting profits.

Like other areas of financial management, working capital policies must therefore be judged in terms of the risk associated with the overall returns that firms deliver.

So, returning to first principles, how do external users of accounts (shareholders, creditors and potential investors) gauge a company's overall return from published financial statements, which are prepared by management on their behalf (the *agency* principle)?

3.4 Financial Interpretation: An Overview

Referring again to your Accounting studies, you will recall that the traditional approach to performance evaluation by external users of company accounts takes the form of a *pyramid* of ratios. At the *apex* of this framework stands the *primary* ratio. An overall return that can be measured in a variety of ways, using various definitions of a profit to asset ratio, termed return on capital employed (ROCE).

The view taken here is that a *summary* metric of corporate profitability is best interpreted by a ratio of *net* profit to total *net* assets, which gauges the productivity of *all* the resources that a firm has at its disposal, irrespective of their financing source.

- Net profit (the *numerator*) is defined as earnings before interest and tax (EBIT) after an allowance for the depreciation of fixed assets. We include tax because rates may change over time, which would invalidate any periodic post-tax profit comparisons (*i.e.* we would not be comparing like with like).
- Total net assets (the *denominator*) represent the *sum* of fixed assets (including excess and idle assets surplus to requirements, which are a drain on profit) after an allowance for depreciation, plus net current assets (the difference between current assets and current liabilities due for imminent repayment).

This *primary* definition of corporate performance (ROCE) can then be *mathematically* deconstructed into two *secondary* ratios, which highlight the reasons for the firm's overall profitability, namely its *net* profit margin and total *net* asset utilisation (asset turnover), as follows:

$$(3)\quad \text{ROCE} = \frac{\text{Net profit}}{\text{Total net assets}} = \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total net assets}}$$

Activity 3

Explain why a high or low ROCE ratio is determined by a combination of a company's profit margin and asset utilisation.

The first point to note is the mathematical relationship in Equation (3). By multiplying the two secondary ratios together, their respective sales terms disappear to yield the ROCE

Thus, it follows that the higher the profit, or the lower the assets, for a given level of sales, then the higher the ROCE and *vice versa*.

The *secondary* ratios are further analysed by a series of *tertiary* measures to show how the company is performing. A simple pyramid is summarised in Figure 3.1 below.

If the published ROCE is deemed unsatisfactory by whatever external test, say an average industry return, returns for similar companies, or past returns for the firm in question (historical cost or value based), we can offer two plausible explanations.

- Weak profit margins, due to an inadequate gross profit percentage or excessive overhead expenses, (the *operating* ratios).
- Mediocre sales turnover, due to an inefficient utilisation of fixed assets or current assets.

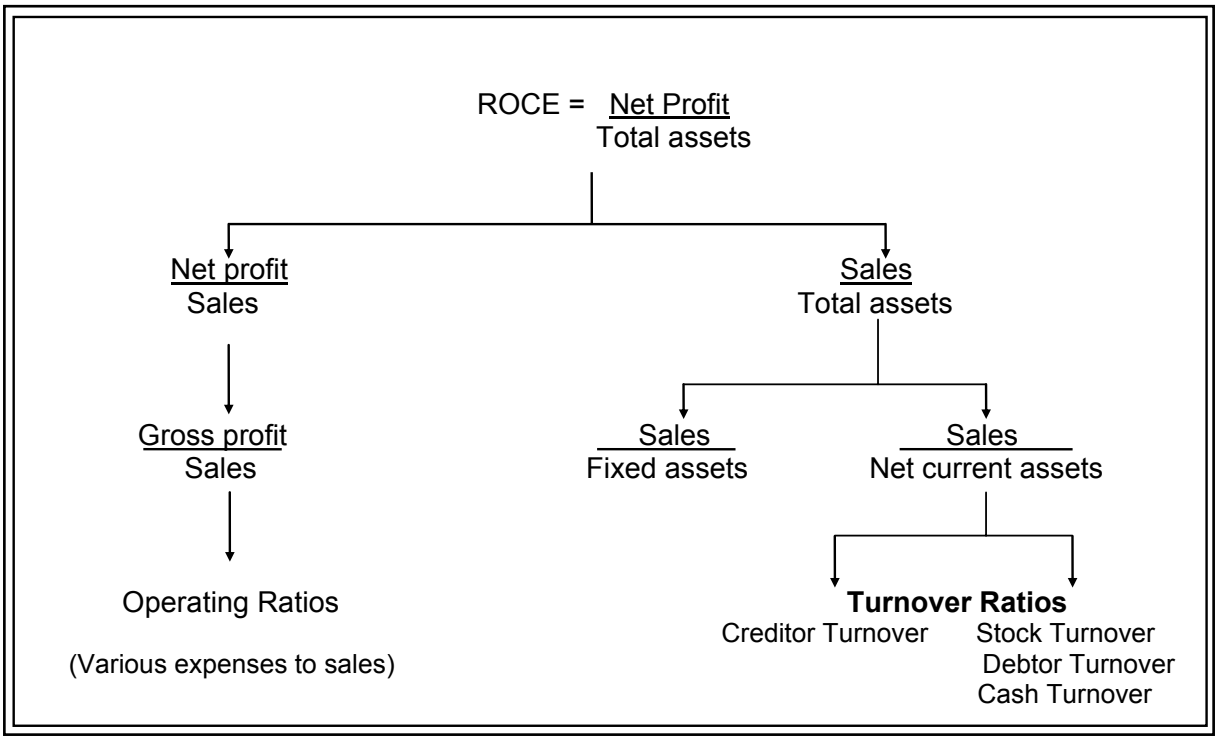

Figure 3.1: Ratio Analysis, Accounting Profitability and Working Capital

As part of a general analysis of corporate profitability, Figure 3.1 highlights that our particular area of study, namely efficient working capital management, is interpreted by a cluster of *turnover* measures subsumed under the sales to net current asset ratio.

Given our initial interest in *solvency*, one of the first questions you might ask is whether it is possible to define the amount of net current assets that a firm ought to hold at any particular time? This is because a high proportion of working capital to total assets may give management greater flexibility:

- To adapt to changing conditions, without compromising its debt paying ability.
- To realise short-term assets (rather than borrow) and reinvest the proceeds in fixed assets or generate more sales.
- To increase sales by a temporary reduction in liquidity.

However, without more detailed analysis of the firm's working capital structure, subsumed under its sales to current asset ratio, we may be jumping to the wrong conclusions. A high proportion of current assets to fixed assets may be inefficient.

The sale to net current asset ratio provides a summary measure of working capital efficiency; the higher the ratio, the higher the sales per unit of net current assets, which should impact favourably upon ROCE.

But again, don't make the mistake of confusing turnover figures with profit. They help to show external users of accounts how a company is performing, but are only part of a bigger picture and therefore need to be treated with caution.

For example, the rate at which goods are sold and cash received from customers, or "turned over" per annum (measured by the ratios of sales to stocks and debtors respectively) is much faster in some sectors than others. Food retailing tends to exhibit a rapid "stock turn" for cash at small profit margins. On the other hand, the nature of the engineering process means that this sector operates at a much slower pace. Considerable capital is locked into production and tied to long term contracts. But set against this, the profit margins tend to be significantly higher.

3.5 Liquidity and Turnover

Before we present a more detailed analysis of the role turnover ratios in Chapter Four, let us set the scene by again focusing on *liquidity* and the definition of a cash balance required by a firm, based on the sales to cash turnover ratio itemised in Table 3.1.

As a guide to further study, our purpose is to reveal the complexity of financial statement analysis and how one ratio may be affected by other aspects of a firm's operations, leading to its misinterpretation.

Since a major corporate motive for holding cash is to support production that generates sales, we can define:

$$(4)\ \text{Cash Turnover} = \frac{\text{Sales for the period}}{\text{Initial cash balance}}$$

The cash *turnover* ratio is sometimes termed the cash *velocity* ratio. But how do we analyse its movement over time?

Activity 3

(a) With sales of $360m and an initial cash balance of $18m, calculate the cash turnover (velocity) ratio for Adele plc.
(b) What is your interpretation of the company's performance if future sales increase to $450m the following year, but the initial cash balance remains the same?

$$(a)\ \text{Cash Turnover} = \frac{\text{Sales for the period}}{\text{Initial cash balance}} = \$360\text{m} / \$18\text{m} = 20$$

(b) Any measure of corporate performance, such as ROCE and its associated pyramid of ratios, is neither *static* or *absolute* but *dynamic* and *relative*. It must be compared to some standard of comparison over time (similar firms in similar industries, or the firm itself) as economic and geo-political events unfold. With regard to cash velocity, ideally, Adele plc would hope to confirm an improving trend, or at least periodic consistency, using all of these criteria. A sales uplift of $90m one year to the next, without any change in its cash balance, increases the company's cash turnover from 20 to 25 times. This represents a 25 per cent increase in sales per unit of cash held. But is it good?

In one sense yes: the cash balance is still $18m, instead of rising to $450m /20, which equals $22.5m. So, there is an implied saving of interest on borrowing, or a financial gain by reinvesting the $4.5m difference at the company's opportunity cost of capital rate. This should improve overall profitability.

Like any *external* analysis of financial ratios, however, the figures also give rise to questions rather than answers, which cannot be interpreted in isolation without access to *internal* (managerial) information.

Two combined worst case scenarios may be that the cash balance is still $18m because creditors have imposed stricter terms of sale and debtors are also taking much longer to pay, imposing an intolerable strain on liquidity. Cash also has a variety of uses, which might not be related to an increase in sales. For example, loans may have been repaid one year to the next. Cash can also appear in the guise of new overdraft facilities that are not recorded in the velocity ratio (or even the Balance Sheet) but still contribute to increased sales.

To second guess *internal* managerial policies (the unknowable) *external* users of accounts can always compare the cash turnover ratio for Adele plc with the average liquidity for the industry. They might also set their own theoretical minimum proportion of cash holdings to sales as a basis for interpretation. Not as an absolute limit but as an opportunity for reviewing deviations from the norm (mean reversion).

However, comparisons between individual firms within a particular industry, or within the firm itself (and certainly across industries) may be of limited value, given the size of the industry, the nature of competition, or the changing scale and diversity of operations (including those of the firm itself).

Review Activity

Our previous Activity reveals why there should be more to financial performance analysis than the interpretation of *historical* data contained in *ex post* company accounts. Management, accountants, auditors, fiscal authorities and governments have long defended such information by stating that they are only designed to provide an objective record of *stewardship*, primarily to satisfy a company's tax obligations.

Certainly, the *price* paid for assets and the derivation of income on this basis are *accountable* facts. And in this sense, accounting statements are *objective*. They are composed of "real" figures, which serve to represent a "true and fair" view according to financial accounting *concepts* and *conventions* (with which you should be familiar). However, without access to the managerial (insider) information that produced this data, they have limited utility for shareholders, creditors, potential investors, or any other external users of accounts who are primarily interested in assessing a firm's current performance and future plans.

To see why, consider the following published Balance Sheet data for Gaga plc (with a €25 million turnover and €5 million net profit) for which we have additional information, only available to management. Without even calculating any ratios, what does the insider information tell us about the utility of annual published financial statements for external users, even if we assume that Gaga's original figures are neither fraudulent, nor creative?

Balance Sheet	€000s	Insider (managerial) information
Land	20,000	(Bought 5 years ago)
Buildings	80,000	(60,000 spent 5 years ago, the balance representing the cost of subsequent additions at various dates)
Plant	40,000	(Various equipment bought on average 2 years ago)
Stock	5,000	(Many different items, bought on average 3 months ago)
Debtors	4,000	(Assumed to repay on average 3 months hence)
Cash	2,000	(Held for 2 months)
Totals	151,000	?

The first point to note is that most data published in corporate financial accounts throughout the world is actually *subjective*. Historically in the UK, for example, whether we begin with the nominal (par) issue value of ordinary shares (common stock) or corresponding net asset values in the Balance Sheet, sales turnover in the Trading and Profit and Loss Account, or end with the final transfers to reserves in the Appropriation Account, all the figures are *biased* toward GAAP concepts and conventions that underpin the UK accounting profession's *regulatory framework*.

Nominal share values do not correspond to *current* market values published in the financial press. *Current* sales turnover may include unforeseen *future* bad debt. Other factual *historical* costs also fail to reflect *current* economic reality and are dependent on forecasts. For example, the *net book value* of assets and by definition *net profit* (which is the *residual* of the whole accounting process) depend upon *future* estimates of useful asset lives, appropriate methods of depreciation and terminal values.

As we first observed in the Review Activity for Chapter One, published financial statements only show the position of a company on a certain date, *i.e.* when the Balance Sheet is drawn up ("struck"). Moreover, each represents a "snapshot" that is also several months old by the time it is published. For these reasons, they are a record of the past, which should not be regarded as a reliable guide to current activity, let alone the future. For this, we need to analyse published stock market data and to research analyst, press and media comment.

Secondly, they do not even provide a true picture of the past. For example, Gaga's Balance Sheet shows how much money has been spent. But not whether it has been spent wisely.

From the simple table above, numerous significant points emerge.

1. In the absence of fraud, each item in the list is a *fact* (an accurate record of transactions that have actually taken place). Every one represents actual money, or money paid and receivable. Except to the extent that there might been error (for example, equipment might have been bought and charged against current revenue, thus reducing profit and the asset figure below total cost) the list is a *factual* statement of assets owned and prices paid.
2. However, the Balance Sheet total of €151 million has no real meaning. It is a summation of euro's at different values (now, five years ago, three months hence, and so on) that equals the *nominal* value of authorised and issued share capital, plus the historical cost of reserves, loan stocks and other liabilities. It says nothing about *market* value and has about as much informational content as saying "four apples and three oranges equal seven fruit".
3. The Balance Sheet is likely to be valued incorrectly, even if the figures were adjusted for *overall* general monetary inflation (the economy's *average* price level change).
4. The list of assets does not provide any indication of their current *specific* worth, which may be above or below the overall rate of inflation.
5. The land could be ripe for development and saleable for €50 million. The specific cost of replacing the buildings and equipment in their present form might be €250 million. Moreover, the fixed assets might have a high or low market value compared with a year ago.
6. Current asset data may be equally misleading. Stocks, debtors and cash may have changed considerably since the Balance Sheet was "struck".

