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Financing GPNs through inter-firm collaboration?

Insights from the automotive
industry in Germany and Brazil

Abstract

Despite its obvious importance, finance is to date still a blind spot in GPN research (Coe 2012, Coe et al. 2013). This paper addresses this lacuna and focuses on the circulation of financial capital and forms of inter-firm financing in production networks in the automotive sector in Germany and Brazil. Conceptually, it takes the emerging body of literature in the field of supply chain finance (SCF) as point of departure which argues that a financial management blurring the boundaries of the single firm can increase the competitiveness of GPNs and their capacities to cope with external shocks. In empirical terms, it draws on qualitative work conducted in Germany and Brazil between 2011 and 2013. According to our explorations, instruments of inter-firm finance have been implemented in corporate practice only very recently, and with distinct variation by country. A number of observed restrictions may explain the inconsistency between SCF theory and corporate practice: On the level of the individual firm, the perception of risks, the interlinking of buying and financing relationships, divergent aims of involved departments as well as the corporate strategy and the persistence of financing practices have become evident as important influencing factors. On the level of networks power relations, conflicting interests and a lack of mutual trust represent obstacles. Thirdly, context-specific conditions – in particular the financial system and legal regulations – affect the design and use of such financing instruments. The paper concludes with a discussion of success factors of collaborative financing in GPNs and possible implications for regional development.

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1 Introduction

Finance is at the heart of every global production network (GPN). Nonetheless economic geography has just begun to address the role of finance in GPN research (Coe 2012, Coe et al. 2013). Financial flows such as payments for materials and intermediate products, investment in fixed assets, or debt financing and repayments precede and follow every economic transaction taking place in GPNs, affecting its design, vulnerability and competitiveness. Driven by the outsourcing of tasks in fragmented forms of production and a stringent working capital management by lead firms, financing requirements are more and more shifted towards upstream suppliers (cf. Hartley-Urquhart 2000, Camerinelli 2009, Randall and Farris 2009). Besides the need to fund investment in fixed assets like machinery and R&D expenses, powerful buyers demand for extended payment terms that only in part can be refinanced with trade credit granted by own suppliers. In addition, stock is reduced to a minimum by lead firms in lean forms of production and has to be held by suppliers to assure quick response times and the demanded flexibility in supply (Hofmann and Kotzab 2010).

An analysis of balance sheet data from German automotive firms illustrates this imbalance between lead firms and their suppliers. As Table 1 reveals, the Cash-to-Cash (C2C) cycle – a measure to determine how long capital is tied in the production process – significantly varies between car manufacturers (OEMs) and their suppliers: For car manufacturers, the calculated mean C2C-cycles added up to 15 days in 2011, on the supplier side, the respective value amounts to more than a triple (53 days) of this figure.

Classification (NACE)	Size	Mean	Std. dev.	Median	N
2910 (manufacturers of motor vehicles)	very large (<i>op. rev.</i> > 1 Mrd. €)	14,9	32	18,2	8
	<i>total 2910</i>	<i>14,9</i>	<i>32</i>	<i>18,2</i>	<i>8</i>
2930 (manufacturers of parts and accessories for motor vehicles)	small (<i>op. rev.</i> < 10 Mio. €)	61,5	50,7	50,9	55
	medium sized ($\geq 10 < 50$ Mio. €)	53,1	40,4	47,7	47
	large (≥ 50 Mio. < 1 Mrd. €)	44,3	24,8	43,4	42
	very large (> 1 Mrd. €)	49,6	41,5	43,7	23
	<i>total 2930</i>	<i>53,2</i>	<i>41,4</i>	<i>47,7</i>	<i>167</i>

Table 1. C2C-cycle in of OEMs and suppliers in the automotive industry in Germany, 2011

(Data source: Amadeus database, Bureau van Dijk)

Within the group of suppliers, decreasing size corresponds with an increase in the C2C-cycle time. These results are in line with Wagenvoort's finding (2003) that particularly SMEs are large net providers of trade credit – a situation he refers to as 'ironic', as stock and the gap between trade credit and debt have to be financed with the help of other sources such as bank debt. As a result, firms that are believed to raise external finance with more difficulties

and at higher costs than their customers have to shoulder large parts of the financial burden and take on a financing function for their trade partners.

From an isolated, firm-centric point of view, shifting financing requirements to partners in the production network appears to be a sound strategy. However, from a more inclusive angle, this strategy is less appropriate as advantages achieved in the lower cost of the physical chain can be rendered void by higher financial costs in total. As competition between single firms is increasingly replaced by a competition of supply chains, at the end of the day, lead firms themselves can be affected in the form of higher prices (as financing costs will be incorporated in the price of goods along the value chain), higher vulnerability (because of a lower reliability of supply) and lower competitiveness (because of the lower productivity and ability to innovate due to lower funds available for investments). This holds true in particular for producers in developing countries with high financing costs and/or restricted access to finance caused by the macroeconomic environment, the institutional and legal framework and an uncompetitive financial system (Beck et al. 2009). The example of Brazil illustrates in this context how financing problems of national Tier-2/-3 suppliers negatively affect the development of the national automotive industry: *“The funding of Tier-2 suppliers is one of the major problems of the Brazilian automotive industry”* (Tier1_5_BRA). The dependency of buyers on the financing capabilities of their suppliers becomes even more evident in times of stress. The recent financial crisis has shown how vulnerable GPNs are to financial shocks (Escaith and Gonguet 2009, Godart et al. 2009). Starting at the level of a single firm they reverberate through the network that serves as a transmission channel. As the ‘financial’ and the ‘productive’ parts of the production network are inseparably intertwined, it becomes obvious that lead firms should, and in part do, care about how their respective supply chain is being financed.

Despite its obvious importance, finance is to date still a blind spot in GPN research (Coe 2012:392, Coe et al. 2013:2). Little is known about how GPNs are financed, how the configuration of financial flows affects the configuration of GPNs and vice versa. Yet, the way in which value is created and captured and in which firms and regions are inserted into GPNs is influenced by the configuration of financial flows between firms on the one hand and firms and investors on the other hand. In the same vein Pollard (2003:442) argues that finance is integral to our understanding of firm behavior, governance and strategy. However, not only finance in GPNs but also firm finance in general remains, 10 years after her verdict, largely a ‘black box’ in economic geography. Valuable contributions such as by Pike 2006, Gärtner 2008, Muellerleile 2009, Appleyard 2013 and a broad body of literature on venture capital (e.g. Powell et al. 2002) yet demonstrate the explanatory power of a financial geographical perspective on firm finance (see Hall 2013 for an overview).

In similar vein, neighboring disciplines, especially Supply Chain Management (SCM), initially paid little attention to the collaborative management of financial flows in supply chains. Recently, more attention has been drawn on finance in SCM (e.g. Pfohl et al. 2003a,b). The emerging sub discipline of Supply Chain Finance (SCF) gives conceptual directions towards a better understanding of finance in production networks, and substantial progress has been made to develop instruments of inter-firm finance (Pfohl und Gomm 2009, Randall and Farris 2009, Gomm 2010, Metze 2010). The authors argue that flows of finance, just like flows of products and information should be analyzed and managed collaboratively between supply chains partners. A financial management blurring the boundaries of the single firm is meant to increase the competitiveness of GPNs and their capacities to cope with external shocks (Hartley-Urquhart 2000, Atkinson 2008). However, the assertion that finance is ready for inter-firm collaboration shows lack of empirical proof and needs a closer examination.

Against this background, the paper follows a twofold purpose. First, it aims to contribute to open the black box of finance in GPNs. To this end, the paper unfolds a variety of forms of inter-firm finance in GPNs within the automotive industry in Brazil and Germany. The second objective is to enrich the evolving discourse in the SCF-literature by means of highlighting factors that spur and impede the design and implementation of inter-firm financial instruments by means of new empirical evidence. Given the discrepancy between theoretical claims in the SCF literature and our empirical findings, the key argument is that financial management is only in part and under certain preconditions ready for inter-firm collaboration. As our results indicate, these preconditions refer not only to the corporate sphere, but also on network level and the level of the financial system and regulatory framework.

