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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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1 An Overview

1.1 Introduction

For those familiar with my bookboon series (referenced at the end of this Chapter) we have consistently 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 commonly accepted *normative* objective of business finance, namely, *shareholder wealth maximisation*.

As we first observed in Chapter Two (Section 2.1) of "Strategic Financial Management" (2008) and most recently in the Introduction to "Working Capital Management: Theory and Strategy" (2013) 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 appraisal they are the province of *working capital management*, which lubricates the momentum of a project once it is accepted.

Having dealt comprehensively with capital budgeting and the pivotal role of working capital management elsewhere, the purpose of this study is to dig deeper into the working capital function. Our focus is its fundamental contribution to the supply and demand for a firm's products and services, which is frequently overlooked in theory and practice, namely:

> The *strategic* importance of debtor policy represented by a company's "terms of sale" (credit terms) as a determinant of optimum investment and financing decisions undertaken by management.

Following on from the author's examination of working capital (2013) cited above, our analysis of credit terms continues to question the logic of a conventional interpretation of published financial statements by many *external* users as a basis for *internal* managerial policy.

To summarise the various arguments from the previous text as a springboard for analysis:

A review of the accounting literature revealed that in order to portray a glowing picture of solvency, liquidity and financial strength to the outside world, management strives to record an excess of current assets over current liabilities in their latest Balance Sheet. With little else to quantify the analysis of a company's past or current financial performance let alone future plans (including analyst, press and media commentaries that are also drawn from the same data set) apart from rumour, speculation and "insider" information (which is illegal) the text observed that:

All external users, with the exception of the tax authorities, are poorly served by management's preparation of financial accounts for public consumption, since they are based on traditional accounting concepts, conventions and generally accepted accounting (GAAP) principles. And shareholders suffer the greatest indignity.

As the "owners of a going concern" they employ management to act on their behalf (the *agency* principle) in order to satisfy their wealth maximising objectives. But it is impossible to justify how the presentation of historical *ex post* records of stewardship can ever meet their informational requirements, particularly as a planning tool. For this they must turn to stock exchange data, which reveals nothing about a firm's working capital position. Moreover, in the event of liquidation (perhaps because creditors have imposed stricter terms and debtors fail to pay on time) shareholders are at the bottom of the financial food chain as "lenders of last resort".

Apart from external data limitations, we also observed that contrary to popular belief, an excess of current assets over current liabilities characterised by a 2:1 ratio is not necessarily an indicator of internal financial strength. We therefore concluded our analysis with a definitive theoretical proposition:

> Management's working capital objectives 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 *optimum* terms of sale.

1.2 Objectives of the Text

As we shall reveal by the end of this study, a company's terms of sale are the foundations upon which working capital management is constructed. Moreover, their policy implications should be justified by more transparent published annual reports communicated to the outside world.

For a creditor firm: the terms of sale offered to customers (credit period, cash discount and discount period) determine its sales turnover and hence working capital requirements (levels of inventory, debtors, cash and creditor balances). Properly conceived, they should be an integral component of management's overall marketing strategy designed to maximise profit, highlighted in project appraisal. Debtor (accounts receivable) policies should underpin the profitability of fixed asset investment, without straining liquidity or compromising a firm's future plans.

For a debtor firm: the availability of trade credit (their creditors) frequently represents the key to survival Small firms in particular (with little bargaining power and limited access to a sophisticated capital market) are often restricted to traditional sources of short term finance, primarily revenue reserves, bank overdraft facilities, creditors and in the extreme, deferred taxation. And for many, trade credit (dictated by their suppliers' terms of sale) is the most important source of funds (more so than bank lending).

This text assumes that you have *prior* knowledge of Financial Accounting, an ability to interpret corporate financial statements using conventional ratio analysis, as well as an appreciation of its limitations.

At the very least, you should be familiar with the following *glossary* of accounting 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.

Solvency: measured by the Working Capital (Current Asset) Ratio.

Liquidity: measured by the Quick Asset Ratio.

Current Asset and Liability Turnover: measured in its simplest form by ratios of sales to current assets and its components (inventory, debtor and cash) compared to creditor turnover.