7. As a consequence, a significant disparity may exist between the "authorised and issued" *nominal* value and "real" *market* value of equity plus reserves, as well as debt. Yet none of this is revealed by the published accounts.
8. Finally, if we consider the initial summary Trading and Profit and Loss Account data also provided for Gaga, don't make the mistake of assuming that a €25 million sales turnover and €5 million net profit reflect economic reality, let alone whether either is good or bad.
9. Any sales figure (physical volume or financial value) is not much good if companies make little money from it. Asset utilisation may be inefficient; profit margins may be low and bad debts high (to the extent that a firm sells on credit).
10. Remember also, that the accountant's net profit may be an *accrual-based* subtraction of various historical costs from current revenue. And this figure does not necessarily correspond to the net cash inflow, to the extent that working capital inventory and other services have been bought and sold on credit. It is also adjusted for depreciation (which is a *non-cash* expense).

As a consequence, any interpretation of Gaga's historical accrual-based company report using conventional *ex-post* ratio analysis as a basis for measuring any aspect of its recent performance, let alone its *future* plans is deeply flawed.

3.6 Summary and Conclusions

As I have emphasised elsewhere in my bookboon series of finance texts, which are referenced at the end of Chapter One:

> Any increase in a company's *long-term* value (shareholder wealth) is determined by the *periodic* net cash inflow that management can first earn and subsequently distribute, without eroding its *original* capital base and hence that of the shareholders to whom they are ultimately responsible (the *agency* principle).

If we adopt these value criteria, however, there is an obvious conflict between a corporate *tangible asset* figure reported in published accounts (even based on current cost) and the *market price* of shares published in the financial press (which use income and dividend yield valuations based on discounted revenue theory).

- The former ignores the profitability of so many intangible items (goodwill, brand names and human resources, such as intellectual property, the quality of management and the workforce).

- The latter are forward looking and all-inclusive. Market valuations not only embrace the whole financial structure of the firm (fixed and working capital).They are also based upon a risk assessment of the present value (PV) analyses of projected cash flows, relative to a company's desired rate of return. These capture media comment, investor speculation and rumour, as well as government policy, changing social, economic and political circumstances at home and abroad.

As a consequence, a company's "real" market rate of return, defined by its dividend yield or earnings yield (the reciprocal of the P/E ratio) may bear no relation to any interpretation of its overall return on capital employed (ROCE) or dividend per share and earnings per share (EPS) derived from the published financial accounts.

Thus, it follows logically that if a company's ROCE is suspect (which stands at the very the apex of a pyramid of ratios), then its very foundations (the secondary and tertiary ratios) including any analysis of its working capital position must also be questioned.

4 The Working Capital Cycle and Operating Efficiency

4.1 Introduction

The previous Chapter's Activities suggest that a conventional interpretation of working capital data contained published financial statements may not only mislead external users of accounts but also contrast sharply with the overall wealth maximising objective of financial management, namely:

> To maximise the demand for a firm's products and services through optimum, profitable investments, financed at minimum cost.

To prove the case conclusively, we shall now confirm why the accounting concept of working capital (which defines an *excess* of current assets over current liabilities as an indication of financial strength) and its interpretation (often benchmarked by a 2:1 current asset ratio) is invariably suboptimal and way of target. As we shall discover:

> The normative objective of efficient working capital management should be to *minimise* current assets and *maximise* current liabilities, subject to the constraint of maintaining a sound liquidity position, which also maximises opportunities for fixed asset investment.

4.2 The Working Capital Cycle

When evaluating overall corporate performance it is not sufficient to calculate the working capital and liquidity ratios from the Balance Sheet and corresponding sales to net working capital ratios and cash velocity using turnover data. As we observed from Figure 3.1 in Chapter Three, it is also necessary to analyses the turnover ratios for other working capital constituents (notably the relationship between inventory, debtors and creditors).

One simple framework is given by an equation which defines how many times net working capital is "turned over" within the period under observation, relative to the rate at which goods are sold, debtors pay and the firm repays its own creditors, typically calculated from the data contained in published annual reports.

$$(5) \quad \frac{\text{Sales}}{\text{Net working capital}} = \frac{\text{Sales}}{\text{Stocks}} + \frac{\text{Sales}}{\text{Debtors}} \text{ minus } \frac{\text{Sales}}{\text{Creditors}}$$

As students of Financial Accounting you should also be familiar with reformulations of Equation (5) which express turnover in either days or months as follows:

$$(6)\quad \frac{\text{Net working capital}}{\text{Sales}} \times 365 = \frac{\text{Stocks}}{\text{Sales}} \times 365 + \frac{\text{Debtors}}{\text{Sales}} \times 365 \text{ minus } \frac{\text{Creditors}}{\text{Sales}} \times 365$$

$$(7)\quad \frac{\text{Net working capital}}{\text{Sales}} \times 12 = \frac{\text{Stocks}}{\text{Sales}} \times 12 + \frac{\text{Debtors}}{\text{Sales}} \times 12 \text{ minus } \frac{\text{Creditors}}{\text{Sales}} \times 12$$

You will see that each equation ignores cash turnover. Unlike stocks, debtors and creditors, it might not move in sympathy with sales. As we have observed elsewhere, cash has a variety of uses, which might not be related to any increase in sales. For example, loans may have been repaid one year to the next. Cash can also appear in the guise of new overdraft facilities that are not recorded in the velocity ratio (or even the Balance Sheet) even though they contribute to sales.

Note also that Equation (5) is *simplistic* because the debtor ratio is the only true *turnover* ratio, whereas the stock and creditor relationships are not. These don't compare like with like, because their denominators are expressed at *cost* but the numerators are at *selling price*. The stock and creditor ratios only exhibit their rate of variability with sales value. Nevertheless, these ratios are still useful indicators of the amount of working capital required to support sales and highlight a need for investigation if they deviate from standard or past trends.

A much more sophisticated analysis is provided by constructing a company's *working capital cycle* (or *net* operating cycle). This measures the average length of time between paying for raw materials that enter into inventory (the *financing* cycle) and the eventual receipt of cash from the sale of finished goods (the *operating* cycle, which also equals the *production* cycle for a trading company). You first encountered these cycles when we defined the objectives of working capital management in Chapter Two. The difference between the two, the *net* operating cycle is shown schematically in Figure 4.1.

As we shall discover, in this chapter and the next, the net operating cycle is an important concept in working capital management, which improves upon our previous working capital ratios.

- Stocks and creditors are now related to their appropriate costs and not revenues. As such they are proper turnover ratios. On a par with debtors, they produce an analysis in physical terms (days) rather than monetary values.
- The greater the time lag between the operating cycle and the financing cycle, the more funds the company presumably needs to support production.
- The relative significance of the net operating cycle's constituents can therefore suggest where managerial effort should be expended to reduce funds which are tied up in working capital.
- Conversely, the cycle reveals how profitability can be improved without putting undue strain on liquidity.

OPERATING CYCLE (days)

(i) Raw Material Turnover = Average value of raw material inventory / Daily raw material purchases

Plus

(ii) Production Cycle = Average value of work in progress / Daily average cost of sales

Plus

(iii) Finished Goods Turnover = Average value of finished goods / Daily average cost of sales

Plus

(iv) Customer Credit Period = Average value of debtors / Daily average sales

Minus

FINANCING CYCLE (days)

Suppliers Credit Period = Average value of creditors / Daily average purchases

Equals

NET OPERATING OR WORKING CAPITAL CYCLE (days)

Figure 4.1: The Working Capital Cycles

4.3 Operating Efficiency

Our study of working capital began by regarding an excess of current assets over current liabilities as highly desirable. Convention dictates that it measures the extent to which a company can finance any future increase in turnover. If the balance is zero, it may be a sign of trouble. The firm is assumed to possess no working capital, since the net cash inflows from future operating cycles must be committed to the payment of existing financial obligations. However, it is also important to realise that any "surplus" may be misleading, since it could relate to assets already committed to a firm's existing operating cycles.

As a consequence, only if a firm were to cease trading altogether would accounting notions of solvency and liquidity (based upon a static *ex post* Balance Sheet analysis) give any indication of its "true" creditworthiness. As a *going concern*, it is the firm's ability to exploit its *future* trading position that determines an adequacy of cash resources to meet debts as they fall due.

As we shall discover, debt-paying ability is a *dynamic* concept, which should not depend upon external user attitudes (notably creditors) towards statements of *current* financial position, but rather the firm's *future* operating efficiency. This may be defined as the inter-relationship between:

- Future profitability
- The operating cycle (the conversion period of assets to cash),
- The financing cycle (the repayment period granted by creditors).

Review Activity

To illustrate why the *internal* dynamics of efficient working capital management can be at variance with its *external* interpretation, imagine that you initially commenced business on July 1st last year without any start-up capital.

Your intention was to exploit a gap in the market by importing specialist music CD boxed sets to the UK mainland from the UK Channel Islands, in order to avoid tax (which is quite legal).

At the beginning of each month, you acquired inventory of £5000 on three months credit. At the end of each month it was sold for cash. Your profit margin was 50 per cent on cost. Cash inflows from sales were not withdrawn. They were utilised to finance fixed asset investment (the purchase of business premises) at the beginning of each following month, compatible with your debt paying ability, to expand the subsequent year's operations.

You are required to produce beginning and end of month Balance Sheets, calculate their corresponding profitability, working capital, stock and creditor ratios for the first twelve months and interpret the results.

(a) Introduction

For the purpose of exposition, I have kept the example deliberately simple. The data relates to a *trading* and not a *manufacturing* company, which we shall consider in Chapter Five. So, there are no raw materials, or work in progress, to complicate our analysis. The absence of any start up capital (ownership or debt) also enables us to focus on the *flexibility* of working capital investment. Specifically, how creditor finance or cash surpluses can be diverted to fixed asset formation, without compromising a firms "real" solvency or liquidity positions.

Beginning and end of month Balance Sheets for the *first quarter* are reproduced in Table 4.2, assuming that the "terms of trade" offered to customers and received from suppliers remain constant throughout the twelve month period and none of the sequential fixed asset investments have been sold. I have left you to calculate the Balance Sheets for the *remainder* of the year to confirm the figures that I have also provided for July 1st twelve months later. Table 4.3 then provides a summary of the requisite financial ratios derived from Table 4.2 as a basis for interpretation.

(b) The Balance Sheets

July 1st				**July 31st**			
Creditors	5,000	Stock	5,000	Profit	2,500	Cash	7,500
				Creditors	5,000		
					7,500		7,500
August 1st				**August 31st**			
Profit	2,500	Fixed Assets	7,500	Profit	5,000	Fixed Assets	7,500
Creditors	10,000	Stocks	5,000	Creditors	10,000	Cash	7,500
	12,500		12,500		15,000		15,000
September 1st				**September 30th**			
Profit	5,000	Fixed Assets	15,000	Profit	7,500	Fixed Assets	15,000
Creditors	15,000	Stocks	5,000	Creditors	15,000	Cash	7,500
	20,000		20,000		22,500		22,500
October 1st				**Next July 1st**			
Profit	7,500	Fixed Assets	17,500	Profit	30,000	Fixed Assets	40,000
Creditors	15,000	Stocks	5,000	Creditors	15,000	Stocks	5,000
	22,500		22,500		45,000		45,000

Table 4.2: Statements of Financial Position

(c) The Ratios

Now we can reformulate Table 4.2 using a selection of financial ratios within a coherent framework as a basis for interpretation.

- Profitability in terms of return on assets (ROCE), net profit margins and asset utilisation,

- Working capital, using current asset and liquidity ratios,
- The operating cycle (stock turnover),
- The financing cycle (creditor turnover).

	July		August		September		October	Next July
	1st	31st	1st	31st	1st	30th	1st	1st
Profitability								
Return %	-	33.3	20	33.3	25	33.3	33.3	66.6
Margin %	-	33.3	33.3	33.3	33.3	33.3	33.3	33.3
Utilisation	-	1:1	0.6:1	1:1	0.75:1	1:1	1:1	2:1
Working Capital								
Current Ratio	1:1	1.5:1	1:2	0.75:1	1:3	1:2	1:3	1:3
Liquidity Ratio	-	1.5:1	-	0.75:1	-	1:2	-	1:3
Operating Cycle								
Stock Turnover (months)							1	1
Financing Cycle								
Creditor Turnover (months)							3	3

Table 4.3: The Financial Ratios

(d) The Interpretation

The first point to note is that although the ratios correspond to those calculated by external users of published financial statements, the firm's creditors (the only external user group, apart from the tax authorities) would not have access to all this the information. Even in the corporate sector, at best they may have an interim report. Alternatively, they will only have access to a Balance Sheet on the date it is drawn up ("struck") at the year's end as a basis for interpretation (say July 1st in our example).

Secondly, without access to further managerial (insider) information that the terms of trade remained the same throughout the period:

- Inventory was acquired on three months credit and sold for cash at the end of each month.
- Cash from sales was not withdrawn but utilised to finance fixed asset investment at the beginning of the following month.

All the published year end ratios highlight are a confusing report of high profitability underpinned by a working capital *deficiency*.

So, how do we reconcile this conventional interpretation of your firm's *ex post* performance with its internal business *dynamics*, even if we assume that prices remained constant throughout the period?

(d) The Interpretation

(i) Profitability

The Review information provided in Table 4.3 reveals that whilst monthly turnover and profit margin remains the same, the sales to asset ratio and hence the overall rate of return (ROCE) fluctuates during the first quarter, thereafter rising to the year-end. Yet, your firm has adopted a policy of consistently maximising its reinvestment potential, rather than allowing cash to lie idle, or repay creditors prior to their due date.

