

Maximising the value of supply chain finance

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MAXIMISING THE VALUE OF SUPPLY CHAIN FINANCE

by

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Supply Chain Finance (SCF) arrangements aim to add value by taking a cooperative approach to financing the supply chain. Interest in SCF has been increasing, and decision makers need a comprehensive view of possible applications and their potential. By means of theoretical and empirical exploration, we develop a conceptual framework that allows for positioning of SCF concepts and practices. The framework is based on a delineation of four archetypal SCF policies and the criteria that are relevant for adoption of each policy. The two main contributions of our framework are: (1) it explicitly considers operational motives as well as the financial motives that could prompt a firm to engage financial cooperation; and (2) it uses a discounted cash flow approach to illustrate the trade-offs that arise from different risks in SCF implementations. We use the framework to review policies that have been used in reverse factoring, an SCF practice that has recently become popular. Our study reveals implications for all the parties involved in an SCF implementation.

Key words: Supply Chain Management, Finance, Reverse Factoring, Conceptual Theory Development, Framework

1. INTRODUCTION

As a result of global sourcing and outsourcing, modern supply chains have become longer, more complex, and in many cases more vulnerable (Wagner and Bode 2008, Blackhurst et al. 2011). Not only has the operational management of these chains become more challenging, but also the associated financial management. Firms are more vulnerable to exchange rate movements, counterparty default, and other such risks. On top of this, the financial crisis of 2008 exposed the goods and cash flows of many firms to increased volatility, so operations and finance managers are increasingly driven to interact with each other. Otherwise, for example, while the operations manager may want to cope with demand uncertainty by investing cash in safety stocks, the financial manager strives to preserve cash to try to cope with cash flow uncertainty. Risk management is thus a complicated and sometimes contentious matter. It is not always clear what actions are more beneficial (e.g., investing or preserving cash?) or even what the key underlying trade-offs for value creation may be. Recently, Sanders and Wagner (2011) call for more awareness of the weaknesses of taking single perspectives and single-method approaches to SCM challenges, as these can render misleading and incorrect analyses. Multidisciplinary and multi-method research can facilitate more holistic solutions on emerging research topics such as the supply chain-finance interface. Against this challenging background, Supply Chain Finance (SCF) has emerged as a concept that aims to add value through cooperative financial arrangements between members of a supply chain.

Despite increased interest, adoption, and foreseen expansion (McKinsey 2010), SCF has received little attention from the scientific community. Researchers in the field of Operations Management are showing some interest for the interface of finance and operations (Birge, Kouvelis, and Seppi 2007), but this literature generally treats firm-level decision problems or problems in the context of a competitive game (e.g., Kouvelis and Zhao 2011). The cooperative aspect that is characteristic of SCF applications is then lacking. One notable exception is the work of Pfohl and Gomm (2009), who present a general SCF model, where a firm can obtain cooperative financing from another firm in its supply chain, rather than from an external financier. We extend their perspective by examining the dimensions and trade-offs in the decisions of an SCF benefactor, a firm that engages a financing arrangement that can benefit firms upstream in its supply chain as well as itself.

Our exploration in this paper is theoretically based on literature as well as empirically based on industry observations. We distinguish the strategic orientation and the tactical orientation of SCF activities and show that an SCF benefactor can consider two approaches to each, allowing for a total of four SCF policy archetypes. Using a discounted cash flow (DCF) approach, we then identify five criteria relevant to selecting a policy that maximizes shareholder value. Together, the policy archetypes and criteria constitute a framework that allows us to position the policies employed in SCF applications and consider when a particular policy may maximize value for an SCF benefactor and/or for the supply chain as a whole. We validate the scientific and managerial implications by considering the current state of a popular SCF application, reverse factoring.

The structure of the remainder of this paper is as follows. In Section 2, we discuss the literature related to SCF. In Section 3, we develop the SCF framework. In Section 4, we consider reverse factoring and show how contemporary applications fit within our framework. In Section 5, we present our conclusions and managerial implications.

2. LITERATURE

There is an apparent lack of consensus among management scientists and professionals about the definition of SCF. Aberdeen (2011) observes two competing viewpoints: SCF is either a technology solution or a topic within trade finance which includes letters of credit and export financing. Moreover, the term SCF is frequently used to identify one particularly popular application, reverse factoring (see, e.g., Eurofinance 2007, Milne 2009, Seifert and Seifert 2011). Reverse factoring is a cooperative implementation of traditional factoring, a financial service that involves the sale of receivables to a factor (Klapper 2006). (See Section 4 for a detailed consideration of reverse factoring.) Ultimately, rather than providing another definition, Aberdeen (2011) propose a common goal for SCF: ‘to facilitate transactions between trading partners by providing financing and payment options that are negotiated to improve each other’s financial position.’

While some aspects of SCF may be novel, the basic concept of facilitation or intermediation of credit between firms in a supply chain is well established. In the US, some firms – e.g., in the automobile industry – have provided financial services to customers through so called ‘captive finance subsidiaries’ for more than half a century (Roberts and Viscione 1981). These services include wholesale financing and as well as purchase of receivables. Brennan

(1988) calls this practice ‘vendor financing’ and shows why firms might engage in it: essentially, it is a mechanism that allows for price-discrimination. Interestingly, Brennan (1988) finds that vendor financing is not profitable as a standalone activity, but only in combination with sales activities. Despite being a form of a financial intermediation between supply chain partners to generate value, the practice of vendor financing has not been linked to SCF. It could be argued that while these financing services address the customer or marketing-interface, SCF applications often address the supplier or operations-interface, which falls within the discipline of Supply Chain Management.