If all this is unfamiliar, then I recommend downloading "Working Capital Management: Theory and Strategy" (2013) from the bookboon Business series as a supplementary reference. Throughout the remainder of this study, the Equations for each Chapter follow on sequentially from the above guide. They also correspond to the mathematics in the more comprehensive text "Working Capital and Strategic Debtor Management" (2013). So, you can reinforce your knowledge of working capital theory and practice from either source.

1.3 Outline of the Text

Whichever route you choose, on completion of this study you should be able to:

- Explain how the terms of sale (credit period, cash discount and discount period) affect the supply and demand for a firm's goods and services.
- Understand the impact of alternative credit policies on the revenues and costs associated with a capital budgeting decision.
- Appreciate the disparities between the theory and application of credit terms management from both a creditor and debtor firm's perspective, supported by wealth maximisation criteria and a review of the empirical evidence.

All the material is presented logically, using the time-honoured academic approach adopted across my bookboon series. Each Chapter begins with theory, followed by its application and an appropriate critique. From Chapter to Chapter, summaries are presented to reinforce the major points. Each Chapter contains *Activities* where appropriate, accompanied by indicative solutions to test understanding at *your own pace*.

Chapter Two initially considers how the terms of sale offered by a creditor firm to its customers are a form of *price competition*, which influences the demand for goods and services. Using the time value of money and opportunity cost of capital concepts within a theoretical framework of "effective" prices, we shall 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 create a *benefit* in excess of their eventual purchase price measured by the debtor firm's freedom to utilise this amount during the credit period (or discount period). By conferring enhanced purchasing power upon its customers, a creditor company's terms of sale are shown to have true "marketing" significance. They represent a financial strategy, whereby it can translate *potential* demand into *actual* demand and increase future profitability.

Chapter Three places our theoretical exposition of credit terms within a practical context by surveying the disparity between an *external* interpretation of a firm's working capital position and the *internal* working capital management function. As we shall discover:

- Efficient working capital management should be guided by *cash* profitability defined by the inter-relationship between a company's working capital *operating* and *financing* cycles.
- This conflicts with traditional definitions of solvency and liquidity based on generally accepted *accounting* principles (GAAP), concepts and conventions used by external users of published financial statements.
- An optimal working capital structure should reflect a balance of credit-related cash flows that may be unique to a particular company, which define the dynamics of its *credit-related funds system*.

Chapter Four analyses how *alternative credit policies* produce different levels of profit for the provider of goods and services (the creditor firm). However, the availability of trade credit is not without cost. Invoiced payments for accounts receivable, which are deferred or discounted, represent a cash claim with a value *inversely* related to the time period in which it is received.

So, when a company 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.

Chapter Five reviews the *empirical evidence* to explain why creditor firms still adhere to *standard industry* terms when so many debtor firms default. Given our critique of conventional working capital analysis compared to a theoretical framework of 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 conclusions:

- Credit policies are a key determinant of the structure, amount and duration of a firm's total working capital commitment tied to its effective price-demand function.
- 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 pital.

Review Activity

The Introduction to this Chapter suggested that without "insider" information, a conventional interpretation of working capital by external users of accounts, who can only access published financial statements (supplemented by analyst, press and media comment) reveals little about a company's "true" financial position, or managerial policy.

A company may record an *excess* of current assets over current liabilities in its latest Balance Sheet as an indicator of solvency, liquidity and financial strength. But this may be extremely misleading.

In an ideal world, 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.

Because the deficiency of published financial statements (working capital and otherwise) is a theme to which we shall return throughout the text:

Before we proceed it would be useful to test your knowledge of Financial Accounting by providing a critique of the *overall* limitations of published financial statements as a basis for interpreting all the data they contain.

An Indicative Outline Solution

The first point to note is that apart from cash items, dividends and tax liabilities, most data published in corporate financial accounts throughout the world may be *factual* but not necessarily *objective*.

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, ending with net profit after the final transfers to reserves in the Appropriation Account, all the figures are *biased* toward generally accepted accounting principles (GAAP) underpinned by the concepts and conventions that define the UK accounting profession's *regulatory framework*. In this sense they are *subjective*

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 because they 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.

Moreover, published financial statements only show the position of a company on a certain date, *i.e.* when the Balance Sheet is drawn up ("struck"). Each represents a "snapshot" that may be 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, company accounts do not even provide a true picture of the past.

Balance Sheets reveal money spent. But not whether it has been spent wisely.

