

9. Short-Term Liquidity Analysis. Operating Cash Conversion Cycle

9.1 Current Assets and Current Liabilities

9.1.1 Cash

A firm should maintain as little cash as possible, because cash is a nonproductive asset. It earns no return. Large cash balances minimize the risk of illiquidity but reduce profitability of a company.

Companies hold cash balances for several reasons:

1. transaction purposes,
2. precautionary reserves,
3. speculation.

Companies need cash to conduct ordinary business transactions. Some companies hold excess cash in order to cover unexpected expenditures. Sometimes a company may delay for example raw materials purchase decisions expecting that prices may change. Speculations on price changes may require to hold higher cash balances.

In some countries banks require a portion of a loan to remain on deposit in the bank for the life of a loan. These deposits, termed **compensating balances**, should not be treated as cash. Cash must be free from any restrictions. A company cannot use compensating balances to meet obligations. Compensating balances against short-term loans are usually separately stated in the current asset section. Compensating balances against long-term loans are included into long-term asset section of a balance sheet. The effective interest rate for a borrower with compensating balance requirements is greater than nominal interest rate.

Investing Excess Cash. Marketable Securities

Typically, cash in excess of requirements for transactions, precautionary balances and speculation is temporarily invested in short-term instruments that can be taken on and liquidated quickly. Marketable securities can be converted into cash as the needs arises.

An alternative to holding and investing excess cash for these purposes is to use excess cash to repay loans and eventually borrow for the short term to finance uncertain cash requirements. Which approach is used depends on management's overall working capital policy and the excess funds available for temporary investment.

The financial manager needs criteria for determining which types of temporary near-cash investments best fit a company's needs. The three most important characteristics to consider are return, liquidity (marketability) and credit risk. Maturity may be also important, because prices of instruments with longer maturity may be more sensitive to small interest rate changes.

Types of marketable securities

1. Treasury bills, notes and bonds
2. Federal agency obligations
3. Bank deposits, banker acceptances, negotiable certificates of deposit, repurchase agreements
4. Money market mutual funds

5. Commercial papers and other short-term notes of corporations, corporate bonds, common stock and preferred stock (marketable equity securities)
6. Derivative transactions

9.1.2 Accounts Receivable

Receivables are claims to future inflows of cash. The primary claim comes from the selling of goods or services, referred to as trade receivables, with the customer promising to pay within a specified time period, such as 14 days. Such claims usually do not bear interest and sometimes collections may not be received (credit risk).

Credit granted to an individual is referred to as consumer credit. Credit extended to another firm is known as a trade credit.

A company involves cash in receivables. It is a short-term investment (zero or low return) financed by capital of a company (with much higher cost of capital).

Some of the accounts receivable may not be collected. A company must estimate bad debt and indicate the impairment of receivables. The impairment of receivables may come from uncollectibility, but also discounts allowed or allowances given. The allowance for doubtful receivables results in the bad debt expense being charged to the period of sales.

When the amount of loss cannot be reasonably estimated, a company may use direct write-off method, which results in the bad debt expense being recognized in the year subsequent to the sale.

The issue is how much to invest in receivables in order to maximize shareholder wealth. Investment in accounts receivables provides lower return (profitability) than investment in long-term assets. But increasing credit to customers may increase sales and also increase profitability. Too little investment in receivables may deprive the firm of the marginal benefits from a higher sales level. But too much investment may expose the firm to excessive costs by tying up valuable capital.

Credit Terms

„net t” payment is due within t days from a specified day, usually the date of good’s receipt

„d/t₁, n/t” allows a discount of d% if payment is made within t₁ days; otherwise, the full amount is due within t days

9.1.3 Inventories

In a manufacturing firm inventories include raw materials, work in process (work in progress) and finished goods.

Raw materials are goods purchased for direct use in manufacturing a product.

Work in process represents goods started but not ready for sales. Work in process includes the cost of raw materials, labor costs and factory overheads.

Finished goods are inventory ready for sale.