The next section of the paper elaborates on the literature and conceptual work on inter-firm financial collaboration and argues for the suitability of the GPN framework for analyzing financing relationships. This argument is further developed in section 3 with regard to the empirical work; in addition this section sketches the context of the study and describes the methods applied. Section four and five present results from interviews conducted with representatives in the automotive industry. First, three different sets of the instruments applied in automotive GPNs in Germany and Brazil are described, namely SCF-programs (buyer-led receivables financing), reactive instruments in times of crisis and other situative/case-specific forms of financial supplier enablement and support. Subsequently, section five outlines a series of constraints which may explain why the (theoretically given) potential of inter-firm financial collaboration in production networks has not been further exploited so far. The final section provides a brief conclusion.

2 Conceptualizing inter-firm financing within production networks

Starting point in the emerging field of Financial Supply Chain Management (FSCM) is the notion that more sophisticated methods for coordination and finance are required in modern production systems, consisting of an intricate web of interdependent actors. Conventional financing of production networks based on decisions regarding working capital optimization and investments that are made on the level of individual firms lead to results that do not exploit the benefits of collaborating in a network (Hartley-Urquhart 2000). Consequently, authors like Hofman and Kotzab (2010) ask why the field of finance should not be subject to a collaborative management just as the management of flows of goods and information already is. The essence of the concept is summarized in the words of Randall and Farris (2009:671): “In this evolution from firm to the supply chain, financial management presents an area that is ready for inter-firm collaboration”.

FSCM itself can be divided in two closely related streams of research. Both are rooted in SCM and share the holistic and collaborative approach towards the design and management of flows within supply chains. The strongly process-oriented strand of Financial Chain Management (FCM) primarily engages with the management and optimization of financial flows. More precisely, it aims to automate and expedite flows of money and data between trading partners, logistic companies and financial intermediaries. IT-systems pose the main tool for such technical improvements of the financial supply chain (Pfaff et al. 2004, Skiera et al. 2004, Skiera and Pfaff 2004, Sugirin 2009). The second strand, Supply Chain Finance (SCF), focuses on the cost of financing in supply chains and is of specific interest for exploring inter-firm finance in GPNs. Due to its novelty, SCF, however, is still a fuzzy concept¹ lacking a commonly accepted definition that would render more precisely its scope as well as the range of solutions covered. In general, SCF is an approach aiming at improving the way supply chains are financed, i.e the financial structure and flows of capital. Different instruments for SCF are based on the idea that by means of collaboration and coordination – i.e. the integration of financing processes with trade partners, investors and other services providers (e.g. logistic firms) – the overall situation for all parties involved can be enhanced. Therefore it has to be evaluated who (trading partners as well as external investors) should finance investments (in current and/or fixed assets) for how long depending on the individual access to finance and capital cost rate (Pfohl and Gomm 2009, Randall and Farris 2009, Gomm 2010, Hofmann and Belin 2011).

1 This fuzziness is related to a diffuse terminology. The term SCF is not only used to describe an analytical approach, i.e. a holistic concept for the inter-firm financial management, but also a set of instruments in trade finance mostly offered by banks (e.g. Robinson 2007) and a specific buyer-led instrument of payables financing (also called reverse-factoring, early payment programs etc.) based on credit arbitrage to give suppliers (and sometimes also buyers) access to capital at reduced rates (e.g. Hartley-Urquhart 2000, Dyckman 2009, Wuttke et al. 2013).

The greatest attention within the discourse on SCF has been paid so far to improving working capital from an inter-firm perspective; many authors even limit the scope of SCF to working capital. Working capital is defined as the difference between current assets (inventory, accounts receivable, cash and cash equivalent) and current liabilities (accounts payable, short term debt, accrued liabilities). It has a direct impact on the enterprise value (e.g. measured by the EVA) and is pivotal to the shareholder value oriented management approach. In a modern view, high levels of working capital are undesirable and a low but positive level is seen as optimal (e.g. Sagner 2010:13f.). This can be achieved by a shortening of the Cash-to-Cash Cycle (also called cash conversion cycle) – a metric conceptualized by Richards and Laughlin (1980) to measure and visualize how long capital is bound in a single firm in the value chain (Fig. 1). A firm-centric approach implies the strategy to increase days payables outstanding (DPO) by paying as late as possible, reduce accounts receivable/days sales outstanding (DSO) by receiving as early as possible and reduce days inventory held (DIH) by pushing as much inventories to the balance sheets of counterparties as possible (Harley-Urquhart 2000).

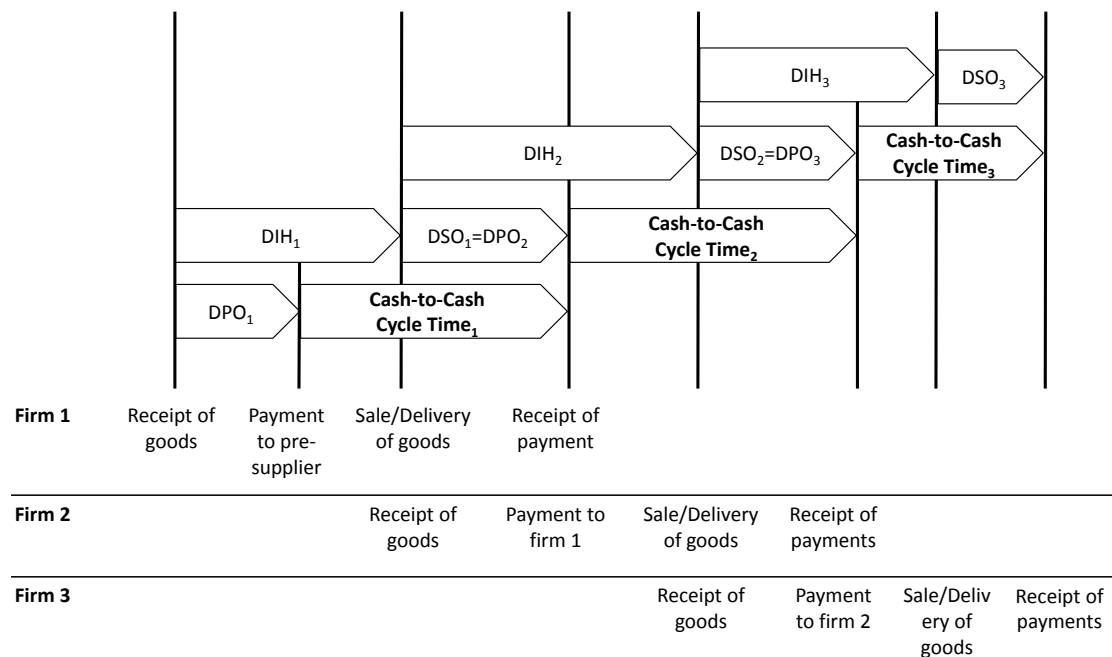


Figure 1. Cash-to-Cash Cycle (Source: authors' illustration, based on Richards and Laughlin 1980, Hofmann et al. 2011)

Figure 1 reveals that the C2C-cycles of companies within a supply chain are interdependent. In other words, DSO of a supplier are equal to DPO of a buyer. Therefore, an optimization based on the limited view of the single firm might lead to suboptimal results if the capital cost rate is not considered. Instruments of SCF come into play to make an end to this zero sum game in which buyers are trying to prolong payment terms and suppliers consequently aim at raising

prices to cope with falling margins and refinancing costs (Cavenaghi 2011). They range from a simple redistribution of financing requirements (e.g. by shifting stock holding) to the implementation of innovative financing instruments in supply chains. Likewise, the outsourcing of tasks implies shifting requirements for investments in fixed assets (e.g. for R&D, licenses) towards suppliers. Again – in theory – partners within the value chain can collaborate to either provide financing/fund investments or facilitate the access to finance in cooperation with external investors such as banks (Hofmann et al. 2011).