Obviously, using the funds of others at no explicit cost for your benefit (in order to set up the business and subsequently finance its future operation) is extremely efficient. Unfortunately, it has a depressing effect on "reported" profitability when reinvestment is higher (August and September), but a beneficial effect thereafter.

There is also the question of whether a higher *rate* of return on lower capital employed is preferable to a lower return on higher capital, or vice versa. In *absolute* terms, your business is definitely more profitable by September 1st than the previous July 31st. But with the exception of the profit margin, all that conventional financial ratio analysis reveals is a significant deterioration in efficiency.

(ii) Working Capital

The decline in working capital is a corollary to the build up of creditors and the transformation of cash into fixed assets. In August, working capital is negative and for the most part liquidity is non-existent. By July of the following year, both the current and liquidity ratios are still highly unfavourable at 1:3 respectively. But you are neither insolvent, nor illiquid, unless you were to cease trading altogether.

(iii) The Net Working Capital Cycle

Given the terms of trade, you are well able to meet your financial obligations when they first fall due in October. Moreover, you can still continue to invest £2,500 elsewhere. Reversing conventional logic, it is no accident that the relationship between the operating and financing cycles, first revealed on October 1st is also 1:3. Inventory is being profitably converted to cash three times quicker than debts are being legitimately paid. All other things being equal, only if credit had been granted to customers, perhaps accompanied by bad debt loss (thereby, increasing the operating cycle) or suppliers demanded earlier repayment (reducing the financing cycle) would you have experienced a cash shortage, leading to possible insolvency. Yet, ironically, all the Balance Sheet analysis would reveal is an increase in current assets, a reduction in current liabilities perhaps culminating in a "positive" net working capital position!

4.4 Summary and Conclusions

This Chapter's Review Activity vividly illustrates what we have mentioned earlier. How a conventional interpretation of working capital data contained in published financial statements may not only mislead *external* users of accounts but also contrast sharply with the overall wealth maximising objective of *internal* financial management, namely:

> To maximise the demand for a firm's products and services through optimum, profitable investments, financed at minimum cost, all determined by its terms of sale.

To prove the case, we have confirmed why the accounting concept of working capital (which defines an *excess* of current assets over current liabilities as an indication of financial strength) and its interpretation (often benchmarked by a 2:1 current asset ratio) may be suboptimal and way of target.

As we shall discover in future Chapters (in line with the only logical conclusion from our previous Review Activity):

> The normative objective of efficient working capital management should be to *minimise* current assets and *maximise* current liabilities, subject to the constraint of maintaining a sound liquidity position, which also maximises opportunities for fixed asset investment.

5 Real World Considerations and the Credit Related Funds System

5.1 Introduction

Before concluding our study of working capital and moving on to Part Three and the role of strategic debtor investment, let us summarise our position so far.

We began by explaining why an excess of current assets over current liabilities (net working capital) revealed by published financial statements is highly desirable. Conventional accounting analysis dictates that if the balance is positive it measures the extent to which a company can finance any future increase in sales turnover, or alternatively fixed asset investment.

Conversely, if the balance is zero, or worse still negative, it may be a sign of trouble. The firm is assumed to possess no working capital, since the net cash inflows from future operations must be committed to the repayment of existing financial obligations.

However, we have also noted why an interpretation of a "surplus" as an indicator of financial strength may be misleading. It could relate to assets (fixed or current) already committed to a firm's existing operations. Likewise, a working capital "deficiency" might be a temporary consequence of a sound investment strategy designed to generate future profitability.

Only when firms cease trading do accounting notions of *solvency* and *liquidity* give any indication of their "true" credit-worthiness. As a *going concern*, it is a firm's ability to exploit its *future* trading position that determines an adequacy of cash resources to meet debts as they fall due.

5.2 Real World Considerations

Debt-paying ability is a *dynamic* concept, which should not depend upon external user attitudes (notably creditors) towards statements of *current* financial position, but rather the firm's *future* operating efficiency. This was defined in the previous Chapter as the inter-relationship between:

- Future *cash* profitability,
- The operating cycle (the conversion period of assets to cash),
- The financing cycle (the repayment period granted by creditors).

Even within the context of providing creditor information, the traditional notion of working capital is suspect. You will recall that we began our review of an accounting approach to its analysis with a number of anomalies.

We observed that solvency underpinned by liquidity is a *cash flow* concept. Yet its evaluation using published financial statements is placed within a pyramid of ratios. This defines profitability (ROCE) at its apex as revenues minus expenses on an *accrual* basis. So, taking a worst case scenario, a firm might generate sales. But what if its customers fail to pay? Debtors will rise, thereby increasing current assets, perhaps "improving" its working capital position. A "profit" will still be recorded in the published accounts and taxed. Shareholders will anticipate a dividend. Employees may demand a pay rise on the strength of this. Yet, none of these events are supported by a corresponding cash inflow.

There is also the vexed question of inflation in historical cost accounts. We all know that price level changes distort financial ratios because revenue flows are valued at different times and by different amounts, relative to assets, costs and expenses. Even the cash figures will be at different values to those used for reporting sales over the period.

Finally, not only are accounting profitability and cash flow liquidity different concepts, they can also move in different directions. Many decisions to improve profitability may have an adverse effect on liquidity and *vice versa*. One obvious example is fixed asset investment, which compromises current debt-paying ability. Another is a build up of liquid assets as interest rates fall. To return to the previous Chapter's theoretical proposition:

> The normative objective of efficient working capital management should be to *minimise* current assets and *maximise* current liabilities (underpinned by the terms of sale to debtors and creditors) subject to the constraint of maintaining a sound liquidity position, which also maximises opportunities for fixed asset investment.

Unfortunately, even with access to the cash flow information that satisfies this objective, it is debatable whether creditors would tolerate the firm it supplies receiving payment from customers before they are paid (revealed by turnover ratios). Debtors too, may take their trade elsewhere. Much depends upon the bargaining positions of suppliers and customers relative to the company concerned, the nature of competition and state of the economy.

Disparities between *internal* cash flow and *reported* accounting profit explain why companies are mindful of external user attitudes and choose favourable publication dates for their accounts.

When balancing profitability, solvency and liquidity, *window dressing* can also come into play before companies publish their accounts. Because conventional wisdom dictates that external users feel comfortable with current asset ratios of 2:1 and liquidity ratios in excess of 1:1, levels of inventory, cash and marketable securities can be temporarily adjusted by management. Creditors may be repaid early and overdraft facilities reviewed. Even dividend and investment policies can be modified. In this way, the "true" internal working capital position during the preceding period can be disguised by legitimate *creative* accounting techniques to confound its year-end interpretation by external users.

For those outside the firm (looking in) the relationship between a company's operating and financial cycles also becomes more problematical if it is a *manufacturer*, rather than a *trader* (like the firm analysed in our previous Chapter's Review Activity).

If you refer back to Chapter Two (Figure 2.2) and Chapter Four (Figure 4.1) we observed that the net operating cycle for a manufacturing company is not simply the comparatively short period of time taken by a trading company to sell products or services *bought in*. It is the extended period between expenditure on raw materials, work in progress, finished goods and the eventual receipt of cash (which includes the period of credit granted to customers) less the time taken to pay suppliers.

Apart from the high degree of estimation associated with the fact that company accounts may be based on historical cost (which weakens their analysis) from a regulatory perspective, there may also be no legal requirement to publish detailed categories of inventory, such as investment in raw materials and work in progress, nor provide purchase figures.

Activity 1 **Kraftwork plc (£million)**			
	Year One	**Year Two**	**Average**
Raw material purchases	85.0	90.2	87.6
Cost of goods sold	125.0	140.0	132.5
Sales	136.0	156.0	146.0
Raw material inventory	18.0	20.4	19.2
Work in progress inventory	12.5	14.5	13.5
Finished goods inventory	10.0	15.0	12.5
Debtors	26.5	29.5	28.0
Creditors	11.0	13.0	12.0

Let us assume that as a basis for analysis, we have access to all the managerial data, including categories of inventory and raw material purchases, contained in the table above for Kraftwork plc.

(a) Using a traditional working capital approach, summarise the company's position one year to the next.
(b) Reformulate the data to produce *average* turnover ratios and tabulate the company's *average* operating, financing and net operating cycles.
(c) Comment briefly on your results.

(a) Working Capital

The first points to note are that current assets are significantly higher than current liabilities in both years, so that on *average* the firm remains theoretically solvent. Comparing one year to the next, net working capital (current assets minus current liabilities) has also risen from £56 million to £66.4 million.

(b) The Working Capital Cycles

Kraftwork plc: The Working Capital Cycles

OPERATING CYCLE (days)						
1.	Raw Material Turnover	=	average value of raw material inventory / daily raw material purchases	19.2 / 0.24	=	80
2.	Production Cycle	=	average value of work in progress / daily average cost of goods sold	13.5 / 0.363	=	37
3.	Finished Goods Turnover	=	average value of finished goods / daily average cost of goods sold	12.5 / 0.363	=	34
4.	Customers' Credit Period	=	average value of debtors / daily average sales	28 / 0.4	=	70
	TOTAL (Days)					221
FINANCING CYCLE (days)						
5.	Suppliers' Credit Period	=	average value of creditors / daily average sales	12 / 0.24	=	50
NET OPERATING CYCLE (days)						171

Using the formulation explained in Chapter Four (Figure 4.1) we can transform the *annual* accounting data for Kraftwork to reveal an *average* operating cycle well in excess of its corresponding financing cycle. The average, *net* operating cycle, expressed in days itemised above, is obtained by calculating the arithmetic means of the respective turnover ratios for each year and subtracting the creditor figure from inventories plus debtors.

(c) The Interpretation

The net operating cycle confirms the firm's overall working capital position. Kraftwork remains theoretically solvent. However, because the *turnover* ratios that define the working capital cycles are based on *annual* data, they have been distorted by all the variations in current assets and liabilities, which have occurred from one period to the next. So, each component requires further investigation.

The *periodic* increase in net working capital may be justified and interpreted as an indicator of financial strength. Particularly because it is accompanied by an increase in sales and a proportionately greater increase in gross profit (measured by sales less cost of goods sold).

On the other hand, perhaps there have still been missed opportunities for economies of scale. All aspects of stock turnover should have been increased, debtor policies tightened, and the period of credit granted by suppliers extended, subject to no loss of goodwill.

Unfortunately, only internal management has access to this *qualitative* information, leaving external users of accounts with a *quantitative* analysis of the financial data that the company chooses to provide.

5.3 The Credit Related Funds System

The operating cycle defines the period taken to convert assets to cash for a particular level of demand. It provides us with a basis for calculating the amount and timing of a firm's working capital requirements relative to its financing cycle over a given period.

Whilst at any point in time there may be a number of operating cycles, all at different stages of completion, initial finance will only be needed for raw materials. As wages and other conversion costs are incurred to support production, and materials are replenished, the amount will increase. The ongoing costs of holding finished goods, selling on credit, plus the need for precautionary cash balances associated with fluctuating demand and bad debt loss must also be considered.

On the financing side, the firm will need to borrow, in order to sustain production before cash is received from customers. This too, entails a cost that is tied to the volume, structure and duration of the operating cycle. The longer the cycle, the more financial resources the firm needs. The optimal level of working capital is, therefore, an amount that does not strain liquidity, but results in no cash surplus.

In an ideal world, where the supply of stocks is perfectly elastic, a firm would hold no inventory (as just-in-time philosophy dictates). Faced with the choice, it would sell on a cash basis, rather than credit. Cash itself would not be kept idle, but utilised to finance fixed asset investment, redeem debt, or returned to the shareholders in the form of dividends.

In contrast, the extent to which current liabilities represent a low cost source of finance means that a firm would maximise creditors compatible with its debt paying ability and financial needs. As a consequence, in an ideal world, it would hold no current assets but finance at least part of its activities *via* the short end of the market (*i.e.* current liabilities).

Real world considerations may alter this precise situation. Nevertheless, the rational, wealth maximising firm should still strive to minimise current assets and maximise current liabilities. As we have stated elsewhere throughout the text, given sales and cost considerations, the objectives of working capital management are two-fold:

- The determination of optimum (i.e. minimum) investments in inventory, debtors and cash.
- The acquisition of an optimum (i.e. maximum but least-cost) balance of finance.

Subject to the constraint of maintaining a sound liquidity position that also maximises opportunities for fixed asset investment, the net inflow of cash will be maximised, thereby satisfying the normative expected net present value (NPV) criteria of financial management.

5.4 Summary and Conclusions

It is important to realise that corporate cash flows are ultimately the product of sales resulting in cash received, or a claim to cash from debtors. Hence, the maximisation of net cash inflows may be achieved by raising the level of sales but not necessarily reducing the level of debtors.

Since there is little point in offering trade credit if the aim is not to generate sales, the extent to which most firms actually sell on credit suggests that the credit function should occupy a pivotal position in working capital management. As a corollary, (contrary to the balance of literature on the subject) other items such as inventories, creditors, securities and cash should be regarded as entirely subordinate.

Unfortunately, one reason that must be ascribed to a build up of debtors in any economy is the traditional indifference with which credit policy in general and credit terms in particular have been regarded by academia and the literature. As a result, recommendations for improved methods of controlling investment in debtors invariably underline the amount of credit to be granted and standard collection procedures but treat the terms of sale as given.

In practice, of course, the terms of sale are frequently *given* in the sense that they are often based on custom or tend to be invariant over time and thus represent an institutionalised aspect of management. In principle, however, this should not go unchallenged, since it is neither rational (customary terms are rarely if ever appraised in terms of their operationally or optimum design) nor is it universally upheld. Indeed if a firm is unique with respect to its production function, access to capital markets, class of customer and so on, its terms of sale may also be unique. Consequently, credit terms need not be just a precondition of trade, which determine an arbitrary investment in debtors.