1. In the absence of fraud, each item in the statement 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 be 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 has no "real" economic meaning. It is a summation of currency 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 fixed assets does not provide any indication of their current *specific* worth, which may be above or below the overall rate of inflation. For example, real estate (land) could be ripe for development and saleable at a premium. The specific cost of replacing buildings and equipment in their present form might be sky high. Other fixed assets might also have a high or low market value compared with only a year ago.
5. Current asset and liability data may be equally misleading. Stocks, debtors, creditors, bank overdraft facilities (and even cash) may have changed considerably since the Balance Sheet was "struck".
6. 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.

Trading and Profit and Loss Accounts (income statements) are equally suspect. Don't make the mistake of assuming that the "top" and "bottom" lines (sales turnover and post-tax net profit) reflect economic reality, let alone whether either is good or bad.

1. Any increased sales figure (in terms of physical volume or financial value) is not much use 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).

2. Remember also, that the accountant's net profit is an *accrual-based* subtraction of various historical costs from current revenue. And this figure does not necessarily correspond to the company's 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).

Consequently, any interpretation of a company's historic accrual-based company reports using conventional *ex-post* ratio analysis as a basis for measuring any aspect of its recent performance, let alone its *future* plans, including its working capital position, is deeply flawed

1.4 Summary and Conclusions

Whatever our views on Financial Accounting and the extent to which a company's published accounts fail to reveal its "true" financial position, it is also vital to realise that despite the normative theoretical objective of finance theory, in reality most firms do not actually maximise wealth.

Companies pursue a variety of "behavioural" 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 they can maximise anything (particularly in small, overcrowded business sectors).

Even where objectives exist, day to day *survival* not only takes precedence over long-run *profit maximisation* but also *short-termism* and managerial *satisficing* behaviour. Faced with widespread competition for its goods and services, *mimicking* the sector's working capital structure and setting credit terms equal to competitors may also be the only feasible managerial strategy.

Similarly, in the case of *oligopoly*, (characterised by the few) even large firms may also feel the need (or are forced) to react to the policy changes of major players in their business sector. But here fear, rather than desperation, may be the incentive to adhere to the over-arching working capital profiles and industry terms of their creditors.

As we shall, discover, therefore, by the end of this study:

For most firms across the global economy:

Debtor policy still represents an institutionalised function of financial management, which inhibits profitability and may be *suboptimal*.

As a corollary, the efficient management of working capital, which should determine optimum net investments in inventory, debtors, cash and creditors 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

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2 The Effective Credit Price, Decision To Discount And Opportunity Cost Of Capital

2.1 Introduction

In future Chapters we shall:

- Define 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.
- Evaluate the impact of *alternative* credit policies on the relevant revenues and costs associated with a capital budgeting decision.
- Compare the disparities between the theory and practice of credit terms management, based on empirical evidence and the normative assumption that firms should maximise wealth.

To provide a framework for analysis, the purpose of this Chapter is to:

> 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.

For cross-reference and to simplify our analysis, the numbering of the Equations begins with (8). This follows on from your recommended background reading, either "Working Capital Management: Theory and Strategy" (2013) from the bookboon Business series, or Chapter Five of the more comprehensive text "Working Capital and Strategic Debtor Management" (2013).

2.2 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:

$$P' = 100\left(1 - \frac{0.18x30}{365}\right)$$

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

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 t Credit customers with positive opportunity rates will experience an effective 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.

2.3 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:

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

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)

$$(11) \quad P'' = P\,[(1-c) - \frac{rt}{365}(1 - c)]$$

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:

$$P'' = 100\left[(1 - 0.02) - \frac{0.18\times10}{365}(1 - 0.02)\right]$$

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

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

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.

2.4 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:

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

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

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

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:

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

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:

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

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

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:

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

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

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):

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

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 the 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, management should 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.

2.5 The Opportunity Cost of Capital Rate

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

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 *explicit* 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. It is therefore necessary to include these 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 according to economic conditions.

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 to simplify the analysis, a *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 for their customers 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 economic, 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.

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.

2.6 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.

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3 Working Capital Management and the Credit Related Funds System

3.1 Introduction

Chapter Two illustrated why 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 a credit period (or cash discount for earlier payment) represents a form of price competition, which provides its clientele with alternative effective reductions on the initial cash price for goods they purchase. Each effective credit and discount price is determined by the individual customers' annual opportunity cost of capital. So, if price is *inversely* related to demand, the availability of trade credit should *increase* overall turnover.

