

Solutions **Chapter 6:** Supply Chain Finance

Review question 6.1:

When firms engage in trade (exchange of goods), they inevitably also establish a flow of related information and financial transactions. Physical flows would not be possible without the sequence of financial events and processes that take place in parallel to the commercial transactions between supply chain partners. These comprise finance-related information (e.g. terms of payment, bank account data) as well as actual financial flows (transfers of cash, liabilities, and other financial assets). A financial intervention or action (a payment, a capital transfer, etc.) in the financial supply chain is driven by an event or an action in the physical supply chain. SCM, therefore, always must consider all types of flows between supply chain partners.

Review question 6.2:

Cost of capital is dependent on a number of influencing factors, most notably:

1. The volume of financing is determined by the amount of capital employed for doing business
2. The duration of financing depends on the mix of different financing sources available
3. The cost of capital rate is mostly influenced by general market rates and perceived risk of individual firms

A single firm's cost of capital are not independent from its supply chain partners, because SCM can influence both the volume of financing required (e.g. shifting tasks and resulting capital requirements between SC partners) as well as the perceived risk level (e.g. collaboratively managing or even avoiding risks).

Review question 6.3:

In SC finance, transaction costs are costs that are incurred for the initiation, execution, and monitoring of a financial transaction between supply chain partners. Identifying possible financing sources, negotiating and actually implementing financing agreements, or monitoring supply chain partners' compliance with these agreements all cause transaction costs. SCF strives to reduce transaction cost by making financing transactions between supply chain partners, but also with other business entities outside the actual supply chain network more efficient.

Review question 6.4:

Net working capital (NWC) – or often simply called “working capital” – is calculated by deducting current liabilities from current assets. Current assets primarily comprise cash, accounts receivable, prepayments, and inventories. Current liabilities comprise accounts payable, accrued liabilities like salaries payable and customer advances. Current liabilities are mostly of a non-financial nature and come at no or very low financing cost.

Review question 6.5:

NWC can be interpreted as a liquidity measure: Current assets are “liquid”, i.e. they either directly constitute cash or can be turned into cash rather quickly. Current liabilities, in turn, are due for payment in the near future as well. Settling current liabilities, therefore, consumes current assets. If current assets exceed current liabilities (positive NWC), the firm can be pretty sure that its liquidity level is sufficient to serve its current liabilities. From a liquidity point of view, therefore, a positive NWC is the preferred option. It ensures that short-term payment obligations can be met without endangering the company's long-term productive capacity.

NWC can also be seen as an efficiency measure: . A positive NWC needs to be financed with more expensive types of capital, such as long-term loans, bonds, or equity. Having a large amount of current assets means that lots of capital is tied up in cash, inventory and accounts receivable – capital that comes at fairly high cost since it is long-term in nature. Consequently, the firm can reduce its cost of capital if it manages to operate its

business with lower NWC – thus reducing the need for costly financing of short-term assets.

Review question 6.6:

Inventory comprises raw material, semi-finished goods, finished goods, merchandise, etc. Inventories have a value and tie up capital. This capital can be “released” only once inventory has been sold and converted back into cash through customer payments. Firms, therefore, will try to speed up this process and realize a speedy, efficient order fulfillment cycle. The less capital is tied up in inventories, the lower NWC will be.

Accounts payable denote payment obligations the firm has towards its suppliers and other business partners. High accounts payable denote the company’s ability to use its suppliers’ capital for own operations. Inputs, therefore, create value in the own firm before any cash has to be paid out for them. Everything else being equal, higher accounts payable will reduce NWC.

Accounts receivable denote capital that is tied up in invoices that customers have not yet settled. When extending credit to its customers (leading to an increase in accounts receivable), the firm uses own capital to finance its customers’ operations. Whenever possible, a firm will try to reduce accounts receivable by collecting cash as soon as possible, thereby decreasing its NWC.

Review question 6.7:

The C2C cycle is typically measured in days and consists of three constituent elements:

1. Days inventory: The time it takes on average for inventory to move through the company’s value-adding process from goods receipt until delivery of the final product to customer.
2. Days receivable (or sales) outstanding: The time it takes on average to receive payment after delivery from customers that have purchased on credit terms.
3. Days payable outstanding: The time it takes for the company on average to pay for goods and supplies it has received on credit terms.