On the contrary, as we shall discover in Part Three, they should be viewed as a potentially powerful component of a firm's *marketing strategy* which, when skilfully utilised, can directly influence demand, determine a firm's working capital requirements and materially enhance future profitability.

Part Three:
Strategic Debtor Investment

6 The Effective Credit Price and Decision to Discount

6.1 Introduction

Our analysis so far, has:

- Distinguished between the *internal* working capital management function and an *external* interpretation of a firm's working capital position, revealed by its published accounts,
- Explained the significance of a company's working capital *operating* cycle and *financing* cycle derived from published data and analysed the inter-relationship between the two, namely its *net* operating cycle,
- Defined the *dynamics* of a company's credit-related funds system and the *pivotal* role of its terms of sale, as a basis for efficient working capital management.

Throughout the remainder of the text we shall:

- Explain how the terms of sale (represented by the credit period, cash discount and discount period) underpin the credit related funds system and determine the demand for a firm's goods and services,
- Evaluate the impact of alternative credit policies on the revenues and costs which are associated with a capital budgeting decision,
- Compare the disparities between the theory and practice of working capital management, given our fundamental normative assumption that firms should maximise wealth.

6.2 The Effective Credit Price

If we assume that the availability of trade credit is designed to generate profitable sales, the impact of credit terms is best demonstrated by the influence they can exert on the demand for a firm's goods and services. To illustrate, let us consider a firm that sells products at a cash price (P) but also allows its customers (T) days in which to pay. This means that during the credit period the customer has the opportunity to use the firm's funds at no explicit cost. Their value is therefore best measured by the interest rate at which customers can obtain funds from elsewhere to finance their purchases.

For the moment let us simply denote this *opportunity cost of capital* by the annual rate (r). We can then translate the benefit of trade credit to the customer who buys on credit into an *effective price reduction*.

$$(8) \qquad P \ \frac{rT}{365}$$

In turn, this can be deducted from the amount (P) that is paid at the end of the credit period to yield the present value (PV) of that amount according to the customer's opportunity rate (r). This *effective credit price* (P') is defined as follows:

$$(9) \qquad P' = P \left(1 - \frac{rT}{365}\right)$$

Activity 1

Consider a firm that offers goods for sale at $100 with 30 days credit to a customer with an annual opportunity cost of capital equal to 18%.

Calculate the effective credit price.

Using Equation (9) we can define:

$$P' = 100 \left(1 - \frac{0.18 \times 30}{365}\right)$$

$$= 100 (1 - 0.015) \quad = \quad \underline{\$98.50}$$

Hence, the price reduction associated with the credit period, defined by Equation (8) is $1.50.

Clearly, an effective credit price P' may differ from customer to customer, since it depends upon their own opportunity cost of capital rate that may be unique. However, we can discern three significant points.

Credit customers with *positive* opportunity rates will experience an effective price reduction.

The longer the period of credit, the greater that price reduction will be.

In the presence of uniform credit terms, the buyer with the highest opportunity rate will experience the greatest price reduction

Expressed mathematically:

$$P_1' < P_2' < P$$
$$\text{for: } r > 0, T > 0$$
$$\text{given: } T_1 > T_2, r_1 = r_2$$
$$r_1 > r_2, T_1 = T_2$$

So from the seller's perspective, the important points are whether:

Price relates to specific quantities demanded, and in particular whether lower prices relate to higher quantities or *vice versa*. If this is true, then it follows that the introduction of a credit period (or the extension of an existing one) can increase the demand for a firm's product.

6.3 The Effective Discount Price

Management not only has the choice of varying the credit period length (T) but also the option of offering a percentage cash discount (c) for immediate payment. For the seller this means the receipt of less money but earlier. For the buyer its availability provides a lower cash price P (1 - c) which is the same for all customers in the presence of uniform credit terms. Therefore, it differs from the effective credit price (P') which may be unique.

Of course in practice, it is more usual for the buyer of a firm's product at a price (P) to face terms of (c / t: T). For example (2/10:30) where:

(c) = the cash discount, (2%)
(t) = the discount period, (10 days)
(T) = the credit period, (30 days)

These terms provide alternative options to utilise the seller's funds during the discount period. Given the customer's annual opportunity cost of capital rate (r), we can translate the discount into an *effective price reduction*, which is equal to:

$$(10) \qquad P(1 - c)\frac{rt}{365}$$

In turn, we can deduct this from P (1 - c) which is the amount the customer actually pays at the end of the discount period. This represents the present value (PV) of that amount discounted at their opportunity rate. In other words, an *effective discount price* (P") equivalent to (P) on terms (c / t: T)

$$(11) \qquad P'' = P\left[(1-c) - \frac{rt}{365}(1 - c)\right]$$

Activity 2

Consider again the customer with an opportunity cost of capital rate of 18% per annum who is now offered terms of (2/10:30) on goods costing $100.

(a) Calculate the effective discount price.
(b) Should the buyer take the discount?

From Equation (11) we can calculate:

$$P'' = 100\left[(1 - 0.02) - \frac{0.18 \times 10}{365}(1 - 0.02)\right]$$

$$= 100\,[0.98 - (0.005 \times 0.98)]$$

$$= \$(98 - 0.49) = \underline{\$97.51}$$

You should be able to confirm that the buyer who rejects the credit period now benefits from an increased price reduction of $2.49 (comprising the $2.00 discount and 49 cents associated with the use of $98 at no explicit cost over ten days). So, they should rationally opt for the discount.

6.4 The Decision to Discount

Because (P") differs from (P') we now understand that under the conditions stated, the introduction of any cash discount into a firm's terms of sale will influence the demand for its product and working capital requirements. So, when formulating credit policy, management must consider the *division of sales* between discounting and non-discounting customers.

For any combination of credit policy variables, the buyer's decision to discount depends upon the cost of not taking it exceeding the *benefit*.

We have already established that the *annual benefit of trade credit* can be represented by the customer's annual opportunity cost of capital rate (r). Because the non-discounting customer delays payment by (T - t) days and foregoes a percentage (c), the *annual cost of trade credit* (k) to the non-discounting customer can be represented by:

$$(12) \qquad k = \frac{365}{(T - t)}\, c$$

Thus, if purchases are funded by borrowing at an opportunity rate (r) *less* than the annual cost of trade credit (k) such that:

$$(13) \qquad r < k = \frac{365}{(T - t)}\, c$$

The buyer will logically take the discount.

Equation (13) also confirms our preceding effective price decision where r =18 per cent with credit terms of (2/10:30) since:

$$18\% < \frac{365}{30\text{-}10}\ 2\% = \underline{36.5\%}$$

Of course, Equation (13) is extremely crude. When cash discounts are not taken, customers forego an amount (Pc) over the additional days (T - t). In other words, if the invoice price (P) equals $100 with terms of (2/10:30) then the "real" price is $98.

To continue with our example, if the firm does not remit payment within 10 days but delays for 30 days, it is effectively borrowing $98 and paying $2 interest for the loan by foregoing the 2% discount.

The rate of interest may be determined by solving for (i) in the following equation, (analogous to an IRR computation):

$$P\,(1 - c) = \frac{P}{(1 + i)}$$

Rearranging terms and simplifying:

$$(14)\quad i = \frac{c}{P(1 - c)}$$

$$= 0.0204, \text{ or } \underline{2.04\%}$$

However, this rate of interest only relates to (T - t) which equals 20 days.

The *annual* cost of trade credit (k) on a *simple interest* basis can be calculated by applying the following formula:

$$(15)\quad k = i\ \frac{365}{(T - t)}$$

For the above example:

$$k = \frac{0.02}{100 - 2} \times \frac{365}{30 - 10}$$

$$= 0.372, \text{ or } \underline{37.2\%}$$

Thus, the customer with an opportunity capital cost rate of 18% would still take the discount, since:

$$r < \frac{c}{(1-c)} \times \frac{365}{T-t}$$

As our example illustrates, opting for the credit period can prove expensive. We can also observe from Equation (12) onwards that:

> The annual cost of trade credit becomes greater, the larger the cash discount and the smaller the difference between the credit period and the discount period.

For example even modest changes to 3/10:30 or 2/10:20 significantly increase implicit costs to 56.4% and 74.46% respectively.

We should also note that the effective *annual percentage rate* (APR) is even higher than any *simple interest rate* that is given, because of the *compounding* effect. You may verify this by the familiar formula for an annual compound rate (k_a):

$$(16) \qquad k_a = \left[1 + \frac{k}{m}\right]^m - 1$$

This may be rewritten;

$$k_a = [1 + i]^m - 1$$

Where:

k = the annual rate of simple interest, (Equation 15)
m = the number of compounding periods per year, $\frac{365}{T - t}$

Thus, *using 360 days* to simplify the arithmetic, the annual interest of 36.72% becomes:

$$k_a = [1 + \frac{0.3672}{18}]^{18} - 1$$

$$= \underline{43.84\%}$$

Activity 3

Before we proceed, confirm that if the credit terms became (3/10:30) or (2/10:20) using *360 days:*

The annual costs of trade credit on an A.P.R basis are 73% and a staggering 107% respectively compared with simple interest of 55.67% and 73.47%.

Let us now *summarise the discounting decision within a framework of effective prices.*

- Any customer whose opportunity rate is *less* than the cost of trade credit will have an effective discount price that is *lower* than the effective credit price.
- A customer, whose cost of funds *exceeds* the cost of trade credit, will find the *largest* price reduction associated with the credit period.
- If management wishes to *increase* the demand for its products, cash discounts should be set to attract the marginal buyer with a *low* opportunity rate.
- Credit periods should be designed to attract the potential customer with a *high* rate, coupled with an acceptable credit rating.

For a customer with a relatively *low* opportunity rate, and hence a *high* effective credit price, a *small* discount would *lower* the effective discount price *below* the effective credit price. On the other hand, for a customer with a *high* opportunity rate, it could take a *large* discount to *lower* the effective discount price *below* the effective credit price.

All these factors pose an obvious dilemma for the financial manager. If decisions are taken to restructure the discount terms and credit period length simultaneously, their combined effects on profits may be difficult to unscramble. Individually, changes to either cash discount policy, or credit period, affect a number of variables.

Activity 4

Using the appropriate equations from our previous analysis, confirm that:

A change in the cash discount from (2/10:30) to (1/10:30) on goods marked at $100 halves the effective cost of credit to 18.25% and raises the discount price by $1.00.

A change in the credit period from (2/10:30) to (2/10:60) not only lengthens the delay in payment, thereby reducing the effective credit price received and paid, but also lowers the annual cost of trade credit from 36.5 per cent to 14.6 per cent.

For the purposes of analysis academics have long advocated that management should simplify the inter-relationships between credit policy variables by considering the credit period and discount policy separately. A common approach is to experiment with different credit policies using *sensitivity* analysis. For example, given a range of customer opportunity rates (k), the *decision to take the discount* for each buyer or class of buyers can be determined for different values of T, c and t by rearranging the terms of the following *inequality* derived from Equation (13) where k equals the annual cost of trade credit.

$$(17)\quad r < \frac{365}{(T - t)}\, c = k$$

In turn this yields:

$$T < t + \frac{365c}{r} \quad \text{given r, c and t}$$

$$c > \frac{r\,(T - t)}{365} \quad \text{given r, T and t}$$

$$t > T - \frac{365c}{r} \quad \text{given r, T and c}$$

Alternatively, using the following *indifference* equation, customers would be *indifferent* to any discount policy and the credit period if:

$$(18)\quad r = \frac{c}{(1 - c)} \times \frac{365}{(T - t)} = k$$

Activity 5

(a) Using Equation (18) confirm why a firm's customers with a 37.2% annual opportunity cost of capital rate (r) who are offered credit terms of (2/10:30) would be *indifferent* to its discount policy.
(b) Re-arrange Equation (18) to define *equivalent* indifference equations for T, c and t, respectively.
(c) If the company decided to revise its terms of sale, comment briefly on which credit policy variable, if any, should management alter first?

(a) Equation (18)

With T = 30 days, c = 2% and t = 10 days; customers with an annual opportunity rate of 37.2% will find that r is equivalent to their annual cost of trade credit (k = 37.2%). So, whether they take the cash discount at the end of the discount period, or opt for the credit period, is *financially irrelevant*.

(b) The Equivalent Indifference Equations

Rearranging terms and solving for the credit period, cash discount and discount period respectively

$$(19) \qquad T = t + \frac{365 \times \frac{c}{(1-c)}}{r}$$

$$(20) \qquad c = (1 - c) \times \frac{r\,(T - t)}{365}$$

$$(21) \qquad t = T - \frac{365 \times \frac{c}{(1-c)}}{r}$$

(c) The Revised Terms of Sale

As we noted earlier, customers with relatively high opportunity rates are more insensitive to changes in discount policy. If they are not to be an expensive concession for all, cash discounts for prompt payment should only be used to attract the potential cash buyer with a low opportunity rate. Consequently, management should only evaluate different cash discount policies once an *optimal* credit period is established.

Review Activity

There is one final point I would like you to consider (perhaps you've picked upon it already). This relates to the availability of trade credit in the *real world* (which we shall return to later when reviewing the empirical evidence).

The various terms of sale substituted into the previous series of equations for analysis were not chosen by accident, but by design. They conform to those offered by many "real" creditor firms. Historically, for example, (2/10:30) used in our previous Activity is not unusual in the UK. Yet, like all the preceding illustrations and Activities, it produces an extremely high value for the annual cost of trade credit relative to observable customer costs of borrowing at an opportunity rate (even if we go back to the 1970s where inflation was in double figures).

So, why don't debtors always opt for these discount terms?

I'll leave you to think about it.

6.5 Summary and Conclusions

We have explained how the terms of sale offered by a company to its customers can influence the demand for its goods and services. Mathematically, the present value (PV) time value of money concept reveals how the availability of credit periods and cash discounts for early payment provide customers with reductions in their cash price. Items bought on credit, therefore, create a utility in excess of their eventual purchase price, which can be measured by the debtors' opportunity to utilise this amount during the credit period, or discount period.