How a firm actually chooses an *optimum* combination of credit policy variables that also *maximises* profit, once a range of customer opportunity rates are established, is a managerial decision where the net benefits require careful consideration. As we shall discover in Chapter Four, a change in either the credit period or cash discount policy creates a unique level of demand, which results in a unique structure of costs and revenues associated with each debtor policy.

Because *individual* customer opportunity cost of capital rates determine the creditor firm's *overall* effective price-demand function and the monetary value of its credit terms, ultimately they also define its total working capital requirements. The purpose of this Chapter is to set the scene for an analysis of credit terms optimisation, with a reminder of the *external* constraints imposed upon this optimisation process by its working capital implications. As we shall discover:

> Management must pay particular attention to its company's *periodic* working capital position revealed by published financial statements and how its interpretation by external users of accounts may compromise the *long-term* wealth maximisation objectives of its terms of sale.

3.2 Working Capital Management: An Overview

For those familiar with the author's views (explained in the 2013 *bookboon* texts referenced in the previous Chapter) the overall *dynamic* of working capital management is to ensure that the operational transactions (cash or credit) 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 by the flow chart in Figure 3.1.

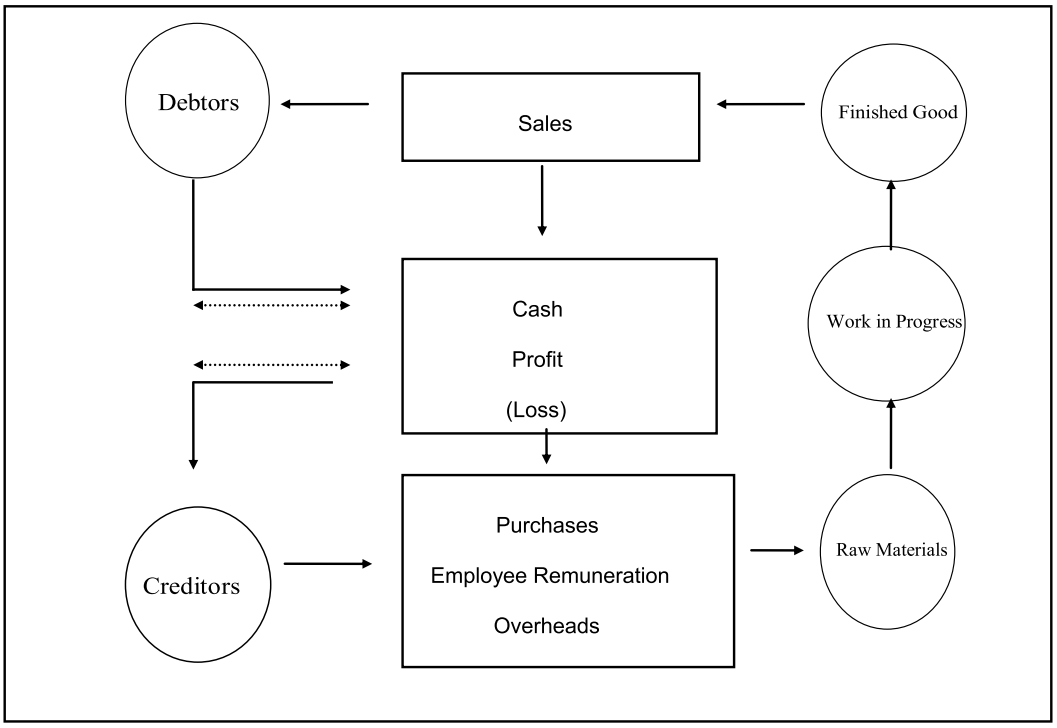

Figure 3.1: The Structure and Flow of Working Capital

We shall refer to aspects of this diagram again later in 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.

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 their stock of finished goods. For a manufacturing company there will also be raw materials, plus items of inventory at various stages of production that 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, a 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 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 should also 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 managerial motivation for holding cash is threefold.