9.1.4 Current Liabilities

There are several types and sources of short-term funds. A useful way to distinguish among them is to think in terms of

1. their availability
2. their cost
3. the degree of management discretion in utilizing them
4. whether or not some form of collateral is required by the creditor

Type of Credit	Source	Cost	Degree of Management Discretion	Security required
1. Accounts payable	Suppliers	Implicit	Spontaneous	Unsecured
2. Accrued wages	Employees	Zero	Spontaneous	Unsecured
3. Accrued taxes	Governments: federal, state, local	Zero	Spontaneous	Unsecured
4. Deferred income	Customers	Zero	Negotiated	Unsecured
5. Bank loans	Commercial banks and other financial institutions	Explicit	Negotiated	Unsecured or secured
6. Commercial paper	Investors	Explicit	Negotiated	Unsecured

To convert the different terms for various types of short-term credit to comparable annual effective interest rates we use the annual compounded (effective) rate of interest (AIR), which is calculated as follows:

$$(49) \quad \text{AIR} = \left(1 + \frac{i}{m}\right)^m - 1$$

where

i is the stated annual simple interest rate

m is the number of compounding periods in one year

Trade credit is the largest source of spontaneous credit to a firm.

Bank credit is negotiated unsecured credit, and lines of credit give companies access to this source of short-term funds. Banks in the US often require companies to maintain a minimum average account balance called a compensating balance, which reduces the usable amount of the loan. This method increases the effective rate of interest.

Commercial paper is a promissory note that can be issued by large companies.

A company can also raise short-term funds from **secured credit sources**. The two most common assets pledged as collateral are account receivable and inventory. Two procedures are used in arranging for short-term financing that is backed by accounts receivable: pledging and factoring.

Pledging receivables. The borrower provides a given amount of receivables as collateral.

Factoring receivables. A factoring receivable is sold to financial institution called a factor.

Pledging inventories. A firm pledges part or all of its inventories as collateral.

9.2 Liquidity and Liquidity Ratios

9.2.1 Liquidity

Long-term investment decisions (capital budgeting decisions) occur irregularly over time and involve expensive and highly illiquid fixed assets. Such decisions are made by top managers. Most investment projects require the company to invest also in net current assets. Separate short-term investment decisions (working capital management decisions), on the other hand, are frequently repeated. Short-term investment decisions consist of smaller amounts and usually intermediate staff is engaged in these activities.

Fixed assets and net current assets are financed with equity and long-term debt. The term **net current assets** refers to the difference between **current assets** (cash, inventories, accounts receivable) and **current liabilities** (accounts payable, short-term borrowing). The capital of a company (equity and debt) may be divided into invested in long-term assets capital and net working capital used to finance net current assets. Decisions on current assets and current liabilities imply the level of the long-term capital (equity and debt) required to finance the operating activities. The area of these decisions is also commonly called **working capital management**.

Figure 1. Net Working Capital

Long-Term Assets	Equity	Capital invested in fixed assets
Net Current Assets	Debt	Net working capital invested in net current assets

Operating strategies involve many different decisions that influence sales and production costs. As sales increase over time, more receivables, inventories and payables are needed. Operating strategies influence “permanent” changes in current assets and current liabilities. Therefore, they also can be called **short-term investment decisions**.

Decisions on current assets and current liabilities are undoubtedly one of the most difficult areas. The two main reasons for this are that, firstly, nearly all units of a company affect the size of net current assets, and secondly, these decisions affect the **liquidity** and **profitability** of a company.

A company’s net current assets are used as a measure of its **liquidity** position. Liquid assets can be converted into cash quickly with a minimum cost. It means that a company is able to meet its financial obligations as they come due. A company must maintain sufficient liquidity to make timely cash payments on its operating and financial obligations. Failure to do so could result in financial troubles, insolvency or even forced bankruptcy by the company’s creditors. The appropriate liquidity should reduce the chances of insolvency or even bankruptcy. Commercial banks often impose minimum liquidity constraints on their loan agreements. Similarly, bond indentures usually contain such restrictions.

The primary consideration in designing an overall working capital policy is the risk-return trade-off associated with

1. the appropriate mix between fixed assets and net current assets
2. the appropriate mix between long-term financing and short-term.