From the supply chain perspective, there is a growing body of research that integrates (corporate) finance theory with concepts of operations management, such as inventory theory, production control, or capacity planning. In an early example of such work, Birge (2000) uses option pricing theory to show that risk can be incorporated into planning models by adjusting capacity and resource levels. Buzacott and Zhang (2004) show how asset-based financing decisions can be incorporated into production decisions. Gupta and Wang (2008) show the impact of trade-credit terms on a stocking policy when demand is random. Protopappa-Sieke and Seifert (2010) introduce a model that determines the optimal order quantity under working capital restrictions and payment delays to analyze trade-offs between financial and operational metrics. Kouvelis and Zhao (2011) study a retailer’s ordering and supplier’s price setting decisions when the retailer is financially constrained. These works yield valuable insights to how finance and operations interact, but they do not explicitly address the ambition of a *cooperative* approach to financing a supply chain.

Pfohl and Gomm (2009) make an important conceptual contribution to the definition and role of SCF. They claim that SCF should ‘save capital cost by means of mutual adjustment or completely new financing concepts.’ Their model assumes fundamental information asymmetries between supply chain actors and external financiers: the former can better assess the potential of new business opportunities within the chain. Consequently, a firm that wishes to invest in a project may obtain a more reasonably priced loan from a credit-worthy trading partner than from external sources. If the project relates to shared business interests, this form of financing may be mutually advantageous for both firms. Such ideas are operationalized in other recent works: Randall and Farris (2009) propose that firms in a supply chain adjust inventory ownership or credit terms, based on their different costs of capital; Hoffman and Kotzab (2010) advocate minimization of working capital costs by

considering the cash conversion cycle of the whole supply chain. While this literature highlights some important elements of SCF, such as resolution of information asymmetries or leverage of credit differences, the policy choices for SCF implementation – most particularly, the different levels of risk and return that firms may face – are worthy of further exploration.

The concept of risk versus return is central to much of modern corporate finance theory (Brealey et al. 2011). It underlies cornerstones such as Modern Portfolio Theory (MPT) and the Capital Asset Pricing Model (CAPM). As is common with most fundamental financial models, MPT and CAPM assume a perfect capital market, i.e., one with full information and no transaction or bankruptcy costs. Under this assumption, the seminal work of Modigliani and Miller (1958) proves that capital structure decisions (i.e., choice between debt and equity financing) have no effect on the value of the firm, nor on the cost and availability of capital. This work yields a traditional argument for separation of investment and financing decisions. It is well known, however, that real capital markets do not operate perfectly, due to phenomena such as taxes, differences in information, and agency problems (Myers 2001). Agency problems can arise between managers of a firm and the equity holders (Jensen and Meckling, 1976) as well as between debt and equity holders. Myers (1977) explains how these problems may even result in an ‘underinvestment problem,’ where managers choose not to undertake projects that have positive net present value.

These insights from corporate finance theory can be reflected in SCF decisions. First, returns (i.e. magnitude of cash flows) from investment or financing activities are to be considered in combination with their relative risk (i.e. uncertainty of cash flows). Second, a firm can modify its investment and financing decisions to account for capital market imperfections. These trade-offs will be addressed in the SCF framework below.

3. A SUPPLY CHAIN FINANCE FRAMEWORK

Our framework stems from consideration of the two main decision dimensions of an SCF implementation: the strategic orientation and the tactical orientation. These dimensions lead us to delineate four archetypal SCF policies and a set of five adoption criteria. The policies and adoption criteria together constitute the framework. Our development primarily takes the perspective of an SCF benefactor, i.e., firm that uses its financial strength to positively change financing conditions for firm(s) upstream in its supply chain. These upstream firms we denote as SCF beneficiaries. We assume that the ultimate objective of an SCF benefactor

is to maximize its own shareholder value, and we use a discounted cash flow (DCF) approach to illustrate key investment trade-offs in execution of SCF. Despite focus on the SCF benefactor, our framework allows us to derive some implications for SCF beneficiaries, as well as for a financial institution that may enable the arrangement.

We motivate our framework in the setting of a trading relationship: a corporate buyer that purchases raw materials from its suppliers to convert and re-sell them as finished goods to its customers. The buyer is the SCF benefactor, intending to enter into an SCF arrangement with its suppliers. The SCF arrangement provides the suppliers more favorable access to financing. In this context, the buyer foresees multiple purchase transactions (rather than a single one) with its suppliers over a projected time horizon. The total value of these transactions for the buyer is assumed to be a function of expected demand, commercial conditions offered by each supplier (price and other terms), and supply conditions resulting from the operational capability of each supplier, such as service level, lead-time, and product quality.

Strategic orientation: collecting direct returns from offering SCF or indirect returns from mitigating operational risk through SCF?

Pfohl and Gomm (2009) note that an SCF benefactor can collect benefits directly and/or indirectly from an SCF arrangement. Direct return can be extracted from the benefactor's advantage in financing costs, while indirect benefits can result when the investment opportunity under consideration is one of mutual interest. Here we highlight the nature of these benefits in our general setting, and explain how they affect the SCF benefactor.