By conferring enhanced purchasing power upon its customers, a company's terms of sale should have true marketing significance. They represent an aspect of financial strategy whereby the creditor firm can translate *potential* demand into *actual* demand and increase its future profitability.

Future Chapters will confirm this view.

7 The Opportunity Cost of Capital and Credit Related Funds System

7.1 Introduction

Chapter Six explained how the terms of sale offered by a creditor firm to its customers represent a potent aspect of its financial and marketing strategies. The availability of either a credit period, or a cash discount for prompt payment, provides its clientele with an effective reduction in the cash price for goods sold determined by their annual opportunity cost of capital. So, if price is *inversely* related to demand, the availability of trade credit can *increase* turnover.

Because *individual* customer opportunity cost of capital rates (r) determine the creditor firm's *overall* effective price-demand function, the purpose of this Chapter is to outline how management can assign values to (r) before choosing their best combination of credit period and cash discount variables designed to maximise profit.

7.2 The Opportunity Cost of Capital Rate

Conceptually (r) is the annual cost of employing a value unit of capital in one use rather than another. We defined it earlier as the rate at which a buyer can raise funds from alternative sources, to finance their purchases. Theoretically, this rate should be determined for each customer trading with a creditor firm, subject to the benefits exceeding costs (*i.e*. the profit from sales should exceed the costs of analysis).

In practice, however, this exercise is unlikely to be undertaken if the firm deals with a multiplicity of customers. A shortage of published data and their shortcomings also makes it difficult, even if *average* cost of capital rates are estimated as a proxy for customer's *marginal* opportunity rates at the time of sale, which are clearly more appropriate.

It is not sufficient to calculate customer opportunity rates using *historic* earnings per share (EPS), dividends paid to shareholders and actual interest on borrowings revealed by their financial accounts, or even their corresponding *current* yields in the financial press. Debtor firms also finance their operations by obtaining funds from a variety of sources at an *implicit* or opportunity cost, rather than any *explicit* cost. By definition, these should be included in the *overall* cost of capital calculation because they relate to funds which firms have at their disposal in order to generate output. Such items include retained earnings, trade credit granted by suppliers, as well as any delay in corporate tax payments, without which, firms would presumably have to raise finance elsewhere. In addition, there are implicit costs associated with depreciation and other non-cash expenses. These too, represent funds retained in a business, which are available for reinvestment.

For most creditor firms, the calculation of any customer's opportunity cost of capital rate (r) is formidable. Especially, if we consider that the fund proportions obtained from various sources are typically a combination of policy, convention and historical accident, which will differ from customer to customer and constantly change over time.

However the problem is not insoluble. It can be overcome by determining a *range of assumed values* for (r) from which *one rate*, premised on market intelligence and financial analysis is considered more appropriate for a particular buyer, or even class of buyers.

One definition of (r) that readily springs to mind is the *minimum* rate at which firms can borrow. This is commonly the rate charged on bank advances which, of course, varies over time. The justification for setting the minimum value at this low level is twofold.

- Firms can often borrow at rates close to this figure but rarely below it.
- In the absence of risk, rational management seeking to maximise money profits should employ capital if its *marginal* yield is at least equal to its *minimum* borrowing rate.

We can derive *higher* values of (r) from the interest rates at which firms can obtain funds from other sources such as the capital market, factoring organisations and so on. Alternatively, we can undertake the calculation of (r) by reference to industrial rates of return, either across all industry or preferably within the customer's own industry, both of which are distributed around the mean.

At the other end of the scale, since we are concerned with opportunity rates, an *upper* limit would be correctly estimated by the highest sectoral operating profit that can be earned on total assets (ROCE) irrespective of their use. However, this would represent an occasional surrogate only. What creditor firms require is a range of assumed values for (r), which is both readily available and of general applicability. Very high rates of return are the exception rather than the rule, occurring only under conditions of disequilibrium, or where there are peculiar social or institutional constraints on the mobility of capital.

Naturally, this range of opportunity rates would require periodic revision in the light of changing economic conditions, such as an increase in the minimum lending rate determined by government or Central Banks. Quite apart from this, the creditor firm would also have to estimate shifts in specific buyer opportunity rates. To ignore any of these capital cost movements would be tantamount to accepting the effective price-demand function for its products or services as a *constant*, which defeats the whole object of the exercise and may be sub-optimal.

7.3 The Credit Related Fund System

How a firm actually chooses the best combination of credit policy variables once a range of customer opportunity rates are established is also a managerial decision where the net benefits are difficult to quantify.

By creating a unique level of demand, a change in either the credit period or cash discount policy results in a unique structure of costs and revenues, associated with sales turnover.

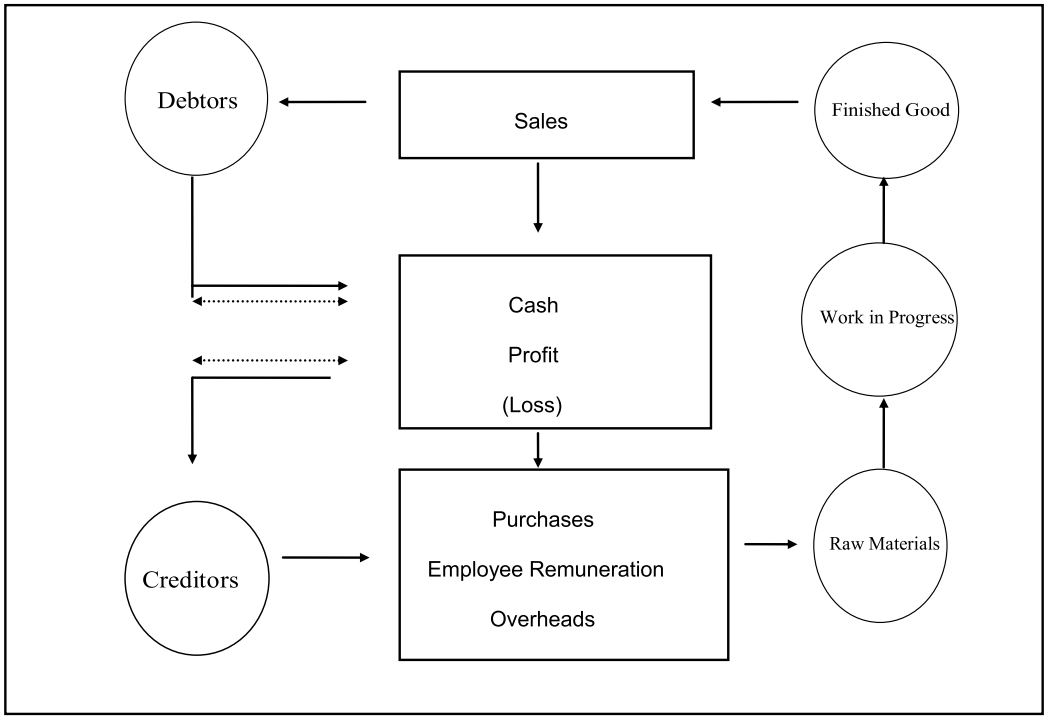

Figure 7.1: The Structure and Flow of Working Capital

On the *operational* side, if you refer back to Figure 2.2 (reproduced in Figure 7.1) and the commentary in Chapter Two, you will recall that longer credit periods increase finished goods outflows to sustain demand. These increase production in previous periods (work in progress) that earlier still determines the raw material purchases, financed by creditors to support that production. In current and future periods there are also increased investments in debtors. Consequently, more cash is committed to production and the inflow of cash is delayed longer.

Cash inflows are further offset by the additional ongoing costs of credit investigation, billing and collection. In the presence of collection risk, there is also the possibility of unauthorised delays in payment and bad debt losses. These inject uncertainty into the timing and amount of the firm's cash inflows, which leads to a need for precautionary cash balances at the anticipated time of collection.

On the *financing* side, the firm will need to support increased demand by borrowing. This also entails a cost that is inextricably tied to the volume, structure and duration of the cash outflows outlined above. As credit-related demand increases, finance must be acquired to support increased production, the costs of credit extension and precautionary cash balances. The longer credit period means more finance for longer, for each unit sold but carried on credit. Hence, their impact on the *inter-relationship* between the operating and financing cycles, summarised by the *net* operating cycle, which we worked through in Chapter Four (Figure 4.1) reproduced in Figure 7.2.

OPERATING CYCLE (days)

(i). Raw Material Turnover = Average value of raw material inventory / Daily raw material purchases

Plus

(ii). Production Cycle = Average value of work in progress / Daily average cost of sales

Plus

(iii). Finished Goods Turnover = Average value of finished goods / Daily average cost of sales

Plus

(iv). Customers' Credit Period = Average value of debtors / Daily average sales

Minus

FINANCING CYCLE (days)

Suppliers' Credit Period = Average value of creditors / Daily average purchases

Equals

NET OPERATING OR WORKING CAPITAL CYCLE (days)

Figure 7.2: The Working Capital Cycles

Within the context of the credit period, cash discount policies also exert their influence on a firm's investment and financing structure. For the seller they provide less money but earlier, to the extent that buyers take the discount. On the other hand, this reduction in cash inflow is offset by shorter operating cycles, which in turn result in lower financing costs. Consequently:

> A creditor firm's investment in current assets and other cash outflows related to its operating cycle, as well as the borrowing and associated cost required to sustain it, (the financing cycle) are a function of the credit terms that provided the demand in that cycle.

Each will have its own asset and financing requirements. This, in turn, will determine the firm's total investment and borrowing commitments, as well as their associated costs over some future period. We can view *multi-product* firms as consisting of many sets of operating cycles in operation at a given point in time, each with its own financing cycle. Optimal sets of credit terms determine the firm's total working capital needs and hence the availability and associated cost of such requirements.

7.4 The Development of Theory

Given the severe limitations of an *external* accounting interpretation of working capital (using ratio analysis explained in previous Chapters) compared to the complexities of its *internal* financial management outlined above, it may surprise you to learn that:

The credit related funds system (first discussed in Chapter Five) and the pivotal role of credit terms are frequently overlooked on taught academic and professional courses world wide.

Yet, like much else in finance, the underlying theories and how to model them have a long history, which can be traced back to the "golden era" of American research and literature in the 1960s and 1970s.

As far back as 1969, Wrightsman derived *optimum* credit terms for a company's "accounts receivable" (*i.e.* debtors). He explained how a creditor firm can use a framework of *effective* prices to simplify the inter-relationships between the credit period and cash discount policy as separate variables (explained in Chapter Six).

Subsequent research, as far later as that by Gallinger and Ifflander (1986), suggested the use of *sensitivity* analysis (also explained in Chapter Six) to experiment with different credit policies, given a range of customer opportunity cost of capital rates.

The decision to take the discount for each buyer, or class of buyers, can be determined for different values of T, c and t. The terms of the following *inequality* derived from Equation (13) are simply rearranged to *solve* for the appropriate variable (where k equals the annual cost of trade credit).

$$(17) \quad r < \frac{365}{(T - t)} c = k$$

On the financing side, Tavis (1970) formulated the availability of short-term funds into a *linear programming* model. The *optimal* balances represented those sources of finance that result in the *minimum* cost of borrowing. The *coefficients* of the *objective function* are those which *minimise* the cost of short-term borrowing from each source. The coefficients in the constraint matrix relate the borrowing capacity to each fund's source and reflect the requirement that sources of funds must *equal* uses throughout the planning period.

Prior to this, C.C. Greer (1967) developed a profit maximisation model, based upon the *quality of debtors*, determined by the number of credit applications accepted by the creditor firm. Functional relationships were derived by linking the number of customers accepted to their credit rating. By *differentiating* the profit function with respect to the number of customers accepted and setting the expression equal to *zero*, he solved for the number of applicants that maximise profits.

Going back even further, Cyert, Davidson and Thompson (1962) had already applied *Markov Chains* to estimate the *probability* of a bad debt loss for a debtor at various future dates. Subsequently, Mao and Sarndal (1974) also examined the predictive accuracy of expected *bad debt ratios* for customers under varying degrees of *correlation* between default losses for such customers.

Picking up on these theoretical American studies, the first major survey of UK credit policies (independently mailed to both the Financial and Marketing Directors of 250 of the FT-SE top 1000 companies) compiled by the author of this text, revealed that the *dynamics* of a company's terms of sale should also have "marketing" significance.

> In order to increase the demand for its products a firm should design its credit periods to entice low effective price (high opportunity rate) buyers, whereas the cash discounts should be utilised to provide a lower cash price for those customers with low opportunity rates (Hill 1979).

Subsequent UK academic research confirmed this view. For example, Emery and Finnerty (1991) also observed that given the extent to which most firms sell on credit, the terms of sale should occupy a pivotal position in working capital management.

- A company's credit operations should be seen as more than the financing of current assets, which are *held* by the seller. Trade credit also finances a firm's markets in terms of goods and services sold and in the *possession* of the buyer.
- Credit management is the means whereby uncertain *potential* demand can be converted into *actual* demand.
- As such, it should not be the sole the responsibility of a firm's finance function.

Certainly, the view taken here is that:

> The credit function should involve the marketing process, which determines a firm's sales turnover and hence production, investment in inventories and the need for cash balances.
>
> The availability of trade credit is a *means to an end* designed to satisfy a firm's normative profit maximising *objective*. It should be a policy for which all executive financial management, irrespective of their functional divide, should be ultimately responsible.

7.5 Summary and Conclusions

To conclude our discussion, the true significance of the relationship between the modern credit function and traditional working capital analysis only emerges when placed in a historic theoretical context. Unfortunately, very little seems to have percolated into practice.

As we shall see later, a significant body of more recent *empirical* evidence continues to suggest that the role of trade credit as a fundamental determinant of working capital management has neither progressed as far as it might, nor been that successful.