At the heart of different SCF-solutions is the idea to capitalize differences in the cost of capital and make use of exclusive information and dependencies between partners within the value chain to lower financing costs and/or problems when raising capital. Conceptually they are rooted in New Institutional Economics and its assumptions of informational asymmetries and principal-agent-problems arising in financing relationships. Instruments comprising the integration of external investors like the SCF-programs described below are based on a transfer of information from within the supply chain to outside investors. Providing investors with hard information by lead firms (e.g. confirmation of receivables) and thereby enhancing the transparency and visibility of information relevant for financing decisions of external investors, render an interest arbitrage possible (Hartley-Urquhart 2000). If information concerning the risk of an investment, for example due to strategic reasoning, can not – or only at high cost – be communicated to outside investors, an ‘internal solution’ in which companies within the value chain finance investments of their counterparties is also feasible (Pfohl and Gomm 2009). Congruent with contributions that explain why suppliers grant trade credit to their trading partners (e.g. Petersen and Rajan 1997, Demirgüç-Kunt and Maksimović 2001, Fabbri and Klapper 2009), Pfohl and Gomm argue that actors within the supply chain have advantages to assess and control risks related to the investment² and in addition can realize positive external effects. Agency-problems can be limited due to the close interaction between capital seeker and internal investor. Problems related to hidden characteristics and information are reduced, the danger of concealed intentions is lowered and the agent’s incentives for hidden actions are narrowed inter alia because of the potential for sanctions. They conclude, that such internal solutions are “more beneficial for companies that are strongly integrated within the supply chain and have a high level of cooperation or collaboration” (Pfohl and Gomm 2009:159).

Some evidence of forms of (informal) capital provision can be found in literature. As early as 1994, Dei Ottati (1994) described the provision of informal credit between trading partners in the industrial district of Prato, Italy. She observed how focal actors raise money with banks to relend them to their contractors co-located within the district, a process she calls ‘double financial intermediation’. Besides their contracting relationship buyer and supplier engage in

2 This is attributed inter alia to the better access to risk relevant information, particular competences to evaluate information, the stronger influence of partners in the supply chain on the outcome of the investment and liquidation advantages.

an additional – financial – relationship. Both are interlinked, concluded in two different markets (e.g. contracting and credit) and offer more benefits as a ‘package’ compared to separate transactions (see also Lazzeretti et al. 2004). Similarly, in Japanese Keiretsu mutual trust, reputation and other forms of informal institutions enhance a members access to finance, for instance by providing implicit credit guarantees (Dyer 1998, Grabowiecki 2006). However, in both cases financing relationships are embedded in a very specific socio-institutional fabric, characterized by a high amount of social capital and reciprocal dependencies. It has to be proven if the provision of interlinking credit is also possible in less tight forms of collaboration.

However limited, the literature on SCF is of specific value to a better understanding of finance in GPNs in general and of inter-firm financial collaboration in particular. But, due to its focus on the supply chain itself the concept is ‘undersocialized’ and does not account for the role of the institutional and socio-cultural framework in which relationships between firms are embedded. It can be assumed that especially the financial and legal systems are of significant influence for the design and implementation of instruments of SCF. Risks and disadvantages that may result from a closer financial collaboration are furthermore often blinded out by the authors. Actors within the value chain might have informational advantages and can better encounter certain agency-problems that external investors face. But, at the same time, inter-linking-credit and other forms of inter-firm collaboration might create new agency-problems. Moreover, internal investors have inferior possibilities to evaluate and diversify risks compared to specialized financial intermediaries like banks. Most of the shortcomings in current literature are rooted in the lack of available empirical material³ that would help render the concept and its instruments more precisely, as Gomm (2010) states: “One open issue is the collection and description of more detailed case studies of SCF” (see also similar calls by Sca-lera and Zazzaro 2009, Metze 2010, Hofmann 2011).

All in all, while the potential of inter-firm financial collaboration is beyond dispute, factors influencing the design and implementation of SCF-instruments have to be explored in more depth. Further light has to be shed on the attitudes of suppliers and buyers towards a closer financial collaboration taking into account power relations, network embeddedness and the institutional framework. As will be demonstrated in the following, the GPN framework proposed by Henderson et al. (2002) offers an appropriate analytical framework for that task.⁴

3 Notable exceptions are a recent study by the Inter-American Development Bank exploring the impact of SMEs’ access to finance of inter-firm linkages (Navas-Alemán et al. 2012) as well as case studies on firm level factors influencing the adaptation of reverse-factoring instruments provided in a contribution by WUTTKE ET AL. (2013). See also contributions by Seifert and Seifert 2011, KIT and IIRR 2010 as well as a set of studies conducted by the Aberdeen Group, a consulting firm (Aberdeen-Group 2006, Sadlovska and Enslow 2006, Tyagi 2013).

4 Interestingly, the suitability of this approach was originally questioned by the authors themselves: in footnote 13 of the original paper they stated that it is “unlikely to be of particular help, for instance, for the analysis of some forms of finance capital such as bank loans and portfolio investment” (Henderson et al. 2002: 459).

3 Specification of analysis: A GPN approach to inter-firm finance

Figure 2 displays how the GPN framework can be used as an analytical framework to analyze financing relationships in GPNs in general and instruments of inter-firm finance in particular.

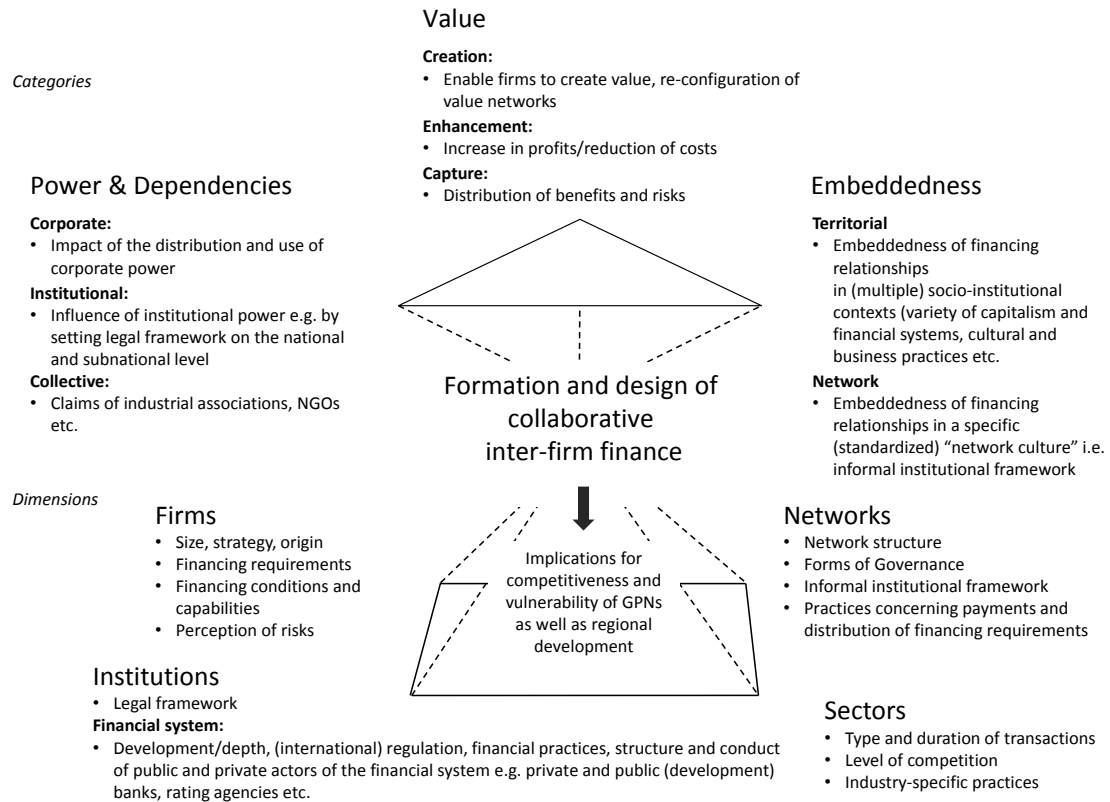


Figure 2. Analytical framework for the exploration of (inter-firm) finance in GPNs (Source: authors' illustration, based on Henderson et al. 2002)