In corporate finance theory agency problems often arise between stakeholders of a firm, such as managers, creditors, and shareholders (Tirole 2006). In a supply chain, agency problems could arise in agreements between firms. When a firm makes an investment decision that affects operations (e.g., production or inventory), it maximizes its own firm value, but the same decision is not necessarily value-maximizing for the firm's supply chain counterparts. Underinvestment problems may arise, in the sense that a particular firm may not invest in the way that creates value for its downstream counterparts. For example, while a supplier might potentially increase a buyer's value through lead-time reductions, batch-size reductions, or service-level improvements, returns on the required additional investments (e.g., in capacity or inventory) may be insufficient or too uncertain, given the supplier's cost of capital or risk

aversion. Due to capital market frictions, the supplier's access to funding may be constrained, resulting in different investment priorities or an inability to invest in its operations at all. There might also be operational arguments for the supplier not to invest up to the level that the buyer would like. Consider, for instance, the decision on the right safety stock level for a standard stochastic inventory model (e.g., Silver, Pyke, and Peterson 1998). A firm's financing costs may directly affect this decision, since capital holding costs of inventory should be recognized in the trade-off with expected shortage costs. The supplier's cost of capital may well dictate a service level that is below the desired service level of its buyer. The buyer's losses from this lower service level may be greater than the cost the buyer would incur to finance additional safety stock for the supplier. One can imagine similar agency problems between a buyer and a supplier concerning operational investments in capacity, lead-time, or batch-size. Although the literature on supply chain coordination of incentives through contracts is well-developed (see Cachon 2003 for a detailed review), the potential of SCF as a rectifying mechanism remains relatively unexplored. Recently, Babich (2010) explored the interaction of capacity ordering financial subsidy decisions to a risky supplier; he found conditions in which these decisions are (in)dependent and the optimal policy for the subsidy decision.

The value of solving such supply chain underinvestment problems may be large. Hendricks and Singhal (2005) have shown empirically that publicly announced 'supply chain glitches' (i.e., mismatches of demand and supply) are associated with high financial performance penalties. Moreover, it seems that the firms surveyed in their study do not recover quickly from the negative economic consequences of a supply chain disruption. In another study on supply chain risks, Wagner and Bode (2008) find empirical support for negative associations between supply chain performance and supply and demand risks. Thus, in addition to saving financing costs or improving liquidity in general, SCF may yield value by solving underinvestment problems that restrict (i.e., risk) the supply chain's ability to match supply and demand adequately. Through an SCF arrangement, a buyer may enable a supplier to engage in operational investments that it normally could not or would not undertake. SCF could help a supplier (re)invest in means to reduce the buyer's operational risk exposure; for example, by increasing inventory levels and reducing supply uncertainty. Alternatively, SCF may enable the supplier to (re)invest in means to improve its own operations, based on which a buyer can in turn improve its own efficiency. For example, supplier investment to achieve a lead-time reduction may enable a buyer to reduce inventory levels for raw materials. SCF

can therefore be used by buyers as a tool for mitigating operational and/or supply risks and improving inter-firm operations.

The foregoing considerations lead us to distinguish two strategic orientations for an SCF benefactor: a 'return-oriented strategy' or a 'risk-oriented strategy.' With a return-oriented strategy, the SCF benefactor aims to reap direct financial benefits from offering SCF. Contrastingly, with a risk-oriented strategy, the benefactor aims to benefit indirectly (through the medium of operations), by using the SCF mechanism to mitigate underinvestment problems present in its supply base. A risk-oriented strategy can increase the level cash flows in the longer run, but requires investment and thus risks cash flows that would otherwise have been collected with a return-oriented strategy.

The strategic orientation is of course not a discrete choice, but rather fits on a continuous scale between extremes. An SCF benefactor can try to earn more returns directly from SCF activities, but this would limit its opportunities of benefiting operationally (risk-wise) from SCF, and vice versa. This trade-off results because the SCF beneficiary is limited in the use of a new source of capital if that source is linked to a mechanism that reduces the firm's value generation capabilities. For example, if the buyer requires a price reduction, payment term extension, or another type of direct compensation for implementing SCF, the supplier's returns from transactions with that buyer decrease. This decrease impacts the supplier's investment decision. The less return an operational investment can generate for the supplier, the less attractive it becomes for the supplier to invest in it. By providing its supplier more 'slack' to invest in its operations, the SCF benefactor invests its direct returns to earn (in risk-adjusted expectation) more returns on the longer run.

As the cash flows from the return-oriented or risk-oriented strategies have a different profile in terms of size, timing, and inherent risk, the SCF benefactor needs to weigh all these elements carefully in determining an orientation that maximizes shareholder value. Figure 1 shows that, with a discounted cash flow approach, the expected return, investment risk, and planning horizon are essential ingredients for the choice of strategic orientation. Supposing that a return orientation yields a constant expected cash flow over time, its cumulative returns can be expressed as a straight line (see the line 'R' in the figure at left). The dotted lines '1,' '2,' and '3' represent possible scenarios of a risk-oriented strategy, i.e., the expected returns from investment in the supplier. After an initial investment, the project accelerates and is

expected to generate additional cash flows on the long run. Scenario ‘3’ illustrates a scenario where an investment accelerated and generated higher returns than ‘R,’ but was not able to compensate for the initial foregone cash flows within the planning horizon. The timeframe is thus important. The figure on the right shows the cumulative risk-adjusted cash flows of all the scenarios, including R. The dotted lines above the arrows illustrate the case when the cash flows of the risk-oriented scenarios are exposed to the same level of risk as that of the return-oriented scenario, i.e., all scenarios have the same discount factor. The dotted lines beneath the arrow illustrate the case when the cash flows from the risk-oriented scenarios have a higher risk profile, i.e., a higher discount factor for 1,2, and 3. As project risk increases, 1 and 2 become less attractive scenarios, since as the time required to exceed the cumulative value of a return oriented strategy increases. The cumulative cash flows of 2 do not exceed that of R at all, so it is not an acceptable undertaking. In financial terms, the operational benefits from a risk-oriented strategy are penalized both by the additional risk and the additional time it takes to realize the cash flows. Thus the additional return, risk and time horizon have to be considered by the SCF benefactor altogether when making the strategic orientation decision.