Debtor policy should involve sales ledger personnel, production departments, budget teams, computer analysts, legal advisors and in particular sales and marketing. Yet, it has long been a financial matter (see Pike, Cheng and Chadwick, 1998). Only in a minority of cases does it even stand alone and command status. In fact, in many smaller companies it appears to be the part-time responsibility of a single individual. Not surprisingly, therefore, that many of the problems relating to credit management have long been a reflection of a separation of *authority from responsibility*, or alternatively *accountability from management*.

Even in many larger organisations, where there is a greater tendency for the sales and credit functions to be *horizontally* integrated, this is also a common dilemma. Here, aggressive marketing techniques may override financial credit considerations. The reverse rarely holds, (due to the lower esteem traditionally accorded to accounting, relative to sales and marketing).

As a result, increased turnover and the accompanying investment in debtors may be followed by bad debt loss, or reduced profitability. Antagonism may develop between management, even at executive level. Treated with indifference by the highest authority, it can then become an area where over-arching organisational objectives conflict and sub-optimisation inevitably follows.

The two functions, credit and sales, find themselves pulling in opposite directions, which provides a significant explanation for the financial disparity between liquidity and profitability (covered in previous Chapters) that the external users of published accounts subsequently find so difficult to unscramble.

7.6 Selected References

1. Wrightsman, D., "Optimal Credit Terms for Accounts Receivable", *Quarterly Review of Economics and Business*, Summer 1969.
2. Gallinger, G.W. and Ifflander, A.J., "Monitoring Accounts Receivable Using Variance Analysis", *Financial Management*, No 15, Winter 1986.
3. Tavis, L.A., "Finding the Best Credit Policy", *Business Horizons*, October 1970.
4. Greer, C.C., "The Optimal Credit Acceptance Policy", *Journal of Financial and Quantitative Analysis,* December 1967.
5. Cyert, R.M., Davidson, H.J., and Thompson, G.L., "Estimation of the Allowance for Doubtful Accounts by Markov Chains", *Management Science,* April 1962.
6. Mao, J.C.T. and Sarndal, C.E., "Controlling Risks in Accounts Receivable Management", *Journal of Business Finance and Accounting,* Autumn 1974.
7. Hill, R.A., "Terms of Sale Theory and Practice", *European Journal of Marketing,* Vol13, No. 8, 1979.
8. Emery, D.R. and Finnerty, J.D., *Principles of Finance*, (Chapters 25 and 26), Western Publishing Company, Germany 1991.
9. Pike, R., Cheng, N.S. and Chadwick, l., "Managing Trade Credit for Competitive Advantage", *CIMA Research Report,* May 1998.

8 The Strategic Impact of Alternative Credit Policies on Working Capital and Company Profitability

8.1 Introduction

If the creditor firm is to achieve its normative wealth maximising objectives, we must view working capital management generally and credit terms in particular as major profit-producing functions, rather than institutionalised or supportive areas of business finance. This, in turn, implies a model into which the firm's objectives have been incorporated.

The purpose of this Chapter is to reveal the dynamics of how management should choose an *optimum* combination of credit period and discount policy for each product, which ensures that their overall objectives are satisfied.

8.2 Effective Prices and the Creditor Firm

We can evaluate the incremental gains and losses associated with a creditor firm's terms of sale by using a framework of "effective" prices, which modifies the series of equations presented in Chapter Six. These began with the customers' *credit price* and *discount price* respectively:

$$(9) \qquad P' = P\left(1 - \frac{rT}{365}\right)$$

$$(11) \qquad P'' = P\left[(1-c) - \frac{rt}{365}(1 - c)\right]$$

Activity 1

Reconsider the data for Activity 2 in Chapter Six, where a firm offers goods for sale at a price (P) of $100 with credit terms (2/10:30). Assume that its opportunity cost of capital (r) is identical to that of its customers, namely 18%. But let us now assume that the profit margin on turnover is $20. In other words, the cost of sales (C) is $80).

Using all the above data, evaluate the effective credit and discount prices for the *creditor firm*. You may use *360 days* in the formulae to simplify the calculations.

First, we must define the cost of trade credit, which represents an investment in cost of sales (C) over the credit period:

$$(22) \qquad C\ \frac{rT}{365}$$

We then deduct this *opportunity loss* from the amount that is paid to the firm at the end of the period to yield the present value (PV) of that amount:

$$(23)\ P' = P - \left(C\ \frac{rT}{365}\right)$$

Using 360 days for simplicity, the effective credit price:

$$P' = 100 - \left[80 \times \frac{0.18 \times 30}{360}\right]$$

$$= 100 - 1.20 \quad = \quad \underline{\$\text{£}98.80}$$

With regard to *discount policy*, we first define the investment in inventory associated with the discount period:

$$(24) \qquad C\ \frac{rt}{365}$$

If we now deduct this from the discount price P (1 - c) to yield the effective discount price:

$$(25) \qquad P'' = P(1 - c) - C\,\frac{rt}{365}$$

Again, using 360 days:

$$P'' = 100(1 - 0.02) - \left[80 \times \frac{0.18 \times 10}{360}\right]$$

$$= 98 - 0.40 = \underline{\$97.60}$$

It is now clear that to offer a 30 day credit period and then provide a 2 per cent cash discount for payment within 10 days represents an *additional* price concession by the seller. Conversely, perhaps you recall from Chapter Six that this is precisely why the availability of the discount is too attractive to sacrifice for all buyers with similar financing costs.

Of course, in our original example, customers actually pay either effective credit or discount prices of $98.50 and $97.51 respectively. The different effective prices facing each party to the transaction of goods and services arise because we have substituted an *inventory* figure into Equations (23) and (25) for *price* in Equations (9) and (11). The cost of goods sold represents the seller's investment in working capital at the time the sale occurs. So, it is clearly the more appropriate measure for the creditor firm. Further adjustments could be made to the right-hand side of Equations (23) and (25), relating to the firm's investment in debtors between the date of sale and the eventual receipt of cash (but more of this later).

Of more immediate interest is the fact that the seller's decision to offer various discounts can also be analysed by modifying Equations (12) to (16) in Chapter Six (which defined the customer's annual cost of trade credit). For example, reformulating Equation (12) where (k) now equals the annual cost of *offering* (rather than *receiving*) discount terms, we can define:

$$(26) \quad k = \frac{365}{T-t}\,c$$

Reversing the logic of Chapter Six (a customer's perception of the *benefit* of discount policy) we now observe that the creditor firm *loses* the discount (c) by allowing customers to advance payment by (T - t) days.

If sales to non-discounting customers can be financed at a lower rate (r) than the annual cost of the discount represented by:

$$(27) \quad r < \frac{365}{T - t}\,c = k$$

The discount policy should not be implemented, unless it can profitably increase sales.

Returning to our Activity (using 360 days), Equation (27) confirms this view, which also corresponds to the range of effective prices calculated earlier and summarised in Table 8.1:

:

$$18\% < \frac{360}{30\text{-}10} \times 2\% = 36\%$$

Customer	Sales Price	Cost of Sales	Effective Price	Profit
Cash	100	80	100	20
Credit (30 days)	100	80	99.80	19.80
Discount (2/10)	98	80	97.60	17.60

Table 8.1: The Impact of Credit Terms on Sales Price ($)

8.3 Alternative Credit Policies, Working Capital Investment and Corporate

Profitability

For the purpose of exposition, the preceding analysis was kept deliberately simple. Although informative, it was *static* and only related to a *single* transaction. It revealed nothing concerning the *dynamic* impact of the terms of sale on overall demand and hence turnover, working capital and incremental profitability for a creditor firm. So, let us introduce these variables.

Consider a company that is motivated by the conviction that its long-term growth and profitability appear unlimited. In the short term it is only constrained by a predetermined output capacity beyond which prohibitive production costs arise. We shall also assume (not unreasonably) that in the short term, it has still not achieved full capacity working. The company's objective is to increase sales for its product to a point of maximum profit by introducing trade credit. Finally, let us assume that the physical volume of credit sales is a positive function of the terms of credit, and that its competitors will not react to any changes in the firm's credit policy.

Armed with knowledge of how prospective credit terms might influence demand, short term investments and the means of financing those investments; let us introduce a series of financial variables which the firm wishes to model:

The potential impact of trade credit is measured by determining that credit policy, which provides the highest post-tax profit (P) requiring the following estimates:

- Cash revenue (R) that includes collections from debtors ("accounts receivable") to use American parlance) plus cash sales obtained by the firm from alternative credit policies.
- Cash expenses (V)
- Investment (I) for each credit policy.

Given these estimates, plus the firm's own cost of capital (r) and the tax rate (b), we can establish the following *objective* function:

(28) $\text{Max } P = [(1 - b)(R - V)] - r(I)$

Suppose we now compare existing cash sales (A) with four feasible credit periods (B increasing through E) over a particular planning period.

To evaluate each policy and ascertain the net revenues from anticipated sales volume, the impact on debtors, revenues and expenses first needs to be established. Table 8.2 summarises assumed values for these variables, with supplementary notes on their derivation.

Credit Policy	Debtors	R Sales	V Acquisition Cost of Inventory	V Bad Debt Loss	V Operating cost	Net Revenues	Net Revenues after tax
A	0	120	84	0	24	12.0	6.0
B	10	240	168	0	42	30.0	15.0
C	25	300	210	0.6	50	39.4	19.7
D	42	340	238	2.6	57	42.4	21.2
E	60	360	252	5.0	60	43.0	21.5

Notes: Net revenues = (R - SV)
Acquisition cost of inventory = 70 per cent of selling price
Tax rate b = 50 per cent
Net revenues after tax = (1 - b) x Net revenues

Table 8.2: The Impact of Alternative Credit Policies on Revenue and Cost (£million)

We can see that each credit period results in a unique structure of costs and revenues. As the credit period lengthens, the firm produces additional sales because the effective price for each potential customer falls. Quantity demanded continues to increase as new customers are attracted in and existing ones buy more. Only when full capacity working is achieved does an incremental increase in the credit period fail to increase turnover.

Set against this benefit are the increasing costs of sales associated with extending the credit period. These are represented by production outflows required to acquire stocks, as well as operating costs. They include the holding and ordering costs of inventory, plus other expenses incurred both directly and indirectly in selling the firm's product.

For each credit period, the short term investments in each operating cycle over the planning period represent the optimal balances, given the anticipated demand in that cycle. So, in an "ideal world" if the supply of raw materials were perfectly *elastic* the firm would not plan to hold stocks. Similarly, as soon as cash was expected to be received from sales it would not be held idle, but committed to the expansion of production outlays, utilised to repay any borrowings, or even distributed to the owners provided the firm's precautionary needs were satisfied.

Table 8.3 illustrates the investment (I) required for each policy. Optimal cash investment in debtors is assumed to be 80 per cent of the corresponding debtor figure in Table 8.2. The 20 per cent difference is the profit that the investment produces. It is also assumed that the firm maintains 60 days of sales in inventory, *i.e.* increasing sales necessitates an increase in stocks.

Credit Policy	Cash Investment for debtors	Inventory Investment	Total Investment
A	0	14.0	14.0
B	8.0	28.0	36.0
C	20.0	35.0	55.0
D	33.6	39.6	73.2
E	48.0	42.0	90.0

Notes: Cash investment in debtors = 80 per cent of debtors, (from column 1, Table 8.2).
Investment in inventory = 60 days sales, *i.e.* the acquisition cost of inventory x 60/360 (from column 3, Table 8.2).

Table 8.3: Investment for Alternative Credit Policies (£ million)

Returning to our creditor firm's *objective* profit function represented by:

(28) Max P = [(1 - b) (R - V)] - r (I)

The remaining factor to consider is the creditor firm's cost of capital (r) which calibrates its *opportunity* cost of capital rate. Estimated correctly (r) represents the borrowing undertaken to finance the firm's optimal balances flowing from that combination of fund sources that minimise the total cost of borrowing over the planning period.

You should also note that subject to there being no loss of goodwill:

> Management should limit the outflow of cash to its own creditors to the extent that its *marginal* cost of capital at the time of repayment is expected to exceed that of the original fund source to be repaid.

Applying the logic of our previous framework of trade credit equations (bearing in mind that our firm is also a "customer") it should not take the discount but always opt for the credit period, if its suppliers offered credit terms of (c / t: T) whenever:

$$(29)\quad r > \frac{365}{T-t}\, c$$

Returning to our analysis, if we now assume that the firm's opportunity cost of capital rate (r) remains constant at 18 per cent, the net profit (P) associated with each credit policy can be calculated using Equation (28).

Credit Policy	(1-b) (R-V) Net Values	I Total Investment	r(I) Cost of Funds	P Net Profit
A	6.0	14.0	2.52	3.48
B	15.0	36.0	6.48	8.52
C	19.7	55.0	9.90	9.80
D	21.2	73.2	13.18	8.02
E	21.5	90.0	16.20	5.30

Notes: P = [(1 - b) (R - V)] - r(I).
r = 18 per cent.

Table 8.4: Net Profit for Alternative Credit Policies (£million)

As Table 8.4 reveals:

> - A *maximum* net profit (P) of £9.8 million is achieved by adopting credit policy C.
> - By definition this is the *optimum* policy, relative to those under consideration.

8.4 Summary and Conclusions

The preceding analysis provides a theoretical insight into how credit policy should underpin efficient "real world" working capital investment and hence overall cash profitability. Actual company's operations may be more sophisticated than the single product model presented here. But as we shall discover, academics have long maintained that there is no contention about its utility or applicability when placed in a wider context. The fundamental problem relates to the reluctance of creditor firms to depart from convention (notably standard industry terms and the conventional interpretation of financial accounts by external users) to improve their trading position.

With information on how sales vary with price (the demand function) multi-product firms can evaluate different combinations of credit periods and cash discount policies, by measuring their net benefit to each potential buyer in terms of an effective price reduction associated with their opportunity cost of capital.

The incorporation of cash discounts into the analysis present few problems. Management should model different discount terms within the context of different credit periods to attract the potential buyer whose effective price is relatively *high* due to a *low* opportunity rate.