The framework takes the three categories value, power and embeddedness as key categories to address inter-firm finance in GPNs:

- **Embeddedness:** Financing relationships in GPNs are embedded on three levels. At the micro level (firm), these are company-specific characteristics such as the financial health and economic performance, strategic orientation and corporate culture (preference for forms of finance) and size. The (informal) institutions of network relationships including industry-specific governance forms and practices constitute the meso-level (network). On the macro-level (territorial), financial relationships are influenced by (multiple) varieties of capitalism, i.e. the institutional structure especially expressed in the financial system (for the interplay of GPNs and national institutional architectures see Lane 2008).

- *Value:* The configuration of financial flows, distribution of financing requirements as well as differing access to capital influence the ways value is created, captured and enhanced. In terms of value creation access to finance determines if and under which conditions firms can participate in production networks. Flows and refluxes of finance – shaped by government actions, firm strategies and ownership – consequently determine which proportion of the value created is captured in the different locations a GPN touches down. Finance is also indispensable for any upgrading process of firms within the network. In other words, access to finance and/or the ability to form financial reserves is a prerequisite for value enhancement.
- *Power:* Closely related to both other categories, financing relationships are shaped by corporate, institutional and collective power. The most pronounced one is the exercise of corporate power to determine the configuration of financial flows and the distribution of financial burdens. In addition, corporate power of firms in their relationships with banks and other investors shapes their access to credit. Institutional power has a twofold impact on firm finance in GPNs. (Supra)National agencies influence the overall financing environment by setting the institutional framework of the legal and financial system. In doing so, they limit the specific scope of action for inter-firm collaboration.

In empirical terms, the results reported in this paper have been drawn from an exploratory study conducted in the automotive industry in Germany and Brazil between 2011 and 2013. The automotive industry was selected for two main reasons. First, literature (e.g. Humphrey 2004, Becker 2006, Sturgeon et al. 2008) provides extensive insight into the configuration of production networks (fragmented value chain, high market concentration on the OEM and Tier-1 level, global presence of OEMs and standardization of processes, inter alia through follow sourcing) and forms of governance (hierarchical structure, concentrated power) that can be built on. Second, supplier-buyer relationships in the automotive industry – at least for direct suppliers of OEMs – appear particularly suited for inter-firm finance as they are in general characterized by repetitive supplying relationships throughout the production of a model/series with mostly high sales volumes, a strong dependence on the skills and reliability of suppliers (JIT forms of production) and a high degree of synchronization, i.e. use of automated systems for information exchange between suppliers and OEMs (see also Sugirin 2009). Additionally, the automotive industry is a driving force in the development and implementation of organizational innovations.

The selection of the context of study was motivated by the theory-based assumption that the environment for corporate finance shaped by the specific financial system in a certain location affects the implementation and/or design of instruments of inter-firm finance. Therefore, Brazil and Germany were selected as the basic structure of their financial systems (bank-based in contrast to market-based) is comparable but financing conditions diverge (in the case of Brazil

especially due to a different macroeconomic setting, concentration in the banking sector, capital absorbing demand of the state). Both countries are especially suited for a comparison as the automotive industry enjoys a similar role as a leading sector of the economy, characterized by the presence of multiple OEMs and a diversified supplier industry.

To gain insight in motives and obstacles for inter-firm financial collaboration in production networks, a qualitative research design was used. This approach provides the necessary openness to account for the novelty and limited dissemination of the topic and the lack of a commonly accepted definition of inter-firm finance in GPNs. The empirical results are based on a total of 40 interviews conducted with experts from OEMs, suppliers, financial intermediaries as well as network partners (see Table A1 in the annex). With one of the interview partners of OEM 2 a total of three interviews was conducted; this proved extremely helpful for the interpretation of results, especially with regard to the comparison of the two research contexts Brazil and Germany.

4 Instruments of inter-firm finance observed in the corporate praxis

While cases addressed in the study in hand cover a large variety of the instruments suggested by the literature, this is not the case in all theoretically described forms of inter-firm finance (Pfohl and Gomm 2009, Hofmann et al. 2011). Interestingly instruments that require a higher degree of collaboration (forms of relationship finance) such as the strategic reconfiguration of the C2C-Cycle according to individual financing conditions of involved partners, cash-pooling and other instruments of finance applied in business groups and conglomerates were not reported by the interviewed experts. The same holds true for the capital provision for investments in fixed capital by internal, non-financial actors within production networks, i.e. a (double) financial intermediation.

The instruments observed (Table 2)⁵ are grouped – and explained in more detail below – according to similar characteristics: their orientation (short-term/long-term), motive of the initiator (tools for the management of an acute crisis/strategic instruments), focus (working capital and/or fixed assets) and capital provision (internal/external). The suggestion of Navas-Alemán et al. (2012) of a distinction between forms of inter-firm finance agreements in arm's length finance (based on hard information: balance sheets or collateral e.g. mortgages or receivables) and relationship finance (based on soft information and trust between lender and borrower) was also included.

5 Other instruments could be used but were not reported by interviewed experts. Instruments observed in only one of both countries are not necessarily limited to this context.

Type of instrument	Instrument	Classification	Focus	Strategic/ reactive	Initiative by	Motivation of initiator	Capital provision	Observed in
SCF-programs: Buyer-led receivables financing	Bank-based reverse factoring	arm's length finance	working capital	strategic/ institutionalized	OEM	Reduction of own working capital and/or financing cost for suppliers	external (banks)	Brazil x Germany x
	FIDC - Reverse-factoring with securitization	arm's length finance	working capital	strategic/ institutionalized	OEM	Reduction of own working capital and/or financing cost for suppliers	external (capital markets)	x
	Asset based lending by OEM captive	arm's length and/or relationship finance	working capital	strategic/ institutionalized	OEM	Reduction of own working capital and/or financing cost for suppliers	internal (refunding i.a. via capital markets)	x
	Industry-wide receivables finance program for suppliers	arm's length and/or relationship finance	working capital	strategic/ institutionalized	OEM	Reduction of own working capital and/or financing cost for suppliers	external (capital markets) (planned)	x
Support in times of crisis (reactive instruments)	Adjustment of payment terms	arm's length finance	working capital	case-by-case	OEM or supplier	Guarantee the security of supply	internal	x x
	Advance payments for future deliveries and services	relationship finance	working capital	case-by-case	OEM or supplier	Guarantee the security of supply	internal	x x
	Provision of materials	arm's length and/or relationship finance	working capital	case-by-case	OEM	Guarantee the security of supply	internal	x x
Case-specific/situative forms of inter-firm finance: enablement and support	Short-term adjustment of payment terms (for balance sheet optimization on request of suppliers)	arm's length finance	working capital	case-by-case	supplier	Optimization of balance sheet for technical rating	internal	x x
	Prepayments/ advance payments for future deliveries and services	relationship finance	working capital and fixed assets	case-by-case	OEM or supplier	Development of strategic suppliers	internal	x
	Inter-firm procurement	arm's length finance	working capital (thru reduction of purchase prices)	strategic/ institutionalized	OEM	Cost reduction	-	x x
	Financial consultancy	miscellaneous	working capital and fixed assets	strategic/ institutionalized	OEM	Supplier development: reduction of costs and vulnerability	internal	x
	(Informal) provision of information to banks/credit guaranties	relationship finance	working capital and fixed assets	case-by-case	Banks and/or suppliers	Support of supplier to guarantee security of supply and suppliers financial health	Internal	x
	Collaborative financing of tools	arm's length finance	fixed assets	case-by-case	OEM or supplier	Cost reduction	external (banks) or internal	x x