- The *transaction* motive to ensure sufficient cash meets known liabilities as they fall due.
- The *precautionary* motive, based on the likelihood of uncertain events occurring.
- The *speculative* motive, which identifies temporary opportunities to utilise excess cash

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

3.3 Working Capital Structure: An External View

Before embarking upon a *specific* analysis of optimum terms of sale in Chapter Four and its contribution to the wealth of the creditor firm, we cannot leave the *general* subject of working capital without also reviewing the controversial question of why its interpretation by *external* users of accounts conflicts with its *internal* management.

First, it is important to realise that without access to "insider" information:

> The outside world bases its initial assessment of managerial working capital efficiency by reference to the limited data contained in a company's published accounts and *static* structural interpretations of its current asset (solvency) and liquidity positions using ratio analysis.
>
> As we shall explain later in this Chapter, a more *dynamic* interpretation of efficiency, using "turnover" ratios (notably those for inventory, debtor and creditors) derived from published financial statements should complement this analysis. But it too, is constrained by data limitations.

With regard to a static analysis, you will recall from your knowledge of Financial Accounting that an excess of current assets over current liabilities (net working capital) revealed by a company's Balance Sheet is highly desirable. Conventional accounting analysis dictates that if the ratio 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, without "insider" information, these *external* interpretations of a "surplus" or "deficit" by the investment community as indicators of either financial strength, or weakness, may be extremely misleading.

Positive working capital could relate to current assets already committed to a firm's existing operations, which yield very little future profit. The worst case scenario is that inventory (raw materials, work in progress and finished goods) may never be sold, debtors may never repay and cash surpluses (including marketable securities) may be lying idle.

Negative working capital might be an efficient combination of tighter inventory control, stricter terms of sale and debt collection policy, the imposition of extended terms to creditors, plus a reduction in cash balances and marketable securities accompanied by increased overdraft facilities. All based on a sound investment strategy designed to generate future profitability.

As consequence, the author's views (rehearsed in earlier bookboon texts) are that:

- Only when firms *cease trading,* do conventional accounting notions of *solvency* and *liquidity* supplemented by the interpretation of financial ratios revealed by published accounts give any indication of their "true" credit-worthiness.
- But 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, none of which is revealed by the periodic publication of *historic* financial reports for external analysis.

3.4 Working Capital and "Window Dressing"

Activity 1

With only *ex post* (historic) statements of corporate performance upon which to base their investment decisions, and little knowledge of management's *ex ante* (future) plans quantified in financial terms:

Should external account users be worried about their possible misinterpretation of a company's periodic working capital position revealed by its accounts?

In an *ideal* world, the short answer is no, particularly if you are familiar with the "agency" principle developed by Jenson and Meckling (1976) cited throughout my bookboon series.

Agency theory defines corporate management as *agents* of the firm's owners, who are termed the *principals*. The former have *authority* to *control* a company on the behalf of the latter. But their actions are *constrained* (or so the theory goes). Management are assumed to act in the *best interests* of shareholders (and by definition, other providers of capital) to whom they are ultimately *responsible*, because failure to satisfy investor expectations can result in their eventual replacement, or worse still bankruptcy.

But what of the *real* world, where authority and control have catastrophically broken down? Despite a legacy of global financial meltdown, today corporate management still adhere to a bonus culture of "short-termism" and abuse the trust of those to whom they are responsible. Moreover they continue to utilise generally accepted accounting principles (GAAP) concepts and conventions for their own advantage, with little concern for external account users.

Like much else in finance, when balancing solvency, liquidity, turnover and profitability, revealed by published statements, astute managers of working capital (some would say unscrupulous) have always been acutely aware of its misinterpretation by the outside world, based on a lack of information. And this is where *window dressing* comes into play to "satisfy" the agency principle.

Because conventional wisdom dictates that external users feel comfortable with current asset ratios of 2:1 and liquidity ratios not far below 1:1, prior to companies publishing their results:

- Levels of inventory, cash and marketable securities can be temporarily adjusted.
- Creditors may be repaid early on a one-off basis and overdraft facilities reviewed.
- Even dividend and investment policies can be modified in the short term.

So, a few words of caution before we proceed:

For those "outside the firm looking in", the *real* internal working capital relationships between a company's current assets and liabilities during the preceding period and their contribution to long-run profitability can be disguised by legitimate *creative* accounting techniques to satisfy its year-end interpretation by external users.

Moreover, management can always defend the *legitimacy* of the limited financial data that they provide by reference to the GAAP framework within which they operate, the accounting concepts and conventions they adhere to, plus the fact that their accounts are audited to satisfy the tax authorities.