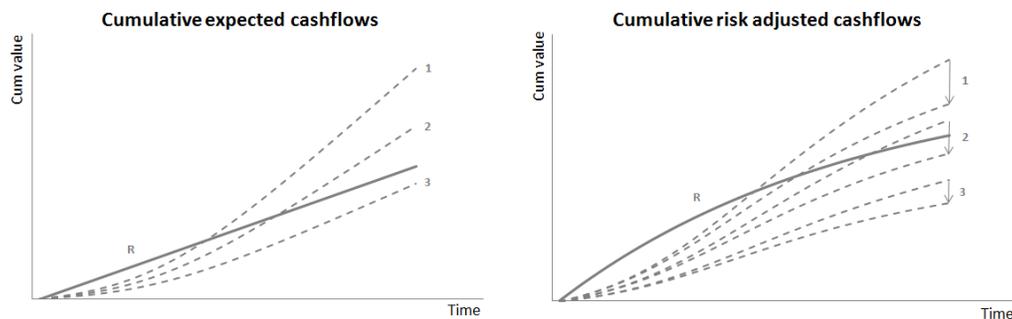


FIGURE 1. CUMULATIVE EXPECTED CASH FLOWS (LEFT) AND RISK ADJUSTED EXPECTED CASH FLOWS (RIGHT) FROM A RETURN-ORIENTED STRATEGY (R) AND THREE RISK-ORIENTED STRATEGIES (1,2, AND 3)

Tactical orientation: minimize initial investment cost through uniformity or maximize long-run returns through customization?

Golicic and Mentzer (2005) draw an analogy between a firm’s varied relational involvements and the management of a portfolio of different investments. According to them, firms’ relationship structures can be described by two dimensions: ‘type’ (i.e., governance) and ‘magnitude’ (i.e., intensity). Despite a correlation between these dimensions (magnitude is

generally greater in integrated than in arms-length relationships), they observe that firms can engage in various levels of magnitude given a certain relationship type. Similarly, we introduce here a tactical dimension to SCF, which shares a common driver (value maximization) with the strategic orientation, yet its implementation may differ according to the nature of relationships between SCF benefactor and beneficiaries.

The supply base of a large corporate buyer, such as an OEM or a major retail chain, can include hundreds or even thousands of suppliers. Depending on the degree of heterogeneity among the suppliers in an SCF benefactor's supply base, SCF arrangements can present a wide distribution of (expected) value opportunities, regardless of the strategic orientation pursued (return-oriented or risk-oriented). Cost of capital can vary between suppliers, independently of the extent to which the buyer may suffer from the a supplier's operational underinvestment. For example, the service level for some critical raw materials may impact the SCF benefactor's firm value much more than the service level of other materials. Some suppliers may experience substantial benefits from an SCF arrangement, yielding in turn substantial returns to the SCF benefactor, while others may experience lesser benefits, yielding lesser returns. Likewise, the ability to finance (ongoing) operational investments varies by supplier. The financial and/or operational status of a supplier thus conditions the potential benefit that an SCF arrangement can yield.

The initial investment required to capture the value of an SCF arrangement may also differ for each relationship. For example, a corporate buyer may not always have the information needed to judge the expected returns from an SCF arrangement from each supplier, and the effort to be exercised to gain and process information may be great. Pursuing a risk-oriented strategy may pose additional decision challenges to an SCF benefactor, compared to a return-oriented strategy, due to the complexities involved in identifying and targeting specific operational investment opportunities at a supplier. Even identifying a supplier's financial status can be far from trivial. The supply base of a buyer firm can contain many SMEs, for which financial credit information is not readily available. Financial statements for exchange-listed firms may be retrieved, but these do not always reveal complete information about a firm's financing restrictions, conditions, or preferences. Besides the cost of capital, many other factors influence a firm's financing and investment decisions. To identify these factors, an SCF benefactor may need to engage in direct dialogue with a supplier. Nonetheless, firms may not be willing to share financial information: business preferences

can be based on counterparty credit risk assessments. For example, a supplier close to financial distress may prefer that a customer not know this.

In order to assess the value of solving supplier underinvestment opportunities, the buyer may need to process information on the operations of its supplier. This can make the SCF value assessment process very labor intensive. As with financial information, the supplier may consider operational information to be sensitive and not wish to share it fully. Although financial and operational transparency between firms may be invaluable for an SCF implementation, the motivation for transparency may be impeded. This already seems to be the case with reverse factoring programs (Milne 2009). Moreover, agency conflicts could arise in the information transfer activities. An SCF beneficiary could selectively convey or even distort information in order to benefit itself, at the potential cost of the SCF benefactor.