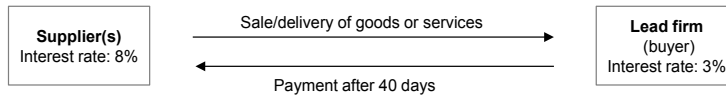
Table 2. Observed instruments of inter-firm finance in automotive production networks in Germany and Brazil

SCF-programs: receivables financing with asset based lending

Buyer-led, institutionalized SCF-programs based on (future) receivables pose the prevailing strategic approach to enhance the financing structure in production networks. Contrary to instruments applied on a case-by-case basis like reactive measures of support or other means of supporting suppliers, such programs focus on a broad range of suppliers. They could be observed in both contexts, yet more examples were identified in Brazil. Notwithstanding different in their specific design, SCF-programs follow the same logic and basic structure. Receivables of suppliers against the lead firm are used as a collateral to provide capital in form of early or even advanced payments. The confirmation of receivables and payment obligations vis-à-vis investors – made possible by the integration of lead firms in these programs – enables suppliers to raise (short-term) capital based on the lead firm's rating plus a fee charged by the financial intermediary running the program. Depending on the individual financing costs substantial cost savings are achievable for the supplier (even if payment terms are extended) as well as for the buyer (if payment terms are extended) compared to a payment without a SCF-program (Fig. 3). Buyers, suppliers and investors are linked to each other by an IT-based SCF-platform within which payments can be requested, payment obligations be confirmed and funds be transferred. These platforms are linked to the firm's enterprise resource planning Systems (ERP), thus speeding up and automating the processes involved. Fig. 3 displays the basic functionality of an SCF-platform.

Funding can be provided either by banks (mostly running and offering their own SCF-platforms) or via securities sold on capital markets mainly to institutional investors. Patterns of such asset-based forms of supplier financing are reverse-factoring programs offered by banks as observed in Germany and Brazil or the so-called FIDC specific to the Brazilian context. FIDC (Fundo de Investimentos em Direitos Creditórios) is a form of an asset backed securities fund pooling short term receivables refinanced through the issue of medium term securities (Uqpbar 2007). Although mostly used as a refinancing instrument for banks, it is increasingly employed in SCF-programs of industrial enterprises. In the latter, supplier's receivables from lead firms serve as collateral and 'back' advanced payments (short-term credit) by the fund. Beside the access to capital via capital markets, FIDCs offer an advantage over other financing instruments, especially bank loans, due to their being exempt from the tax on financial transactions (Imposto sobre Operações Financeiras, IOF). A striking example of an FIDC that links inter-firm finance to regional development is a program by a regional Brazilian development bank. To support the productive chain of the car maker FIAT a supplier financing program was originated by the development bank of the state of Minas Gerais, Brazil (BDMG) in which the carmaker's production site is located (BDMG 2011). Similar reverse-factoring programs implemented by development banks are also reported from Mexico (Klapper 2006, Castañeda et al. 2011).

without SCF-program



with SCF-program

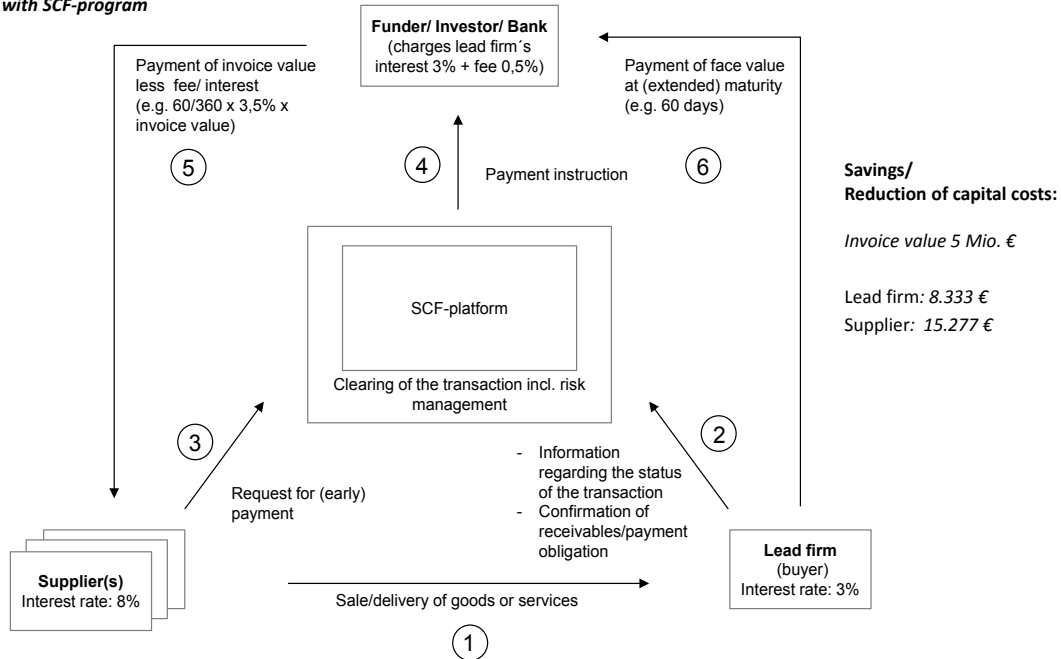


Figure 3. Mechanism of an IT-based SCF-program (illustrative numbers) (Source: authors' illustration based on Hartley-Urquhart 2000, Hofmann and Belin 2011, Wuttke et al. 2013)

While the current FIDC-programs were established by OEMs for their individual supply chains, interviewees reported considerations to implement an industry-wide supplier-financing program also funded by an FIDC. A program comprising all, or most, of the OEMs in Brazil would offer substantial advantages compared to individual solutions by each OEM such as lower overall risk, no free-rider problems and a higher impact on supplier stability. The plan to provide advanced payments for receivables up to three years in the future appears especially promising. A delivery contract serves as a guarantee and is the prerequisite for medium term pre-shipment/-delivery payments. This solution is meant to enable suppliers to make necessary investments not only in working capital (increase liquidity and reduce debt with banks) but also machinery, infrastructure etc. to achieve an increase in productivity and quality. However, to date its implementation has not made any progress and interviewees judge its prospects differently. While the representative of a manufacturers' association is convinced of a realization in the near future, other managers see many obstacles in the way, among others the coordination and collaboration between all involved parties as well as the distribution of risks.

Ultimately, a highly interesting case in Brazil shows that also OEM captives (i.e. automotive banks as the financial arms of carmakers) can be involved in an asset-based supplier financing program. The aim of the captive is to support the OEM and its value chains as well as to enlarge their portfolio of financial services and generate new revenue streams. Similar to a bank based reverse-factoring program, the automotive bank steps in to provide advanced payments for existing and, for a limited number of suppliers also future receivables against the OEM. As the provision of capital is based on the information provided by the OEM, such an internal solution offers extended possibilities to realize the value of shared information to create mutual benefits for the OEM, its bank as well as suppliers. Similar to other supplier financing programs interest among suppliers to participate is yet limited.