3.5 The Working Capital Cycle: An External View

To supplement a *static* Balance Sheet interpretation of a firm's net working capital *position*, with all its pitfalls, we mentioned earlier that investors can also review the *dynamics* of its net working capital *cycle*. This incorporates the "turnover" ratios for working capital constituents (notably the relationship between inventory, debtors and creditors) derived from published financial statements.

The net working capital *cycle* measures the average length of time between paying creditors for raw materials that enter into inventory (the *financing* cycle) and the eventual receipt of cash from debtors for the sale of finished goods (the *operating* cycle).

The simplest framework is given by the following series of numbered equations, which the author previously explained in Chapter Four of both "Working Capital and Strategic Debtor Management" and "Working Capital Management: Theory and Strategy", (2013).

These define 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.

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

With knowledge of Financial Accounting, you should also be familiar with reformulations of Equation (5). These 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 observed earlier, 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 which are still lying idle.

The series of Equations is also *simplistic* because the debtor ratio is the only true *turnover* ratio, whereas the stock and creditor relationships are not. The latter don't compare like with like, because their denominators are expressed at *cost* but the numerators are at *selling price*. Therefore, the stock and creditor ratios only exhibit their "rate of variability" with sales value.

Unfortunately, for many external users of financial accounts, these serial Equations represent their best shot at interpretation. The reason relates to the lack of detailed inventory data (finished goods, work in progress and raw material purchases) which may not be published.

Nevertheless, turnover ratios are still useful external 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.

3.6 Working Capital: An Internal Perspective

Of course, management are unconstrained by the data limitations of external users when analysing the consequences of their own investment decisions. Internally, a much more sophisticated analysis of a company's *net* operating cycle is provided by constructing a framework, initially explained in Chapter Four of "Working Capital and Strategic Debtor Management" and "Working Capital Management: Theory and Strategy" (*op cit*).

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). The difference between the two, the *net* operating cycle is shown schematically in Figure 3.2.

- 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 produces 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 = $\frac{\text{Average value of raw material inventory}}{\text{Daily raw material purchases}}$

Plus

(ii) Production Cycle = $\frac{\text{Average value of work in progress}}{\text{Daily average cost of sales}}$

Plus

(iii) Finished Goods Turnover = $\frac{\text{Average value of finished goods}}{\text{Daily average cost of sales}}$

Plus

(iv) Customer Credit Period = $\frac{\text{Average value of debtors}}{\text{Daily average sales}}$

Minus

FINANCING CYCLE (days)

Suppliers Credit Period = $\frac{\text{Average value of creditors}}{\text{Daily average purchases}}$

Equals

NET OPERATING OR WORKING CAPITAL CYCLE (days)

Figure 3.2: The Working Capital Cycles

3.7 The Credit Related Fund System

Let us now put the pieces of our working capital jigsaw into place to define the *credit related funds system* as a basis for future reference.

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 a company's sales turnover, which determines its working capital commitments.

On the *operational* side, if you refer back to Figure 3.1 and its commentary, 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 in Figure 3.2, which we worked through in the previous section.

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 cycle will have its own asset and financing requirements. This, in turn, will determine the credit related funds system, namely 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. As we shall discover in Chapter Four, optimal sets of credit terms determine the firm's total working capital needs and hence the availability and associated cost of such requirements.

3.8 The Development of Theory

Given the simplicity of an *external* accounting interpretation of working capital compared to the complexities of its *internal* financial management outlined above, it may surprise you to learn that:

> The credit related funds system 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 academic 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 Two).

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

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, 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 specific 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, the credit function should not be the sole the responsibility of financial management. It should also 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 role, should be ultimately responsible.

3.9 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 breakdown in *agency theory* 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 Board 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 earlier) that the external users of published accounts subsequently find so difficult to unscramble.

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

4.1 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.

4.1 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 Two. 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 Two, 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. This yields the present value (PV) of that amount:

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

Using 360 days for simplicity, the effective credit price:

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

$$= 100 - 1.20 = \underline{\$98.80}$$

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

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

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

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

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 Two 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 Two (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 Two (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:

$$r < \frac{365}{T - t} c = k$$

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 4.1:

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

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

4.2: 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 that 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:

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

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 4.2 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 = $(R - \Sigma V)$
Acquisition cost of inventory = 70 per cent of selling price
Tax rate b = 50 per cent
Net revenues after tax = $(1 - b) \times$ Net revenues

Table 4.2: 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 4.3 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 4.2. 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 × 60/360 (from column 3, Table 4.2).