Information is not the only area where an SCF benefactor could expose itself to agency problems when pursuing a risk-oriented strategy. A supplier may misuse an SCF arrangement that facilitates improvement of service levels. Instead of raising service levels for the SCF benefactor, the supplier may give preference to other (more profitable) customers. Such problems of moral hazard are recognized in the literature of corporate finance, and (contractual) remedies are generally prescribed. These kind of measures need be carefully devised and implemented, however, and thus may entail considerable costs.

The foregoing considerations lead us to distinguish alternatives for the tactical orientation of an SCF benefactor: a 'uniformity tactic' or a 'customization tactic.' With a uniformity tactic, the SCF benefactor offers SCF arrangements to supply chain counterparts in a standardized way. With a customization tactic, the SCF benefactor attempts to customize each SCF arrangement to the problems and opportunities of a specific supply chain relationship. Customization can improve the level or risk of cash flows of the SCF implementation, but usually requires additional initial investment in, e.g., legal, information, organisational, or operational processes.

As with the choice of strategic orientation, choice of tactical orientation lies on a continuous scale. In addition, although dependencies may occur, the strategic orientation and tactical orientation are in principle independent. Customization follows principally from the

opportunity to create value by differentiating the offer of SCF to a specific or a group of SCF beneficiaries. The costs of differentiation result from the following activities:

1. Obtaining, verifying, and monitoring information from SCF beneficiaries.
2. Offering different participation conditions to SCF beneficiaries.
3. Monitoring, controlling, incentivizing, or penalizing behavior of SCF beneficiaries.

Obtaining, verifying, and monitoring information from SCF beneficiaries allows the SCF benefactor to take actions that generate value. This value is manifested either through greater expected cash flows or decreased risk in cash flows from the SCF arrangement. For example, by gathering better information on a supplier's financial state a buyer may adjust its compensation requirements from an SCF offering. Similarly, by gaining better knowledge of a supplier's operations, a buyer may adjust its operational requirements from a potential SCF arrangement (e.g., a service level improvement or lead-time/batch size reduction, based on the expected value for the buyer). By understanding the potential losses from agency conflicts, a buyer can take specific measures to lower the risk that a supplier would act in a disadvantageous way. These customizations require the SCF benefactor to initially invest more in legal informational, organizational, and operational processes, increasing the initial cost of the customized tactic. Some economies of scale may be achieved if supplier characteristics are already relatively homogeneous. Due to extra cost and risks associated with collecting the benefits of the customized tactic, the marginal value of additional customization will for all firms become zero at some point.

To determine a tactical orientation level that maximizes value, an SCF benefactor must consider the additional initial investment, the level and the risk of the additional returns, and the desired timeframe for collection of returns. Figure 2 shows, in the discounted cash flow setting, how these factors interact. The graph at the left illustrates the cumulative expected cash flows of select scenarios while the one at the right shows the risk-adjusted cumulative cash flows. Scenario '1' (continuous line) represents a scenario in which no customization takes place, i.e., a uniformity tactic. Scenarios '2' and '3' (dotted lines) represent scenarios with increasing investment in customization. By investing in customization initially, one can collect additional returns over time. When comparing the risk-adjusted cash flows with the cumulative cash flows, we see the greater expected time needed for the value of the customization tactics in scenarios '2' and '3' to exceed the value of the uniformity tactic in scenario '1.' Risk entails a longer expected time to break-even. In addition, while scenario '2' creates value as the risk-adjusted cash flows exceed the required additional initial

investment cost, scenario '3' does not generate value and should therefore not be pursued. As with the strategic orientation, the additional return, risk and time-span of customization have to be considered by the SCF benefactor in deciding the tactical orientation.

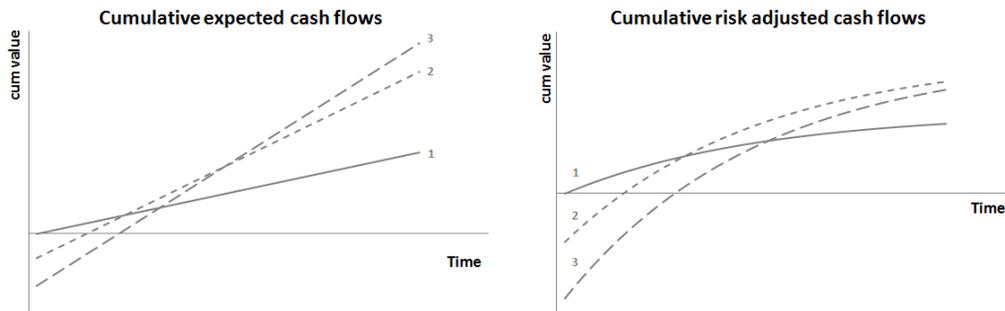


FIGURE 2. CUMULATIVE EXPECTED CASH FLOWS (LEFT) AND RISK-ADJUSTED EXPECTED CASH FLOWS (RIGHT) FROM VARIED CUSTOMIZATIONS (1,2, AND 3)

An SCF framework

Based on the available alternatives for strategic or tactical orientation we can identify four archetypal implementation policies for an SCF benefactor: Return-Uniform, Return-Custom, Risk-Uniform, and Risk-Custom (see Figure 3). The foregoing discussion also allows us to distil five key adoption criteria that condition an SCF benefactor's optimal choice of policy. These criteria will be summarized in the paragraphs below. With archetypes and key criteria in place, we can suggest an SCF framework that allows management by exception. By listing for each criterion and each policy the ideal scenario for an SCF benefactor, the framework provides a means for managers first to estimate the SCF archetype that fits best with their business situation, then subsequently identify criteria where the fit to archetype may be improved. We conclude this section with some examples of management by exception in the context of our framework.