The three elements are combined into the composite measure “cash conversion cycle” or “days working capital”, which is the key performance indicator when managing a business entity’s C2C cycle:

$$\begin{array}{rcl} & \text{Days inventory} & \\ + & \text{Days receivable outstanding} & \\ - & \underline{\text{Days payable outstanding}} & \\ = & \text{Days working capital} & \end{array}$$

Review question 6.8:

A single-firm attempts to improve NWC and C2C, respectively, often lead to opposite effects with other supply chain partners that might wipe out benefits for the supply chain in total. In an un-coordinated setting, supply chain partners will try to optimize their individual C2C cycle time – at the expense of the other partner. One partner’s improvement translates into a C2C deterioration at the supply chain partner. This is true, for example, if the supplier improves its days receivable that lead to a matching decrease in the OEM’s days payable. The supply chain in its entirety would not improve its efficiency. Recurring negotiations and bargaining efforts will even drive up transaction costs for the supply chain.

Review question 6.9:

In a collaborative setting, supply chain partners can follow two alternative, but complementing, approaches to C2C cycle management: First, they can shift NWC to those supply chain partners with lower cost of capital rates. The same amount of capital employed will then translate into lower total cost of capital. Bigger

companies, for instance, can often profit from higher bargaining power in financial markets, a stronger reputation (reflected in credit ratings) and possibilities to leverage synergies by pooling financing needs across different legal entities.

Second, supply chain partners can initiate internal process improvements or similar efficiency gains. If one supply chain partner manages to improve the efficiency of its own operations, translating into lower inventory levels, the entire supply chain will profit from a corresponding improvement in the cross-partner C2C cycle time independent of each partner's cost of capital.

Review question 6.10:

Trade finance arrangements deal with financing (Who is funding the trade deal to what extent and up to what point in time?) and related risks (Who has to bear the risk of non-payment or default risk and which collaterals are available?). Trade finance provides funds to suppliers to help them produce goods and to buyers to help them purchase these goods, respectively. The payment instruments commonly used in international trade transactions such as letters of credit and documentary credits are examples of trade finance.

SCF instruments do not entirely differ from traditional trade finance, but they add a collaborative component that is typically not present in traditional trade finance agreements. Collaborative behavior attempts to leverage synergies and gain advantages that would not be available to firms when acting on their own. SCF instruments, therefore, always require the willingness to engage in activities to the mutual benefit of both partners.

Review question 6.11:

Since supply chain partners typically do not have the necessary financial expertise themselves to structure financial arrangements that go beyond trading on open account terms or take recourse to standard instruments of trade finance, they involve additional partners that support SCF arrangements by combining specialized financial services (providing actual funding plus related services) together with modern technology platforms that ensure reliable and cost-efficient realization of such SCF deals.

A typical SCF solution needs three key elements in order to be efficient and attractive to supply chain partners: a trusted advisor (providing expert know-how), a funding partner (providing the funds required for interim financing), and a reliable technology platform. While the supplier and the buyer (i.e. the actual trading partners in the supply chain) constitute the "demand side" of the SCF solution, the parties offering funds, advice, and the technology platform constitute the "offer side".

Review question 6.12:

Traditional factoring denotes a financing arrangement where a firm (the seller in a trade transaction) receives cash from a specialized institution (the "factor") in exchange for its accounts receivable that originate from the sale of goods or services to a customer. The factor advances cash to the supplier in return for the right to collect cash from the supplier's customers once the open amounts come due. The amount that the supplier receives from the factor equals the open invoice amount minus an administrative handling fee and interest (discount).

Reverse factoring reverses the initiative of the financing deal. Instead of a (small) supplier approaching the factor for financing, it is now typically a large customer that initiates the deal: The purchasing firm enters into an umbrella contract with a factor, specifying which of its payables are eligible for factoring. The suppliers falling under the big customer firm's umbrella contract can collect advance payments from the factor. Since the big customer firm typically has a good credit rating and is well-known in financial markets, credit risk is low for the factor. In addition, the customer firm has approved open amounts, adding even more payment security to the factor.