Reactive instruments to assist suppliers in crisis

Reactive instruments, characterized by their limited duration and scope, are a specific form of inter-firm finance. They represent short-term measures in place as long as a) the situation of the supplier relaxes or b) an alternative supplier has been established as a replacement. Three tools, namely the adjustment of payment terms, credit in the form of advance payment for future deliveries and services and the provision of materials, were reported to be used by buyers, without any variation between Germany and Brazil. An interviewed OEM executive summarizes the actions taken by lead firms in the event of a crisis of their suppliers:

“In the short-term, we help, we make adjust payment terms, make pre-payments, provide materials etc., but this is always limited to a restricted period of time. Such instruments can be extended up to 6 months but it is not a healthy practice, neither for our suppliers nor us, and will only be conducted until we find an alternative supplier.” (OEM5_BRA)

The empirical data implies that reactive instruments taken by buyers to assure the supply with goods from their suppliers in crises represent a general pattern in automotive GPNs.

Case-specific/situative forms of inter-firm finance: enablement and support

Reactive instruments described above are also applied in non-crisis situations. Contrary to strategic SCF-programs, those agreements are made on a case-by-case basis. Lead firms report that especially close to the accounting date or the closing date for the quarterly statement some suppliers demand for short-term adjustment of payment terms in order to improve their balance sheets. In return, buyers pay early with a discount. Interestingly, in a similar way one interviewed OEM reported on specific cases in which the company funds development expenses of suppliers before start of production (SOP). The milestone-related provision of capital is hereby motivated by the OEM's aim to secure an exclusive access to innovative suppliers and their products as the representative from OEM 1 explains:

“To secure exclusiveness with suppliers we sometimes go as far as paying development activities and expenses step-by-step up-front e.g. before the commercialization of the product starts instead of reimbursing them via the price of parts which for us is negatively affecting our liquidity.” (OEM1_DE_b)

Contrary to other examples from the literature (e.g. Dei Ottati 1994), informal credit, with the exception of capital provision in the form of advance payments, could not be observed. In the same way lead firms were reported by suppliers to be reluctant in providing corporate guarantees. Only in one case in Brazil OEM 3 acted under very specific preconditions as a guarantor in a program led by the Brazilian development bank (BNDES) to finance tools that were exclusively appointed for the production of parts for OEM 3. Yet some lead firms reported that they informally share information with banks upon request. Collaborative sourcing is another possibility to reap benefits of an inter-firm collaboration in the field of purchasing. Although the main aim is to realize economies of scale by bulk buying and to reduce risks (centralized hedging for price and exchange rate volatility) especially for SME suppliers, it can be seen as an instrument of inter-firm finance. Financing requirements are lowered due to reduced prices, costs for hedging are reduced and – depending on the design of the operation⁶ – stock holding and financing requirements are shifted towards lead firms. Finally the program for financial consultancy pursued by OEM 1 in Brazil is particularly mentionable as a different approach towards inter-firm financial collaboration. Instead of directly offering financial instruments, strategic, but mostly small local Brazilian suppliers are advised by a task force to financially enable them, i.e. to improve their financial structure and management. Notwithstanding the reach is limited as only around six suppliers can be covered each year and convincing suppliers to participate is difficult.

All in all, short-term measures to solve acute crises of suppliers in order to guarantee the security of supply are widespread. Whereas inter-firm financial collaboration as an strategic approach in general and the implementation of SCF-programs in particular is to date still in an initial phase⁷, as the manager of a Brazilian bank explains:

“There are some initiatives to improve funding for suppliers. They are not widespread but some firms do it.” (Fin4_BRAb)

Concerning differences between both contexts, SCF-programs initiated by OEMs seem to be more widespread and sophisticated in Brazil than in Germany. Yet, the data does not allow for any representative statements in this respect.

6 Collaborative sourcing can take different forms ranging from a provision of material (suppliers only charge their processing costs) to trade models (lead firm acts as a broker, buying and re-selling material), general agreements negotiated by the lead firms for their suppliers, to a coaching model in which the lead firm provides target prices and indicates purchasing sources. However, depending on their size, suppliers of raw materials will be reluctant for such an agreement as their possibilities of price discrimination is limited. For a more detailed overview of different forms of collaborative sourcing see Hofmann (2011).

7 This finding is in line with previous studies (WT100 2009, IEG 2011, Seifert and Seifert 2011, Tyagi 2013).

5 Constraints and conducive factors for inter-firm finance

The interviews conducted reveal a multitude of factors influencing the implementation, dissemination and design of instruments of inter-firm finance both on the side of the suppliers as well as of the buyers. Analytically, they can be grouped on three levels (as displayed in Fig. 4) on which they mainly unfold – (financial) system-, firm- and network-level – although, a clear-cut distinction cannot be made as factors on levels overlap. The findings of Wuttke et al. (2013) on factors shaping the dissemination of SCF-programs – the relational strength (power, obtrusive communication, trust) between trading partners as well as the achievable gains – can be supported in general, but turn out to be incomplete given the results of the present study.

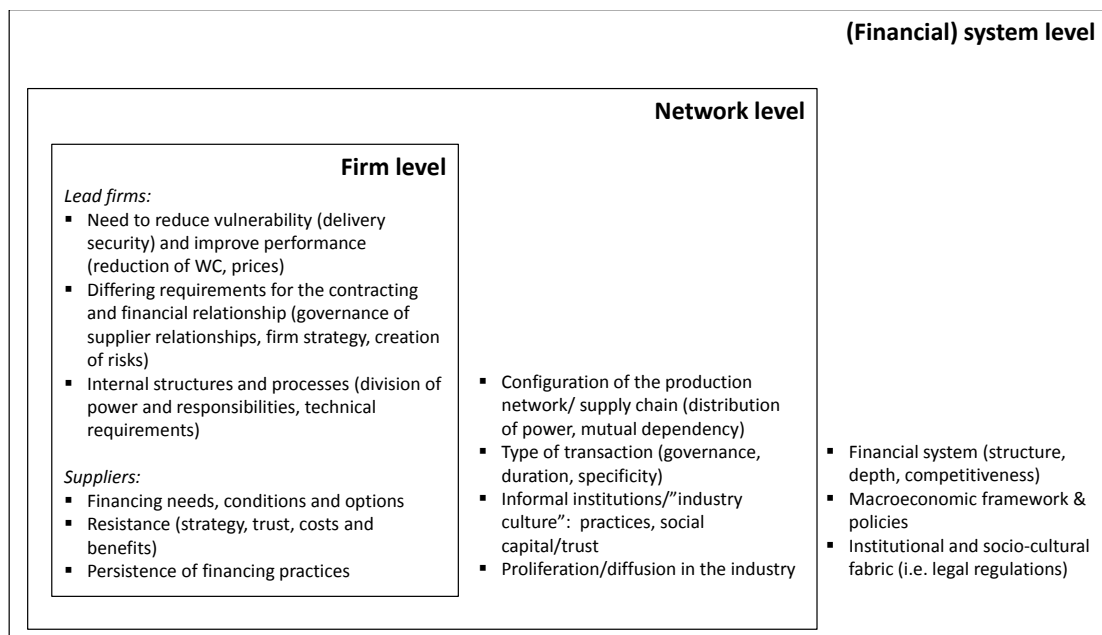


Figure 4. Factors influencing inter-firm finance in GPNs (*authors' illustration*)

5.1 Constraints on the level of the firm

Constraints on the side of the firms offering financing instruments

Interviewed lead firms that have got involved in the described forms of inter-firm finance pursue one or both of two main goals, namely the reduction of the vulnerability of the supply chain and better cost efficiency leading to greater competitiveness including a reduction of their working capital by means of an extension of payment terms. While reactive, short-term actions to support suppliers in times of crisis are widespread, lead firms were observed to be reluctant to get involved in strategic programs aiming at a reduction of their suppliers' finan-

cing costs. Forms of relationship finance and permanent inter-firm collaboration that goes beyond confirming existing receivables from their suppliers vis-à-vis banks or other investors do not represent a common practice; apparently, they are rather avoided.