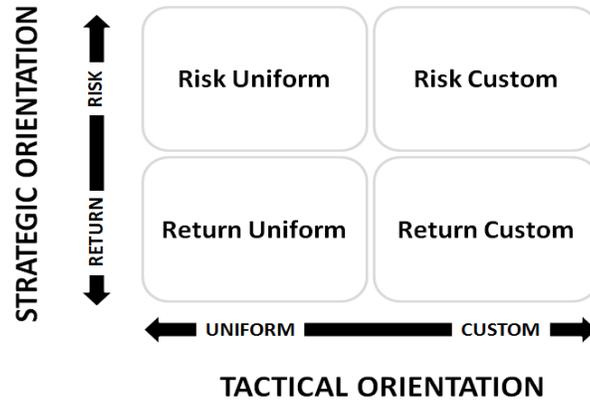


FIGURE 3. ARCHETYPAL SCF POLICIES

Adoption Criterion #1: expected return from reducing operational underinvestment in the supply base. If a buyer is aware that its suppliers’ operational investment level (e.g., inventory or capacity) is suboptimal from a supply chain perspective, the buyer could generate substantial value by facilitating further investment. This would require a risk-oriented strategy. If suppliers are expected to invest and perform operationally as required, however, then taking a return-oriented strategy would be more appropriate.

Adoption criterion #2: investment risk of reducing operational underinvestment in the supply base. Pursuing operational investments as part of an SCF arrangement may expose a buyer to more uncertainty in returns, despite greater expected values. As the uncertainty of returns from a risk-oriented strategy becomes substantial, the discounted returns of this strategy may prove inferior to the discounted returns from a return-oriented strategy.

Adoption criterion #3: required timeframe for collection of benefits. The risk-oriented strategy and the customization tactic each entail additional time for the collection of (additional) value from an SCF implementation. Due to business terms and/or conditions, a buyer may prefer to realize benefits more rapidly. For example, a buyer in a competitive, dynamic industry, such as the retail sector, may experience a relatively high efflux in its supply base. This makes it very difficult to pursue investments or apply customizations, and the shorter timeframe of the return-uniform policy would be preferable to longer timeframe of the risk-custom policy. In contrast, supply relationships in the capital goods industry may last relatively long and be critical to a buyer. The risk-custom policy then becomes attractive.

Adoption criterion #4: expected additional return from customization. The expected additional benefit from customization depends on the characteristics of a particular supply base. In some instances, suppliers may all experience similar financial conditions. A buyer pursuing a return-oriented strategy may then introduce SCF uniformly, since customization would yield little additional value. Likewise, suppliers could be operationally homogeneous, e.g., if they experience similar problems with insufficient capacity. The buyer may uniformly pursue a risk-oriented strategy, with the aim of realizing a general increase in supplier capacity. If suppliers are heterogeneous, the buyer may achieve additional returns by applying customizations appropriate to the financial and/or operational characteristics of each supplier.

Adoption criterion #5: investment cost of customization. Customization may require a substantial investment in information systems or organizational and contracting processes. The level of investment required will depend on a buyer's existing capabilities and the characteristics of relationships with the supply base, such as the level of interaction, visibility, and trust.

Table 1 indicates the ideal scenario for each archetypal SCF policy. For example, a return-uniform policy would be best when the additional returns from solving operational underinvestment at suppliers are relatively low, the incurred investment risk of solving them is relatively high, the required time-span to collect benefits are short, and customization is more costly than the (risk-adjusted) additional return it could create. The reality of a specific situation may of course not fit perfectly to one of the archetypes, but this structure allows a manager to see *where* the fit must be improved. For example, if an SCF benefactor identifies significant value in solving supply underinvestment opportunities, but the current timeframe for collection of benefits is short, it could consider the ways to extend the timeframe. Would extending the contractual length with its suppliers be a viable option? If there is significant value in solving underinvestment opportunities, but the investment risk of these opportunities are high, it would need to consider introducing risk mitigation measures. Would customizations that would reduce potential agency conflicts be worthwhile? An SCF benefactor that observes significant value in customizing, but faces a high cost of customization, may consider outsourcing or collaboration with industry partners. Are there entities that can obtain and process information more cheaply?

| SCF POLICY | Return Uniform | Return Custom | Risk Uniform | Risk Custom |
|--|-----------------|---------------|--------------|----------------|
| 1. Expected additional return from solving underinvestment | Low | Low | High | High |
| 2. Investment risk from underinvestment opportunities | High | High | Low | Low |
| 3. Time span to collect benefits | Very short term | Short term | Long term | Very Long term |
| 4. Expected additional return of customization | Low | High | Low | High |
| 5. Investment cost of customization | high | Low | High | Low |

TABLE 1. ADOPTION CRITERIA FOR SCF POLICIES

4. REVERSE FACTORING

In this section, we consider the current usage of reverse factoring (RF) in the context of our SCF framework. RF is a form of SCF that has recently received increased attention (Eurofinance 2007; Milne 2009; Hurtrez and Salvadori 2010; Seifert and Seifert 2011). It is already used by major firms such as Nestlé, Metro, and Volvo (Milne 2009). Our analysis is based on information from trade and scientific literature and on the content of interviews conducted at two major corporations that have implemented reverse factoring. We find that our framework not only allows a categorization of observable RF policies, but also indicates why some possible variants of RF are in practice rarely encountered. In order to reach our conclusions, we first explain the essence of the RF concept. Subsequently we highlight benefits and challenges that extend beyond the concept, and finally we evaluate actual application of RF from the perspective of strategic and tactical orientations.