Reverse factoring makes sense when the large customer profits from a significantly better rating and lower credit risk and is willing to pass some of this financing advantage on to its smaller suppliers in return for lower

prices.

Review question 6.13:

In a dynamic discounting scheme it is the (typically large) customer firm itself that provides financing opportunities by offering variable discounts to its suppliers for early payment of their invoices. The necessary funds are not provided by a third party (e.g. bank), but come directly from the buying organization itself. Different to traditional cash discounts, the purchasing firm offers a whole range of early payment discounts at various time-dependent rates to its suppliers. Immediate payment triggers a larger discount, later payments offer smaller (or no) discounts – i.e. the discount rate gradually decreases over time. Whenever a new invoice from the supplier has been recognized and approved by the buyer, the supplier can set an individual payment date for the open invoice – triggering a specific discount rate from the purchasing firm's range. Different from traditional discounting, therefore, the initiative for taking a cash discount comes from the seller and not from the buyer.

Review question 6.14:

Pooling involves aggregating balances for multiple bank accounts to minimize both idle funds and bank borrowing. Netting, in turn, involves the consolidation and mutual offset multiple payments into one consolidated (net) payment. Netting reduces payment volumes and consequently also transaction costs (bank fees, process cost, etc.). Netting and pooling is easier to implement in internal supply chains, because SC partner firms often share a common IT platform for realizing and monitoring the inter-related cash flows and account balances, have the necessary governance structures (e.g. hierarchical controls) in place and can more easily agree on the terms of the resulting transactions (e.g. allocation of shared transaction costs).

Review question 6.15:

In vendor leasing, a large customer firm finances entire equipment (machines), operating facilities and other durables by purchasing the capital goods at own account and subsequently leasing them out to its supplier. The capital goods are directly installed at the supplier's premises and are used for production of the goods that are to be supplied to the customer firm. The (smaller) supplier does not only profit from a reduced capital investment burden, but also from a more stable planning of future operating expenses, since leasing fees are fixed between both partners.

Exercise 6.1:

$NWC = \text{Current assets} - \text{current liabilities}$

$$NWC = 5094 - (1140 + 903 + 468 + 27) = 2556$$

C2C cycle time:

$$\text{Days inventory} = ((2016 + 1956) / 2) / 9762 \times 365 = 74,26 \text{ days}$$

$$\text{Days receivable outstanding} = ((2064 + 1865) / 2) / 14019 \times 365 = 51,15 \text{ days}$$

$$\text{Days payable outstanding} = ((903 + 899) / 2) / 9762 \times 365 = 33,69 \text{ days}$$

$$\text{Days working capital} = 74,26 + 51,15 - 33,69 = 91,72 \text{ days}$$

Exercise 6.2:

The starting scenario leads to total cost of capital tied up inventory along the SC layers as follows:

	value/unit	# units	WACC	capital cost
Supplier	5	80000	8%	32.000,00 €
OEM	8	35000	7%	19.600,00 €
Retailer	12	10000	8%	9.600,00 €
				61.200,00 €

Everything else equal, the supplier-enforced VMI option will effectively increase total cost of capital that is tied up in inventories along the SC layers. The only difference to the current situation would be that inventory tied up at the OEM's premises is now still owned – and therefore also financed – by the supplier, who has a higher cost of capital rate than the OEM:

	value/unit	# units	WACC	capital cost
Supplier	5	80000	8%	32.000,00 €
Supplier	8	35000	8%	22.400,00 €
Retailer	12	10000	8%	9.600,00 €
				64.000,00 €

One might argue that the supplier is in a better position to handle the OEM's inventory and might be able to realize some efficiency gains, but the effect cannot be quantified in financial terms without further information.

The collaborative initiative to improve chained DSI will have a significant effect on capital tied up in inventory and consequently also on cost of capital:

	value/unit	# units	WACC	capital cost
Supplier	5	60000	8%	24.000,00 €
OEM	8	30000	7%	16.800,00 €
Retailer	12	10000	8%	9.600,00 €
				50.400,00 €

The gain in cost of capital is high enough to offset the one-time effort of 10.000 Euros. Gains are spread unevenly across SC partners, however. The initiative will be realized only, therefore, if partners can agree on a compensation scheme that effectively makes each partner slightly better off than before.