To summarise our position:

> In order to increase the demand for its products, a firm should design its credit periods to entice low effective price (high opportunity rate) buyers, whereas the cash discounts should be utilised to provide a lower cash price for those customers with low opportunity rates.
>
> This would mean the receipt of less money but sooner. But set against this would be shorter operating cycles, and lower financing costs.
>
> Under the conditions stated, optimal credit terms would be that combination of credit period and discount policy, which maximised profits.

Part Four:
Summary and Conclusions

9 Empirical Evidence and Theoretical Review

9.1 Introduction

Looking back over forty years at the pivotal role of credit terms policy within the theory and practice of working capital management, the purpose of this Chapter is to produce a *selective* overview of empirical work conducted by academics, analysts and professional bodies.

To provide a sequential analysis within a defined macro-economic framework, most of the material is based on the UK literature with reference to the European Union (EU). Hopefully, on completion of this text, you will then pursue comparative research from your own country as a guide to further study.

9.2 The Theory

Part One of our text (like all others in the author's bookboon series) introduced the time-honoured *normative* objective of finance theory as a convenient benchmark for subsequent analysis and critique. Namely, that a company should *maximise* shareholder wealth using an NPV investment model that incorporates *optimum* financing, a combination of which *maximises* the net cash inflow of all its projects at *minimum* cost.

Within this overall strategy:

> Management's working capital objective should be to *maximise* current liabilities and *minimise* current assets *compatible* with their company's debt paying ability, based upon *future cash profitability* dictated by their *optimum* terms of sale.

Part Two defined working capital as an investment in current assets *irrespective* of their financing source. This definition questioned the accounting conventions of *solvency* and *liquidity* revealed by traditional Balance Sheet analyses.

We observed that if firms strive to maintain a *2:1* working capital ratio of current assets to current liabilities, supported by a "quick" asset ratio of *1:1*, these policies are likely to be *sub-optimal* relative to normative wealth maximisation criteria.

The point was proven by reference to the interrelationship between a firm's short-term *operating* and *financing* cycles in an *ideal* world, whereby:

Inventory is purchased on credit using "just in time" (JIT) inventory control techniques.

Finished goods are sold for cash on delivery (COD).

Cash surpluses do not lie idle, but are reinvested or distributed as a dividend.

So that:

The operating cycle (conversion of raw material to cash and its reinvestment or distribution) is shorter than the financing cycle (creditor turnover).

Part Three also departed company from conventional external Balance Sheet ratio analyses of a firm's operating and financing cycles to reveal why:

Optimum terms of sale determine an overall working capital structure, which comprises *optimum* investments in inventory, debtors, cash and creditors.

The incremental gains and losses associated with a creditor firm's terms of sale were evaluated within a framework of "effective" prices using the following equations from Chapter Six. These define the customers' *credit price* (P') and *discount price* (P") respectively:

$$(9) \qquad P' = P\left(1 - \frac{rT}{365}\right)$$

$$(11) \qquad P'' = P\left[(1-c) - \frac{rt}{365}(1 - c)\right]$$

Where buyers of a firm's product at a cash price (P) are offered terms of (c / t: T) such as (2/10:30):

(c) = the cash discount (2%)
(t) = the discount period (10 days)
(T) = the credit period (30 days)

Because (P') differs from (P") we analysed how the introduction of any cash discount into a firm's period of credit influences the demand for its product and working capital requirements. When formulating credit policy, management must therefore consider the *division of sales* between discounting and non-discounting customers.

For any combination of credit policy variables, the buyer's decision to discount depends upon the *cost* of not taking it exceeding the *benefit*.

The *annual benefit* of trade credit can be represented by the customer's *annual opportunity cost* of capital rate (r). Because non-discounting customers delay payment by (T - t) days and forego a percentage (c), their *annual cost of trade credit* (k) can be represented by:

$$(12)\quad k = \frac{365}{(T - t)}\, c$$

Thus, if purchases are financed by borrowing at an opportunity rate (r) that is *less* than the annual cost of trade credit (k) so that:

$$(13)\quad r < k = \frac{365}{(T - t)}\, c$$

The buyer will logically take the discount.

From the *seller's* perspective, we then confirmed that:

> To increase the demand for its products, a firm should design its credit periods to entice low effective price (*high* opportunity rate) buyers, whereas the cash discounts should be utilised to provide a lower cash price for those customers with *low* opportunity rates.

To summarise: with a COD price (P) on terms (c/t: T) and a customer opportunity rate (r), the *effective* price framework and discount decision can be expressed mathematically as follows:

Price	COD (P)	Credit Price (P')	Discount Price (P")
	P	P [1-(rT/ 365)]	P [(1-c) - (r t / 365) (1-c)]
Decision			
r < k = 365c / (T-t)		P′ > P″ < P	Take the discount
r > k = 365c / (T-t)		Opt for the credit period	P′ < P″ < P

9.3 The Empirical Evidence

Armed with these equations, Chapter Seven briefly introduced some early empiricism to support our theoretical exposition, which we shall now develop to complete our study.

The first major UK survey questionnaire of *large* companies (independently mailed to both the Finance and Marketing Directors of 250 of the FT-SE top 1000) was compiled by the author (Hill 1979) to evaluate the financial and marketing *dynamics* of their terms of sale.

With regard to the credit period, nearly sixty per cent of respondents asked for payment one month after the end of the month of invoice or delivery. A further 12 per cent of companies had 30 day terms. If we accept that most buyers interpret 30 day or monthly terms as meaning one month after the end of the month in which goods are delivered (and we assume that a typical transaction takes place in the middle of a calendar month) then during the 1970s the majority of UK credit terms were in the region of 45 days.

Turning to discount policy; the author's survey also reveals that the commonest discount terms in the UK were either 3¾ per cent for payment within seven days, or 2½ per cent for payment within one month. Using Equation (12) above, this confirms that typical costs of trade credit on a simple interest basis were:

$$k = \frac{365}{45 - 7} \times 3^{3}/_{4} = 36.0 \text{ per cent per annum for } (3^{3}/_{4} / 7{:}45) \text{ terms}$$

And:

$$k = \frac{365}{45 - 30} \times 2^{1}/_{2} = 60.8 \text{ per cent per annum for } (2^{1}/_{2} / 30{:}45) \text{ terms}$$

Of course, these calculations are "broad-brush" based on *average* credit policy variables. We should also note that like today, only a minority of UK companies offered discount facilities. Subsequent survey evidence confirmed the author's findings to be in the region of 20 per cent. The majority of firms without a discount policy frequently remarked that they wished to avoid the long-standing practice of customers taking discounts, irrespective of when they pay (see the British Chamber of Commerce survey by Lowrie 1994).

Nevertheless, the above calculations do suggest that when offered discounts to encourage early payment, they were set far too high. Even with inflation in double figures, no debtor company in the UK borrowed funds at anywhere near 36 per cent (let alone 61 per cent). Consequently, they represented an expensive price concession to all customers, which were not making a full contribution to the creditor firm's cash profitabity.

Not surprising, therefore, that the author's research also revealed that many companies who offered discount terms, particularly those experiencing cash flow problems, would have preferred to abandon them altogether. But as Goddard and Jay (1980 and 1981) and Heath (1983) also confirmed:

> Because credit policies such as (3¾ /7:45) and (2½ /30:45) were based on long-standing industry practice, rather than any rational response to changing economic conditions, a significant number of firm's were either unwilling, or unable, to reduce their discounts, or restructure the credit period, for fear of losing custom to competitors.

Turning to the *customers* of creditor companies, the high cost of trade credit (relative to the lower cost of borrowing at an opportunity rate to fund purchases) also leads us to ask why all debtor firms did not opt for discount terms. Picking up on the author's research, surveys continued to reveal two obvious answers.

- *Misunderstanding* concerning the calculation and size of discount incentives associated with the present value (PV) *time value of money* concept (which underpins all our previous analysis).
- *Insensitivity* of credit terms to *changing* economic conditions.

Throughout the 1970s and 1980s inflation and interest rates continued to vary, whilst discount terms remained static, thereby eroding their real value. Moreover, many debtor firms, experiencing cash flow difficulties in the face of economic adversity, had little choice to remit payment, not only beyond the discount period, but also well beyond the credit period.

And this introduces the most cogent explanation for the customer's failure to take a discount (even today in the UK, where inflation and interest rates are in single figures).

> Traditionally, many debtors *unilaterally* extend the legal credit period granted by their suppliers and then take the cash discount when they eventually pay.

If proof were needed, one simple measure is the disparity between credit periods *offered* and periods of credit *taken* as evidenced by debtor turnover ratios drawn from annual company accounts. Throughout the 1980s and 1990s UK surveys indicated that typical trade credit terms still conformed to 45 days. However, the actual repayment period remained substantially higher.

In successive European surveys of small and medium sized firms, Grant Thornton and Business Strategies revealed an EU average of 65 days. The Association of British Factors and Discounters (AFBD) regularly quoted an annual debtor turnover in the region of 60 days for members and a UK average of about 80 days. (see Lowrie, *op. cit.*). Of course, as we observed earlier, these figures are still *average* collection periods, which make their detailed interpretation difficult, a point confirmed by Ridley (1993). Some customers, (presumably high-risk, with high opportunity borrowing costs) actually deferred payment well beyond 100 days.

Activity 1

Assume the discount terms offered by your two suppliers are 3¾ per cent for payment within seven days, or 2½ per cent for payment within one month, respectively. However, if you opt for the credit period, both companies require payment after 45 days.

Use Equation (12) to confirm the *legitimate* annual cost of trade credit from both your suppliers.

Suppose you always choose not to take the discount but delay payment well beyond the legal credit period. Substitute 100 days for 45 days into the previous calculations and briefly explain the financial implications.

Using Equation (12) the *legitimate* costs of trade credit on a simple interest basis are, respectively:

$$k = \frac{365}{45 - 7} \times 3\,{}^{3}/_{4} = 36.0 \text{ per cent per annum for } (3^{3}/_{4} / 7{:}45) \text{ terms.}$$

$$k = \frac{365}{45 - 30} \times 2\,{}^{1}/_{2} = 60.8 \text{ per cent per annum for } (2^{1}/_{2} / 30{:}45) \text{ terms.}$$

If 100 days are substituted into either terms of sale already mentioned, the effect is to reduce the cost of trade credit to a more realistic level, relative to any likely customer opportunity cost of capital rates (their cost of borrowing).

The annual cost of not taking a discount on a simple interest basis becomes:

$$k = \frac{365}{100 - 7} \times 3\,¾ = 14.7 \text{ per cent compared with 36 per cent for } (3¾ / 7{:}\ 45) \text{ terms.}$$

And

$$k = \frac{365}{100 - 30} \times 2\,½ = 13 \text{ per cent compared with 60.8 per cent for } (2½ / 30{:}\ 45) \text{ terms.}$$

For all customers with opportunity cost of capital rates greater than zero, deferring payment for 100 days, rather than 45 days, produces larger effective price reductions associated with the credit period. This means lower effective credit prices, with the lowest prices corresponding to the highest rates and *vice versa*.

The Countervailing Power of Firm's Size

The previous Activity also reveals why customer *gains* from paying late translate into supplier's *losses* that may be catastrophic. The "true" value of a creditor's cash inflows are determined by whenever (or if ever) payments are eventually received (the opportunity cost and time value of money concepts again).

An early significant survey by the Insolvency Practitioners Society (CIMA, 1994) revealed that 20 per cent of all UK corporate failures (the vast majority of which are small firms) were due to late payments and bad debts associated with poor credit management practice.

One obvious solution for any creditor firm (large or small) confronted with delayed payments, or bad debt loss, therefore, is to revise their collection procedures, even if it means lower demand, or losing custom to competitors.

The 1981 survey by Goddard and Jay (*op.cit.*) of 87 UK companies engaged in textiles and electronic engineering revealed that 52 respondents (59.8 per cent) had tightened collection periods, with no adverse effects. Similarly, Peel and Wilson (1996) in their survey of working capital practices among 84 UK firms in the small sector (defined as a maximum of 50 employees) reported that 68.3 per cent of respondents had recently reduced their debtors' average credit period. This sub-sample was also more likely to review the declared terms of sale (including cash discounts), as well as their policies for bad debts, doubtful debts and customer credit risk.

However, since the millennium stock market crash, the ability of small scale creditor firms to dictate their terms of sale to preserve cash flow seems more constrained. Surveys by Wilson and Summers (2002) and Huyghebaert (2006) noted that start-up companies and small firms need to *conform* to the industry norms of established and major players, simply to survive.

UK evidence also suggests that large creditor firms can always dictate their terms of trade to smaller suppliers with impunity. Since 2003, the small firm lobbying group *Forum of Private Business*, regularly "names and shames" high profile FT-SE companies that make retrospective changes to payment terms to squeeze their suppliers. In 2010 for example, Boots, Carlsberg UK and Molson Coors (among others) extended their credit periods to a massive 105, 95 and 90 days, respectively. In Carlsberg's case, the "95 days" was even longer, since it began from the "end of the month of the date of invoice". In late 2012, the UK press highlighted the Forum's findings, notably that Sainsbury and Dell Inc. had increased their credit periods from 30 to 75 days and 50 to 65 days respectively.

On the other hand, it is worth noting the academic survey by Cheng and Pike (2003) who set out to observe whether variations in credit policies and debtor turnover in *large* UK companies were more dynamic than their small scale counterparts. Their results were inconclusive. Sometimes they were and sometimes they were not. But then not all Finance Directors of even the largest companies are always "on the ball", as evidenced by the 2007 global meltdown.

Whatever the truth of the matter, it seems reasonable to assume that a firm's size should be a major determinant of its ability to exploit its trading position. For example, the 2011 annual report by *Basware* (the Finnish software solution company) into the opinions and priorities of 550 CFOs and Finance Directors across the world revealed that:

> 28 per cent of respondents wished to increase their supplier base, in order to take advantage of increased competition and then delay payment to creditors. The report also confirmed that large companies always expect to pay late when times are tough.