Factoring and Reverse Factoring

Factoring is a financial process wherein a specialized firm – the ‘factor’ – purchases the right to the future cash flow entailed by one of a firm’s accounts receivable (Soufani 2002). The factor makes immediate payment to the seller of the receivable: the remitted funds correspond to the face value of the account receivable, minus an interest charge and a transaction fee. The interest charge is composed of a time portion, based on when the cash flow is scheduled to occur, and a risk portion, based on the risk that the debtor may ultimately default on the payment. An important distinction is thus made between recourse and non-recourse factoring (Klapper 2006). In recourse factoring, the seller is liable for any payment deficiency of the debtor; the factor will then only incur a loss in case both the debtor defaults and the client cannot make up the deficiency. In non-recourse factoring the seller is not liable for debtor default. Factoring thus differs from a secured bank overdraft or a loan, as more emphasis is placed on the risk and value of the receivable, not only on the seller’s general

credit worthiness. When debtor is a highly credit-worthy firm, even non-recourse factoring incurs little risk of default and so the interest charge imposed by the factor may be low.

RF also involves the sale of an account receivable. Whereas factoring is initiated by the selling party, however, the RF transaction is initiated when a credit-worthy debtor notifies a factor of the forthcoming payment of a receivable. The primary process is then 'reversed' (Klapper 2006). As the credit-worthy debtor explicitly confirms the receivable, risk and pricing can be optimally reconciled. Indeed, the debtor may take on a legal obligation to pay the factor and resolve any operational problems, such as quality of goods, delivery delays, or invoice errors, directly with the supplier.

RF is believed to yield benefits to all the parties involved and hence is often considered to be a 'win-win' concept (Klapper 2006; Milne 2009; Hurtrez and Salvadori 2010; Seifert and Seifert 2011). A corporate buyer improves the liquidity of its suppliers, without affecting its own financial resources. As a large corporation often has access to lower short-term borrowing rates than its suppliers, this additional liquidity comes at more competitive rate than the suppliers could independently obtain. This forms a basis for the buyer to renegotiate commercial terms, e.g., pricing or payment delays (Klapper, 2006). The factor essentially becomes a payment extension arm to the buyer and thereby gains business.

Additional Benefits and Challenges

Besides the immediate advantages of liquidity and savings on short-term financing for suppliers, RF seems to benefit SCF benefactors in ways that have not been explored in the current literature. Our interviews indicate that a buyer's negotiation power is improved, as some suppliers come to depend on the system. RF may necessitate more efficient procurement processes: faster detection of invoice errors, settlement of disputes, and digitalization of processes by e-invoicing all expedite invoice confirmation. Finally, through standardization of payment terms, buyers can bundle more disbursements, which resulted in more predictable cash flows, transactional cost savings, and simplifications in currency hedging activities.

A RF program can also bring challenges for the SCF benefactor. Several departments are typically involved in the launch – IT, Treasury, Purchasing, and Finance – which raises the

need for organizational coordination, both internally and externally (Milne 2009). Connecting to a standardized platform can be a cumbersome activity for a multinational buyer, as national accounting standards, internal procedures, or legacy systems may entail that payment processes differ between subdivisions or affiliates. The confirmation of an invoice enables financing, so the speed of invoice confirmation becomes key. This creates additional pressure on the buyer's invoicing processing and confirmation processes, especially if these processes are not automated or digitized yet. Whereas a traditional payment term may allow one or two months to process an invoice and resolve any potential issues, these steps must be completed within a couple days for reverse factoring. Suppliers may also have difficulty adapting to the new platform. For instance, a supplier may have pledged or collateralized its credit-worthy receivables in a portfolio with other assets to a credit institution, so moving receivables to RF would impact the management of existing credit. Failure to achieve a critical mass of suppliers has forced buyers to abandon their RF programs (Hurtrez and Salvadori 2010). Even in less extreme cases, costly delays may be incurred. For example, due to a lack of understanding both at their suppliers and within their own organization, Nestlé required much more time than initially expected to introduce RF (Milne 2009). Our interviews reveal that the time required for a buyer and supplier to reach an agreement on legal and commercial conditions can vary significantly, as suppliers respond differently to the introduction of the scheme and the conditions attached to it. Besides contractual terms themselves, the financial knowledge level of the supplier and the power balance in the relationship may be often be obstacles to agreement. One interviewee recommended that finance specialists from both sides always be included in discussions, in order to avoid misunderstandings or even suspicion about the workings of the RF concept.

Reduce working capital or reduce supply risk?

In the current industry practice of RF, return-oriented strategies are adopted much more frequently than risk-oriented strategies. Milne (2009) explains how KPN, a Dutch Telecom provider, introduced RF as a 'financial sweetener' to accompany an unpopular extension payment terms to suppliers. Reduction of working capital is often touted as the buyer's primary gain from RF (Lewis 2007; Milne 2009; Hurtrez and Salvadori; 2010; Seifert and Seifert 2011). By offering RF, a buyer can have an extended payment term, without forcing the supplier to wait longer for payment. The additional credit that is realized by the longer payment term reduces the buyer's working capital requirement. This is associated with increased financial efficiency as it implies that less capital is needed to run a firm's

operations. Based on a survey among executives, Seifert and Seifert (2011) report that buyers have achieved an average working capital reduction of 13%. Other reported benefits include ‘standardization of payment terms,’ ‘improved vendor relationship,’ ‘reduction of prices,’ and ‘information gain about supplier’s finances.’