First, this can be traced back to the general corporate strategy towards relationships with contractors. A prevalent attitude in this context is to view the financial situation of suppliers as a part of the sourcing risk, among others, which has to be controlled for but does not constitute a field the lead firm wants to get involved or interfere in more detail: “Our philosophy is that the supply chain should take care of their problems themselves” (OEM2_GER_d). This is in line with the firms’ strategy to outsource tasks in order to be able to focus on their core business.

Second, the formation of a financing relationship implies direct impacts on the underlying contracting relationship. As both are interlinked they have a direct effect and cannot be separated from each other. Our results are in contrast to Dei Ottati’s finding: the resulting closer tie between firms is widely perceived as disadvantageous by interviewed lead firms, which is closely related to the configuration of production networks, industry practices and distribution of power among actors. Collaborative sourcing and other forms of closer inter-firm collaboration cannot be easily reversed. They generate coordination costs and require long-term relationships between suppliers and customers (Hofmann 2011). The empirical results show little inclination on the side of lead firms to engage in additional, interlinked relationships that bound them to their suppliers. Lead firms’ prime goal is to maintain their flexibility, which manifests inter alia in the lack of volume guarantees and long-term contracts. In the view of buying firms a financing relationship (e.g. credit provision in the form of advance payments) ties the lead firm to the supplier, hence reducing its flexibility and scope of action. This particularly relates to the effectiveness of sanction mechanisms, above all, in the event of quality problems. Similarly the potential to pressure suppliers to achieve an continual increase in productivity and cost savings is affected. As a manager of corporate finance from OEM 2 explains: “There is a risk to lose sanctioning options and set unintended incentives for suppliers to ‘feel safe’ and enter a comfort zone” (OEM2_GER_b1_c). Even flagship firms which in general are open-minded towards an inter-firm approach to finance, are reluctant to a closer collaboration as they perceive interlinking transactions as an inappropriate risk. Therefore, the interlinking of the financing relationship with the supply relationship not only impedes collaboration but also fundamentally shapes the design of instruments, favoring instruments that create no additional risks, maintain the flexibility of lead firms and keep penalty mechanisms in place. Additionally, closer forms of collaboration, e.g. by consultancy, creates responsibilities and might result in liabilities which lead firms try to evade.

Third, this trade-off directly crops out in internal conflicts between departments involved. Owing to the cross-functional characteristic of instruments of inter-firm finance a number of departments – e.g. procurement, treasury, logistics/SCM – are concerned. Yet their interests

are not necessarily in line. Especially purchasing departments are powerful in the automotive industry and in most cases showed no interest in implementing additional instruments that might affect their 'power play' with suppliers. Usually, procurement managers are evaluated and in part remunerated according to the buying conditions (quality, price, payment conditions) achieved in negotiations. Establishing closer relationships with buyers by dint of an inter-firm financial collaboration is perceived to limit their bargaining power. Moreover, any instrument – as it causes additional work – would have to have a direct benefit for purchasing managers they could claim as their success. Therefore, incentive mechanisms have to be adapted to motivate employees to push those financing instruments. As a result of the cross-functional character, the same holds true for treasury managers and other departments. To encounter problems such as unclear competencies, incentives and diverging interest, interviewees identified a top-down implementation from the general management as a core internal success factor.

Fourth, in view of the interviewees, besides risks affecting the commercial relationships, additional financial risks and negative effects are attached to a closer collaboration with suppliers in the field of finance. However, these risks only occur in forms of inter-firm finance that involve funds supplied by the lead firm and not outside investors as it is the case in most observed supplier financing programs. Adapting payment terms in order to support suppliers increases the firm's own working capital, contradicting the shareholder-value (SV) approach which identifies the reduction of working capital as a driving force to increase the SV. In the case of a double financial intermediation – e.g. lending and redistribution of a lead firm to its suppliers – the financing firm's indebtedness increases and the balance sheet will be extended which has a negative impact on performance indicators (e.g. ROCE) and might deteriorate the overall financing conditions. As the manager of an OEM reports, banks – in part to secure their own business – warned to establish an internal reverse factoring program, as funds used would reduce available credit lines. Using equity is of no help either as it has, in general, to be remunerated to investors with a higher rate of return than bank loans, making it a costly solution. While financing existing claims from suppliers involves a minimal risk for lead firms, financing future receivables or other kinds of assets bears a substantial risk in the case of supplier insolvency. Lead firms might enjoy an informational advantage compared to outside investors, but fewer possibilities of a diversification of risks; therefore they (might) evade adding more risks than necessary to their balance sheets.

Fifth, implementing and managing financing instruments tie up personnel resources and need an initial investment to align IT-structures and processes. Notwithstanding SCF-platforms connect to internal ERP-systems, interviewees stated the need for the adaptation of internal systems, especially to assure an ongoing synchronization and preclude double payments to suppliers.

Constraints on the side of the suppliers / users (targets)

Persuading suppliers to participate in financing programs initiated by lead firms is one of the greatest challenges and success factors as lead firms and bank managers report.

“We offered the program to our suppliers, we went there, the bank went there to explain it to them but the suppliers did not accept it, but they need it!” (Tier1_5_BRA)

According to interviews with suppliers and OEMs, the attitude towards such instruments is shaped by the need and/or benefits attached, the complementarity to existing forms of finance, the firm strategy and the characteristics of the relationship with the lead firm. The need for alternative forms of finance differs among firms and depends on the specific condition of every individual supplier. As the bank manager of an international commercial bank describes, suppliers with a low level of liquidity and restricted access to external finance represent a prime target group for their SCF-solutions:

“... if a supplier has not suffered enough yet, he doesn’t need to come up with something like SCF.” (Fin1_GER)

Concerning the need for instruments of collaborative finance among suppliers in the automotive industry, the picture to be drawn from the interviews is an ambiguous one. Reflecting the implementation of a reverse-factoring program during the financial crisis, a manager responsible for supplier risk management with OEM 1 recalls:

“We got a wide range of feedback to our initiative. Different circumstances at suppliers create different actions. They range from an immediate approval from companies that are up to their neck in it, to firms that don’t need it but participate anyways, to firms that are in serious trouble but still refused it because they didn’t really understand it, to partners that say they have enough money and therefore don’t need it.” (OEM1_GER_b)

Suppliers on the Tier-1 level whose financing conditions sometimes excel the credit rating of OEMs (as e.g. in the case of the German Robert Bosch group) generally do not need financing programs offered by OEMs. Suppliers on the Tier-2 and Tier-3 levels, on the contrary are more often faced with high financing costs and financing problems and therefore can improve their overall financing conditions through such initiatives. Yet, a distinction has to be made between Brazil and Germany. While in Germany especially the financial crisis had a short-term impact on the financing conditions of suppliers (reflected in a drop in the credit rating, cf. IKB 2011, 2012), in Brazil these problems are more of a fundamental nature rooted in the financial system and in specific management practices. However, financing conditions of SME suppliers in Germany might deteriorate in connection with the implementation of Basel III (Ganguin et al. 2011). Similarly, a downturn in the industry following the boom in the aftermath of the crisis is predicted to increase insolvencies as suppliers have not been able to build up sufficient reserves due to the intense price competition (Richter 2012).

The way in which suppliers evaluate their potential benefits/advantages and costs/disadvantages represents a further important factor. Especially suppliers that have no financing problems show well-defined demands towards the design and conditions of instruments of inter-firm finance. Therefore, in order to be accepted, instruments have to improve financing costs and/or cash flow. One manager of an SME supplier explains:

“We would have to benefit directly from such an instrument. This means payment conditions as well as interest rates have to improve. As long as this is not the case for SME the implementation of such financing instruments is in my opinion difficult and unlikely.” (Supplier2_GER)

To be advantageous for suppliers, the spread between the own financing conditions and the conditions offered by the program must be ample. In other words the scope for arbitrage must be sufficiently high. Additionally, sales volumes (absolute as well as a share of total sales) need to be sufficiently high to justify the cost of implementation and administration⁸. In this context, small suppliers interviewed motivated their lack of interest in such financing forms with their size.