Of course, such policies exhibit *short-termism* that may be counterproductive, not only damaging small suppliers, but also the economy as a whole. There may be a "domino" effect. If large companies at the top of the supply chain don't pay on time, it might break. So, smaller creditors go into liquidation, thereby reducing competition, which defeats the whole point of the exercise.

Activity 2

In the third quarter of 2011 (with inflation below 5 per cent and the Bank of England *base rate* only 0.5 per cent) the global credit-risk management company *Experian* reported the average time taken by UK debtors to remit payment was 26 days beyond a typical 30 day period of credit granted.

- How do these figures compare with earlier empirical research from the last millennium?
- Can you offer any rational explanation for their similarity?

Let us accept (as earlier) that most buyers interpret 30 days as meaning one month after the end of the month in which goods are delivered (and we assume that a typical transaction takes place in the middle of a calendar month). Then just like the 1970s and beyond, the majority of UK credit terms are still in the region of 45 days.

If we now reformulate the *Experian* data (where debtors remit payment 26 days beyond 45 days) the average collection period in the UK for 2011 conforms to 71 days, which fits neatly into the earlier empirical data: so why the similarities?

The first point to note is that the average sanctioned credit period still conforms to a norm for the 1970s and 1980s when inflation and borrowing rates were in double figures and sometimes spiralling out of control. It, therefore, confirms our earlier view that within the financial community there must be:

Insensitivity of credit terms to *changing* economic conditions.

Of course today's inflation and interest rates may be extremely low, relative to the previous millennium. But with the 2007 global financial meltdown, ongoing banking crises and euro debacle, it is understandable why many debtor firms experiencing cash flow difficulties in the face of economic adversity still have little choice but to remit payment well beyond the credit period. As the Experian report reveals, with restricted borrowing opportunities, trade credit remains more important than bank lending, particularly for small companies.

9.4 Late Payment and the Case for Legislation

Irrespective of the reasons we ascribe to a build-up of debtors and working capital investment in any economy, it seems reasonable to conclude that:

- Historically, creditor firms have set discounts to entice all customers to pay cash, including those with high opportunity rates.

Faced with cash shortage and ineffectual collection procedures:

- Many customers who forego the discount offset the resultant cost (or where discounts are not offered, increase the benefit of trade credit) by unilaterally extending the payment period.

Unfortunately, both strategies have two unfortunate effects.

- They perpetuate the myth that customers who do not take cash discounts, or pay late, are poor credit risks.
- Where collection policies are lax, this may be financially sub-optimal.

The consequential costs of credit mismanagement obviously represent a significant drain on working capital throughout the economy. But without detailed internal information on corporate cash flows and the firm's opportunity cost of capital this is impossible to quantify.

To resolve the dilemma, we can therefore make a strong case for government intervention and legislation to encourage a cultural change, so that paying late is unacceptable.

The UK first introduced late payment rules for charging interest on overdue company accounts into law, way back in 1998. This was reinforced in 2002 by a European Union (EU) Late Payment Directive, which created a statutory right to interest 30 days after the date of invoice. In 2011, the UK government also announced that in 2012 it would fast track the introduction of a revised EU Late Payment Directive, scheduled for implementation by other Member States in March 2013.

This new legislation not only increases the right to interest on overdue accounts, but also *harmonises* standard payment terms throughout the EU for the first time. The Directive sets *30 days as standard terms* for all public and private entities. These can be extended to 60 days when suppliers have specifically agreed to provide customers with this facility. The late payment rules now allow companies to charge 8 per cent interest on overdue accounts, as well as a minimum 40 euro administrative fee per invoice to recover bad debts. In the UK the government has been even more generous. It allows companies to add the Bank of England base rate to the late payment percentage (0.5% at the time of publication) plus an administrative cost ranging from £40 to £100 per invoice.

So, how will the new Directive work?

Before and after the introduction of UK legislation in 1998, CIMA and other professional bodies, such as the ACCA, the CBI and the Institute of Credit Management (ICM) were unanimous in their belief that it harms the very companies the law is designed to assist.

- Small firms are crippled by statutory interest.
- Large companies with a stronger network of trading relations and sophisticated computerised accounting systems have the resources to either take their custom elsewhere, or turn the law to their advantage.

If proof be needed, since 1998 UK legislation has been little used by those who need it most. The senior partner to any credit agreement can usually dictate whatever terms they want within the law. And even change them retrospectively, by moving supply elsewhere at little cost. Remember the 2011 reports by the *Forum of Private Business* and *Basware* (*op.cit*) which revealed that large companies expect to pay late when times are tough.

The author's view is that *standardising* payment terms to *justify* charging interest on overdue debtor accounts may also be a remedy worse than the original disease. Neither are substitutes for the derivation of *optimum* terms of sale and *efficient* working capital management.

Review Activity

Technotronic (a small company) currently requires payment from customers by the month end after the month of delivery (45 days). On average, it takes debtors 87 days to pay. Sales amount to £2 million per year and bad debts are £40,000 per year.

The company plans to offer customers a cash discount of 2 per cent for payment within 30 days. Management estimate that 50 per cent of customers will accept this facility. But the remainder will not pay until 80 days after the sale.

At present Technotronic has an overdraft facility costing 10 per cent per annum. However, if the plan goes ahead, bad debts will fall to £20,000 per annum. There will also be credit administration savings of £10,000 per annum.

Using all this information:

Advise Technotronic as to whether it should offer the new credit terms to customers.

Initial points to note

- Theoretically, the purpose of a credit period is to offer customers a source of finance at no explicit cost as an inducement to purchase, thereby increasing the demand for a supplier's goods and services (and hence profit).
- Alternatively, the customer may also be offered a cash discount for prompt payment.
- On the supply side, cash discounts mean the receipt of less money, but earlier. So, speedy payments should improve the creditor firm's net cash flow and hence liquidity.

The Advice

Given Technotronic's revised terms of sale (2/30:80) there is a *quantifiable* benefit for those customers who opt for the discount. On a simple interest basis, this can be measured by the *implicit* annual cost of trade credit if they opt for the credit period. Recalling the cost of capital equation:

$$(12) \qquad k = \frac{365}{(T - t)} \, c$$

The annual cost of trade credit equals:

$$\frac{365}{80 - 30} \; 2\% \; = \; 14.6\%$$

So, if customers can finance their purchases by borrowing funds at an interest rate lower than 14.6% they should take the 30 day discount. Customers with higher opportunity cost of capital rates should opt for the credit period.

Assuming a 50–50 split between discounting and non-discounting customers, the question management must now ask themselves is how do terms of (2/30:80) benefit Technotronic?

The effects of the revised credit terms can be summarised as follows (£000):

Debtor Investment

Average debtors under the *present* regime:	(87/365) x £2m		477
Average debtors under the *proposed* regime:	50% x (30/365) x £2m	82	
	50% x (80/365) x £2m	219	
			301
Anticipated reduction in debtors:			176

Anticipated Savings and Costs

Finance:	(10% x £176,000)	17.6	
Bad Debts:	(£40,000 - £20,000)	20.0	
Administration	(given)	10.0	
			47.6
Discounts	(50% x 2% x £2m)		(20.0)
Net Saving			27.6

Thus, there is a potential £176,000 reduction in debtors and a cost saving (profit contribution) of £27,600 if Technotronic implements the new discount policy.

9.5 Summary and Conclusions

Our preceding study reveals why the traditional, accounting concepts of working capital are of limited use to external users of company accounts and internal financial management. It questions the long-standing rules that a firm should strive to maintain either a 2:1 current asset ratio, or a 1:1 "quick" asset ratio, as worthwhile solvency and liquidity criteria.

An optimal working capital position is the product of a delicate balance of revenues and costs, which may be unique for a particular company. Any *external* assessment of either credit worthiness, or the *internal* management of working capital, based on conventional notions of solvency and liquidity must be treated with suspicion. Otherwise, profits foregone by the creditor firm and its investors may be very great indeed.

We therefore explained and analysed why the terms of sale offered by a creditor firm to its customers on these assumptions represent potentially powerful *financial* and *marketing* components of its strategic objectives,

Like much else in normative finance, the *time value of money* and *opportunity cost* concepts dominated our critique. Present value (PV) analysis should determine a company's optimal working capital investment. But while all the *theoretical* implications of this fundamental concept have been fully developed, we observed that its *application* to contemporary working capital and credit management is deficient.

A number of significant points emerged, which you should note as a guide to further study.

1. Goods bought on credit create a utility in excess of their purchase price, best measured by the buyer's opportunity to utilise this amount during the period of credit.
2. By creating what is in effect a new form of purchasing power, trade credit therefore has "real" marketing significance.
3. Like advertising, the terms of sale are a means whereby the creditor firm can convert *potential* demand into *actual* demand for its products and services.
4. Conceived logically, credit policies should materially enhance future profitability.

However, remember, all this is not without cost.

5. For the seller, goods sold on credit represent a claim to cash. And cash has a value that is inversely related to the time period in which it is received.
6. Credit policies are also a key determinant of the structure and amount of a firm's working capital tied to the demand resulting from the extension of credit.
7. When a firm decides to sell on credit it should therefore ensure that the added benefit from this incremental investment exceeds the cost incurred.

Using the time value of money principle, we challenged the utility and fairness of credit terms currently on offer by many UK firms. Traditionally, large discounts confer unnecessary benefits on cash customers. They also force customers who do not take a discount to remit full payment well beyond the standard credit period.

And this introduced our most important empirical observation.

> Setting credit terms equal to those of competitors based on tradition ("satisficing" behaviour or negligent management) or the fear of departing from convention (perhaps to survive) is still a commonly expressed business policy.

Yet optimal terms of sale are the product of a delicate balance of parameter values explained throughout our text. They should maximise combined profit on output sold and credit extended to customers. They are also decidedly influenced by the firm's cost of funds. Moreover, if a firm is *unique* with respect to its revenue function, cost function, access to the capital market and class of customer, it will have a *unique* solution to its credit policy.

The two "rational" extremes (profit maximisation and survival) are not necessarily irreconcilable. For the purposes of exposition, we assumed that management should maximise cash profits in present value (PV) terms for the benefit of shareholders (the *agency* principle). However, companies pursue a variety of objectives that widen this neo-classical motive. These embrace different goals and different methods of operation, right across the business spectrum. Some dispense with the assumption that firms maximise anything. In fact, it is not unreasonable to assume in the small sector where objectives exist, it is likely that for a significant number of competing firms, survival not only takes precedence over wealth maximisation, but also satisficing behaviour. In such circumstances *conforming* credit terms may be all that are possible. Even in the case of an oligopoly (where large firms are expected to react to the policy changes of the major players) there may be no incentive to deviate from standard terms.

On the other hand, given the delicate balance of parameter values associated with different credit policies, the extent to which creditor firms may be avoiding the whole issue by relying on traditional "rules of thumb" or legislation suggests that in many industries today:

- Working capital policies are sub-optimal and the cost of this sub-optimality is very great indeed.
- Generous credit terms are offered to attract new customers. But credit vetting, control and vetting procedures are weak.
- The management of working capital (which should determine optimal investments in inventory, debtors and cash) lacks the clarity associated with capital budgeting decisions (based upon time value of money and opportunity cost concepts) and the maximisation of expected net present value;
- Small firms with limited access to a sophisticated capital market are restricted to traditional sources of short term finance, primarily trade creditors followed by reserves, bank overdraft facilities and in the extreme, deferred taxation;

The view taken here is that:

> The *normative* wealth maximising objective of strategic financial management should be equally applied to working capital and capital budgeting decisions, all underpinned by a company's optimum terms of sale.
>
> As a consequence, the expected cash return commensurate with the degree of risk associated with any investment in assets (whether fixed or current) should at least equal its associated cost of finance.

9.6 Selected References

1. Hill, R.A., "Terms of Sale Theory and Practice", *European Journal of Marketing,* Vol.13, No. 8, 1979.
2. "Small Firms Crippled by Late Payment", British Chamber of Commerce Survey (BCC), sponsored by Alex Lowrie, *Management Accounting,* May 1994.

3. Goddard, S. and Jay, S., "Medium Sized Companies and the Discount Trap", *Accountancy,* February 1980.
4. Goddard, S. and Jay, S., "Credit Management: BIM Foundation, Management Survey Report No. 52", *BIM Research and Publications Division, (London),* 1981.
5. Heath, J., "Summary Findings of a Survey of Credit Management Practices of Medium Sized UK Companies", *Control Data Business Advisors. (London)* September, 1983.
6. Ridley, J., "The Best Way to Report on Customer Receivables", *Management Accounting,* September 1993.
7. Peel, J. and Wilson, N., "Working Capital and Financial Management Practices in the Small Firm Sector", *International Small Business Journal,* Vol. 14, No. 2., 1996.
8. CIMA. "CIMA to Investigate Trade Credit Management", *CIMA Research Foundation Newsletter,* 4(11), 1994.
9. Wilson, N. and Summers, B., "Trade Credit Offered by Small Firms: Survey Evidence and Empirical Analysis". *Journal of Business Finance and Accounting,* April/May, 2002.
10. Huyghebaert, N., "On the Determinants and Dynamics of Trade Credit Use: Empirical Evidence from Business Start-ups", *Journal of Business Finance and Accounting,* Jan/March 2006.
11. "Late Payment – Hall of Shame", Forum of Private Business: www.fpb.org, 2003 to date.
12. Cheng, N.S. and Pike, R., "The Trade Credit Decision: Evidence of UK Firms", *Managerial and Decision Economics*, No. 24–7, 2003.
13. "The Cost of Control – Fuzzy Finance", Third Annual Report, www.basware.com, 2011.
14. "The Quarterly Benchmark Report", www.experian.com, October, 2011.
15. "The Late Payment of Commercial Debts (Interest) Act", UK, 1998.
16. "Late Payment", Directive 2000/35/EC, 2002.
17. "Late Payment", Directive2011/7/EU, 2013.