Inclination toward a risk-oriented strategy is, however, evident in some instances of RF. Aepfel (2010) explains how Caterpillar introduced RF as part of a program to ‘gear’ its supply base after the credit crisis. Volatile demand had put the firm’s suppliers under great stress: liquidity problems had forced some suppliers to reduce capacity or cut inventory drastically. At one of the firms we visited, RF is seen as a way to secure preferential treatment when faced with shortages in the supply base. As the firm’s representative explained, ‘suppliers can advance payments through our platform within days, while from other customers they have to wait much longer for payment.’ This firm did not re-negotiate any commercial terms with their suppliers as part of their RF implementation, nor did they introduce a change in their commercial conditions before implementation. They found the potential returns from renegotiating commercial conditions based on RF to be insignificant. Nevertheless, they proceeded with implementation as they believed that RF would significantly contribute to the suppliers’ operational resilience in dealing with volatile demand. The impact of missed revenues could be substantial when a supplier were not able to meet requirements of a large order at short notice. RF could thus be an investment in the flexibility of the supply base, enabling it to follow the needs of the customer. The benefit or value of solving underinvestment problems by RF can sometimes reach an acceptable level for a buyer firm to pursue this risk-oriented strategy. Identifying the value and the level of risk of solving operational underinvestment problems quantitatively is, however, by no means straightforward. New models are needed to provide insights in how operational decisions are impacted by financing decisions in RF applications and vice versa. For instance, Cetinay et al. (2012) characterize an RF contract that maximizes the operational and financial benefits to each party in different production settings.

Customization based on financial and/or operational attributes?

It appears quite common that an SCF benefactor will employ customization in order to increase benefits from return-oriented strategy. From an interview we learned that a firm can adjust the payment term extension individually for each supplier, based on their different financial states, in particular the current cost of short-term borrowing. The buyer thus

discriminates between its weaker and stronger suppliers according to the financing benefits the reverse factoring scheme yields for them. The factor may support this type of customization activity by helping to determine a supplier's financial status. The resulting additional revenues may be shared between the buyer and the factor. For smaller suppliers such information may not be available, however, so buyer and/or factor would have to resort to estimation procedures.

Instances of risk-custom policies for RF do not yet appear to exist. From the perspective of our SCF framework, this entails that some buyers may neglect potential benefits of an RF implementation. When customization is driven by a return-oriented strategy, the SCF benefactor's attention will tend to focus on large suppliers, since these generate the highest potential return. Such suppliers are not necessarily the ones that offer highest value for the supply chain. Given more favorable access to capital, other suppliers might generate significant value through operational improvements. Since RF influences both the cost and availability of capital to a supplier, operational objectives can drive the customizations of an SCF benefactor. A buyer may require suppliers to use the capital released through RF for investments in service level increase, lead-time reductions, more efficient lot-sizing, etc. Implementation of such customizations is likely to be more challenging than customization for a return-oriented strategy, but they may generate more value in the long term, as financial resources become more attuned operational needs of the supply chain. Active consideration of the operational attributes of a supplier is needed, so the negotiation of RF becomes more than a discussion of adjustments in pricing or payment term. Better scientific and practical models will help, but the transfer and processing of information between supplier and buyer may need to be more intensive than in current implementations. Financial institutions that provide RF services could thus invest in information technology that would facilitate customizations based on operational needs.

5. CONCLUSIONS AND MANAGERIAL INSIGHTS

Researchers and practitioners are exploring SCF concepts and applications that enable a firm to influence the financing of supply chain counterparts. Pfohl and Gomm (2009) and others have identified the overall aim of SCF to be a cooperative approach to financing, where all participants realize some benefit. In this study we extend the SCF concept by developing a framework for understanding the decision choices and value dimensions of the SCF

benefactor, the firm that exploits its financial or informational state to facilitate capital access for its supply chain partners. Although we have not empirically tested our framework on a large, random sample of SCF implementations, we believe that it advances issues that will be important in future SCF research and practice. Our contribution lies in explicit recognition of operational and risk motives for inter-firm financing decisions, as well as the motive of financial return. By means of four policy archetypes and five adoption criteria that constitute the framework, managers can orient their attention to the most valuable form of SCF for their organization, and also identify points of deviation that may be addressed before moving to implementation.

We use the framework to evaluate the policies applied in reverse factoring, an SCF application that is increasingly being adopted by investment grade firms. We conclude that return-oriented strategies are more commonly applied than risk-oriented strategies, and even where the latter are followed, customization tactics rarely or never pursued. We attribute these findings to the challenges that a buyer faces in assessing the value and risk of solving supply-base underinvestment problems, compounded by limitations on the information collection and processing systems that are needed to apply risk-oriented customizations successfully.

Our study has managerial implications for the SCF benefactors, beneficiaries, and the financial institutions concerned. SCF benefactors should explore whether risk-oriented SCF strategies and related customizations may yield more value on the longer term. SCF beneficiaries should consider the value of sharing information on underinvestment opportunities with an SCF benefactor. Financial institutions offering SCF services should evaluate investments in technologies that can support a wider range of SCF policies, so that value may be created by operational improvements and risk management as well as direct returns from short-term borrowing advantages.

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