There is a trade-off between liquidity risk and return. The greater is liquidity the lower is profitability of a firm. Liquidity risk reduction (higher net current assets) results in lower returns (lower profitability). Fixed assets give higher returns than current assets.

Long-term debt usually has a higher explicit cost (interest rate). It lowers profitability but in the same time it lowers risk of illiquidity. Short-term debt has a bigger risk of illiquidity for two reasons. First, a firm may not be able to refinance its short-term debt when it matures. Second, short-term interest rates vary more than long-term interest rates do.

9.2.2 Liquidity Ratios

Liquidity ratios (short-term solvency ratios) measure a company's ability to meet its current obligations.

Current Ratio

$$(50) \quad \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

It measures short-term debt paying ability.

Quick (Acid Test) Ratio

$$(51) \quad \frac{\text{Current Assets} - \text{Inventories} - \text{Prepaid Expenses}}{\text{Current Liabilities}}$$

$$= \frac{\text{Cash} + \text{Short-term Investments} + \text{Current receivables}}{\text{Current Liabilities}}$$

It measures immediate short-term debt paying ability.

9.3 Liquidity and Working Capital Policy

Conservative policy (a relatively high level of current assets and relatively high level of long-term debt) leads to higher liquidity and lower profitability. Aggressive policy (a relatively low level of current assets and relatively low level of long-term debt) leads to lower liquidity and higher profitability.

The following analysis requires to establish the level of permanent current assets. **Permanent current assets** are the minimum current assets required to maintain a company's daily operations during a year. **Temporary current assets** fluctuate over the company's operating cycle.

Aggressive policy. Fixed assets and only part of permanent current assets should be financed by long term debt and equity. Temporary current assets and also part of permanent current assets should be funded by short-term liabilities.

Matching policy. Fixed assets and permanent current assets should be financed by long term debt and equity. Temporary current assets should be funded by short-term liabilities.

Balanced. Fixed assets, permanent current assets and also part of temporary current assets should be financed by long term debt and equity. Only part of temporary current assets should be funded by short-term liabilities.

Conservative policy ignores the distinction between temporary and permanent current assets by financing all assets investments with long-term capital. When the level of current assets contracts, any surplus funds are invested in short-term marketable securities.

Just as there is no optimal capital structure that all firms should adopt, there is no one optimal working capital policy for all firms.

Assets	Liabilities			
	Aggressive	Matching	Balanced	Conservative
Temporary Current Assets	Short term debt	Short term debt	Short term debt	
Permanent Current Assets				
Fixed Assets	Long term debt and equity			

9.4 The Operating Cash Conversion Cycle

9.4.1 Cash conversion cycle

The short-term investment (or working capital) decisions are commonly evaluated in terms of time. Thus if raw material inventories are held for two weeks before being used, then 2/52 of annual raw material requirement will be average inventories held. Similarly, if it takes 3 weeks to change the raw material into finished goods, then there will be 3/52 of the annual raw material requirement in work-in-progress.

In a manufacturing company before any cash inflows are received, cash outflows for materials, labor overheads and other operational expenditures must be incurred. These cash may then be involved in inventory (raw materials, work-in-progress, finished goods) for weeks before finished goods are sold. Moreover, if sold on credit, the original cash expenditures will still be tied up (invested) in accounts receivable. Only when the credit customer pays the bill a company finally receives a cash inflow from its short-term investment.

In a retailing company cash outflows include purchases of goods and may sit in inventory several days before cash inflows from sales. In a service company cash may be tied up in purchases of spare parts.

The operating cash conversion cycle measures the time it takes from the initial cash outflows for materials, labor costs, services etc. and cash inflows from sales.

To see how quickly the operating cash flows through the firm, we need to determine how fast each account turns over.

Example

Accounts receivable	30 days
Inventory	40 days
Asset conversion period	70 days
Payables conversion period	-32 days
Net cash conversion period	38 days

In this example, it takes 70 days for cash to flow through the current-asset conversion cycle. With regard to current liabilities, raw materials and services are usually purchased on credit, and it must be determined how long a company defers these payments. The combined result is a net cash conversion cycle of 38 days.