Table 4.3: Investment for Alternative Credit Policies ($ million)

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

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

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 4.4: Net Profit for Alternative Credit Policies ($ million)

As Table 4.4 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.

4.3 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 presents 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.

5 Empirical Evidence and Theoretical Review

5.1 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 UK literature and experience, 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.

5.2 The Theory

Like all others in the author's bookboon series referenced earlier, this study has adopted the time-honoured *normative* objective of finance theory as a convenient *benchmark* for our 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, we reversed the conventional view that an excess of current assets over current liabilities is a reliable indicator of financial strength.

> 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.

If you have read the companion to this Business text "Working Capital Management: Theory and Strategy" (2013) recommended in Chapter One, you will recall that we defined working capital as an investment in current assets *irrespective* of their financing source. This questioned the accounting conventions of *solvency* and *liquidity* revealed by traditional Balance Sheet analyses. 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 an *optimum* interrelationship between a firm's short-term *operating* and *financing* cycles, whereby:

- Inventory is purchased on *credit* using "just in time" (JIT) inventory control techniques.
- Finished goods are immediately sold for *cash*.
- Cash surpluses do not lie idle, but are immediately reinvested or distributed as a dividend.
- The operating cycle (conversion of raw material to cash and its reinvestment or distribution) is shorter than the financing cycle (creditor turnover).
- So, in an *ideal world* a firm would hold no current assets but maximise its current liabilities within the confines of its suppliers' terms of sale.

Of course, this scenario is only a theoretical benchmark. For example, a company is likely to hold stocks of inventory input and output to solve any problems of erratic supply and unanticipated demand. But it vividly illustrates why profit maximising firms should strive to minimise their levels of inventory, debtors and precautionary cash balances, providing they can still satisfy consumer demand for their goods and services. It also provides a springboard to explain why firms not only buy on credit but also sell on credit, despite increasing their current asset position.

Chapter Two initially considered how the terms of sale offered by a creditor firm to its customers is a form of *price competition*, which can influence the demand for its goods and services. Using the time value of money and opportunity cost of capital concepts within a framework of "effective prices", we explained how the availability of credit periods and cash discounts for prompt payment provide customers with reductions in their cash price. As a consequence:

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. These defined 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

5.3 The Empirical Evidence

Armed with these equations, Chapter Three 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:

$$k = \frac{365}{45 - 7} \times 3^{3}/_{4} = 36.0 \text{ per cent per annum for (3¾ / 7:45) terms}$$

And:

$$k = \frac{365}{45 - 30} \times 2^{1}/_{2} = 60.8 \text{ per cent per annum for } (2½ / 30{:}45) \text{ terms}$$

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 low 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:

$$k = \frac{365}{100 - 7} \times 3\,{}^{3}/_{4} = 14.7 \text{ per cent compared with 36 per cent for } (3¾ / 7{:}\ 45) \text{ terms.}$$

And

$$k = \frac{365}{100 - 30} \times 2\,{}^{1}/_{2} = 13 \text{ per cent compared with 60.8 per cent for } (2½ / 30{:}\ 45) \text{ terms.}$$

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 time value of money and opportunity cost of capital 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, after the millennium stock market crash, the ability of small scale creditor firms to dictate their terms of sale to preserve cash flow seemed more constrained. Surveys by Wilson and Summers (2002) and Huyghebaert (2006) noted that "start-up" companies and small firms needed to *conform* to the industry norms of established and major players, simply to survive.

More recent 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 (even in 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 1970's 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, the availability of trade credit remains more important than bank lending, particularly for small companies.

5.4 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 becomes 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% in early 2013) plus an administrative cost ranging from £40 to £100 per invoice.

So, how will the new Directive work?

Before and after the introduction of earlier 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, the UK legislation has been little used since 1998 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. This should increase the demand for a supplier's goods and services (and hence overall profit).
- Alternatively, the customer may be offered a cash discount for prompt payment to similar effect.

- 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:

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

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.

5.5 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. A *credit related funds system*, 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 (that 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 effectively 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 (also based on 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.

5.6 Selected References

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