9.4.2 Cash Conversion Cycle Ratios

Average Collection Period, Days' Sales Uncollected

$$(52) \quad \text{Average Collection Period} = \frac{\text{Accounts Receivable}}{\text{Net Sales Per Day}}$$

It measures liquidity of collection.

Average Collection Period can be compared with a company's credit terms. This ratio shows how efficiently a company manages its receivables. For example, if the credit terms is 14 days, average collection period should not be significantly over 14 days. If it is significantly over 14 days, a company has a collection problem.

Accounts receivable are usually net of allowances for doubtful accounts. Sometimes gross receivables (include allowances for doubtful accounts) are used and sometimes average receivables are used.

Accounts receivables should include trade notes receivables. In China trade notes receivables are used as a payment against outstanding trade receivables. Trade notes receivables are bank guarantee promissory notes which are non-interest bearing and generally mature within 6 months.

Net sales includes both credit sales and cash sales. To have a realistic collection period only credit sales should be used in computations.

Days' Sales in inventory

$$(53) \quad \text{Days' Sales in Inventories} = \frac{\text{Ending Inventory}}{\text{Cost of Goods Sold} / 365}$$

It measures liquidity of inventory.

9.4.3 Asset Utilization Ratios

Accounts Receivable Turnover

The accounts receivable turnover measured in times per year is computed as follows:

$$(54) \quad \frac{\text{Net Sales}}{\text{Accounts Receivable}}$$

This ratio measures efficiency of collection.

Inventory Turnover, Merchandise Turnover

(55) $\frac{\text{Cost of Goods Sold}}{\text{Inventories}}$

It measures efficiency of inventory.

to się powinno nazywać Days' COGS in Inventory

Task 9

1. Calculate short-term solvency ratios.
2. Calculate net cash conversion cycle.
3. Calculate asset utilization ratios.

Problem 20. Short-term Solvency Ratios

Required:			
Calculate and interpret short-term solvency ratios.			
Solution			
	<i>Dec. 31, 2014</i>	<i>Dec. 31, 2013</i>	<i>Dec. 31, 2012</i>
<i>Current Ratio</i>			
$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	1,02	1,13	1,09
$\frac{\text{Current Assets} - \text{Inventories} - \text{Prepaid Expenses}}{\text{Current Liabilities}}$	0,81	0,90	0,77
$= \frac{\text{Cash} + \text{Short-term Investments} + \text{Current receivables}}{\text{Current Liabilities}}$	0,81	0,90	0,77

Problem 21. Net Cash Conversion Cycle

Required:			
(a) Assuming a 365-day year, what are average daily sales?			
(b) How many days of sales are represented by accounts receivable?			
(c) How many days of sales are represented by inventory?			
(d) How many days of sales are represented by accounts payable?			
(e) What is the net cash conversion cycle?			
Solution			
	<i>Dec. 31, 2014</i>	<i>Dec. 31, 2013</i>	<i>Dec. 31, 2012</i>
Net Sales (Net Operating Revenues)	45 998	46 854	48 017
Accounts receivable	4 466	4 873	4 759
Inventory	3 100	3 277	3 264
Accounts payable	9 234	9 577	8 680
(a) Net Sales Per Day (average sales per day)	126,0	128,4	131,6
(b) Average Collection Period (accounts receivable conversion period)	35,4	38,0	36,2
(c) Inventory Conversion Period	24,6	25,5	24,8
(d) Payables deferral period	73,3	74,6	66,0
(e) Net Cash Conversion Cycle	-13,2	-11,1	-5,0
Asset Conversion Cycle	60,0	63,5	61,0
Payables Conversion Cycle	73,3	74,6	66,0
Net Cash Conversion Cycle	-13,2	-11,1	-5,0

Problem 22. Asset Utilization Ratios

Required:			
Calculate and interpret asset utilization ratios.			
Solution			
	<i>Dec. 31, 2014</i>	<i>Dec. 31, 2013</i>	<i>Dec. 31, 2012</i>
<i>Accounts Receivable Turnover</i>			
Net Sales			
<u>Accounts Receivable</u>	10,3	9,6	10,1
<i>Inventory Turnover, Merchandise Turnover</i>			
Cost of Goods Sold			
<u>Inventories</u>	5,8	5,6	5,8