Similarly, the attitude towards inter-firm financing instruments is shaped by the strategy and corporate culture of suppliers. Suppliers on the Tier-2 and Tier-3 levels are reported by interview partners in Germany and Brazil to follow a more ‘conservative’ approach to corporate finance. In other words, they resort to trusted instruments and established financing channels. A substitution of these channels with new, unknown instruments is therefore perceived as a risk with dubious effects on established financing relationships; as for example credit-lines with banks can be reduced or lost. Particularly in Brazil, the macroeconomic instability in past years caused a reluctant attitude among national SME suppliers towards external finance in general and bank loans in particular. On the Tier-1 level, suppliers are more open to innovative forms of finance as their financial management is, in general, more capital market oriented and firms have specialized financial departments. However, centralized decision making in the parent companies’ headquarters limits their scope of action in local international markets. Though the participation of Tier-1 suppliers in supplier financing programs could be observed in Brazil, interviewees stated that parent companies often interdict an involvement due to their globally standardized policies.

In addition to the reasons mentioned, existing financing instruments finally reinforce the persistence of financing practices as they can be incompatible with supplier financing programs of lead firms. Both, factoring and supplier financing programs, for example, use receivables as an underlying collateral. Because suppliers in general have to assign a package of receivables from different customers to a factoring bank, they are ‘locked-in’. To participate in a reverse-factoring or another form of financing program, a part of the receivables has to be dissolved

8 With a further dissemination of such instruments supplier might be faced with multiple individual programs of their customers. The programs need to be administered and create additional operating expenses.

from the pool of receivables which, if possible, might alter the factoring bank's risk evaluation of the remaining receivables; leading to higher interest rates and/or fees for the transaction. Similarly, if suppliers guarantee a credit from a bank by a blanket assignment of receivables from goods, deliveries and performances, participation is not possible and needs a renegotiation with resting financing entities.

5.2 Influencing factors on the network-level

The configuration of the GPN has a strong impact on the need, design and implementation of instruments of inter-firm finance. First, the distribution of power and industry specific standards determine the length of the C2C-cycle by means of practices regarding payment terms, stock holding etc., thus consequently affecting the necessity for instruments to finance investments in working capital. The director of supplier 7 explains this connection.

"I think that FIDCs will expand increasingly. Today it is not used so much because we have a market standard for receivables around 30 days, which is very short. Once suppliers and Tier-1 suppliers start continually extending payment terms, this financing tool becomes more and more attractive." (Supplier7_BRA)

Second, the mutual dependency and form of governance – which varies in the automotive industry between different types of suppliers – has an influence on the design and enforceability of instruments. Relationships characterized by a high asymmetry of power – mostly found on the Tier-2 and -3 levels – between buyers and their suppliers permit lead firms to design instruments according to their needs and put pressure on their suppliers to participate. Relationships with Tier-1 suppliers, in contrast, can be characterized with a more balanced distribution of power. The same holds true for the individual type of transaction, especially its (future) duration and the dependency of the buyer on the specific product/supplier (its replaceability), which favors or discourages the involvement of lead firms. One manager of OEM 6 illustrates the lead firms vital interest in securing the supply of parts and components by providing (short-term) assistance and/or enhance the financing structure of suppliers:

"The production line can't stop. A severe financing problem of one of our suppliers turns into a direct problem for ourselves. If they have financing problems and can't produce and can't deliver a part we are by far more financially affected than the simple cost of a component. That is why we care and check the financial management and situation of our suppliers." (OEM6_BRA)

Third, the structure of the automotive industry with few key players on the OEM and Tier-1 level implies that supply relationships are often not exclusive. This leads to two main obstacles especially for the use of closer forms of inter-firm finance. On the one hand, OEMs are unwilling to finance any investment in assets that are not directly and exclusively related to them,

thus preventing any ‘free-riding’ by competitors. This largely obstructs collaborative investments in fixed assets (e.g. machinery) and limits the scope to instruments to finance working capital, tools and exclusive development services. But also suppliers are reluctant to establish a strong financial collaboration with an individual OEM as their other OEM-customers might perceive it as a threat to be disadvantaged for instance in the access to innovative products.

Fourth, the ‘industry culture’, understood as the informal institutions, especially mutual trust, also shapes the relationships between buyers and suppliers. Part of the reason for the resistance OEMs face when trying to implement long-run strategic financing instruments is the lack of trust and social capital. This applies to the instruments themselves as well as the lead firms and their intentions in general. In theory, social capital (e.g. Bourdieu and Wacquant, 1992: 119) built and reproduced in network relationships enables the provision of informal credit and other forms of inter-firm finance (Dei Ottati 1994, McMillan and Woodruff 1999). However, as the empirical results suggest, most buyer-supplier relationships in the automotive industry in Brazil as well as Germany are characterized by low levels of trust. In consequence, suppliers regard financing instruments offered by their buyers with great suspicion. As managers from two OEMs explain:

“There is this culture of mistrust, a general subliminal mistrust. Suppliers doubt that we want to do something that is good for them, that there is a catch.” (OEM1_GER_a)

“They always think we want to gain something on them. Whatever project we propose to suppliers, they always think we want a discount and/or prolonged payment terms.” (OEM6_BRA)

The lack of trust not only impedes the acceptance from suppliers but also hinders suppliers to approach their customers to mutually develop or offer financing programs. Such an approach is feared to be interpreted as a signal of financial instability of a supplier, which might lead OEMs to establish alternative sourcing options. The formation of trust and social capital itself is shaped by the dominant practices in the highly competitive and hierarchical structured automotive sector.

It remains to be seen if the attitude of actors in the automotive industry will change in the future. Akin to other organizational innovations – e.g. the inter-firm approach to manage flows of goods and information within the supply chain management approach – the diffusion takes time (Wuttke et al. 2013). Yet for an accelerated spread of an approach to finance that spans the boundaries of individual firms well-known best-practice examples are still widely missing and the available knowledge among suppliers as well as lead firms was observed to be often too limited.

5.3 The (financial) system as an influencing factor

Production networks are embedded in (multiple) institutional frameworks on the national and subnational levels that determine the basic rules and conditions which firms have to cope within a specific location. With regard to corporate finance the characteristics of the financial system are of specific interest as they influence companies' cost and the possibilities of local financing. The broad body of literature on the finance-growth nexus shows in this context how economic development is linked to financial system development – although the direction and limits of this correlation is subject to controversial debates (see for example King and Levine 1993, Levine et al. 2000, Beck 2012, Love and Pería 2012).

The comparison between Brazil and Germany in this respect reveals how differences in the local financing conditions and institutional framework affect the use of instruments of inter-firm finance. Due to its more difficult financing environment, interviewed OEMs in Brazil perceive pronounced financing problems of suppliers especially on the Tier-2 and Tier-3 levels as an obstacle for the development and competitiveness of their (sub)contractors. For example, national SME suppliers have difficulties to access credit lines of the national development bank BNDES due to legal requirements attached to the loans provided. SCF-programs (especially FIDCs) are implemented to encounter financing problems of local suppliers. Representatives of OEMs having implemented SCF programs emphasize that their use is closely linked to these problems and the need to adapt to the local business environment. A manager of OEM 5 illustrates in this context the company's motives to implement a supplier-financing program.

“The objective of OEMs is to develop a strong national industry of auto parts with high levels of quality, productivity and reliability. Priority of the program are Tier-2 and Tier-3 suppliers because only three to four Tier-1 suppliers are Brazilian companies, while the rest consists of multinational firms with diverse possibilities to access capital.” (OEM5_BRA)

The case of the FIDC also illustrates how local legal regulations influence the configuration and spread of instruments of inter-firm finance because part of the cost benefits are rooted in the exemption from a local tax on financial transactions (IOF). As the example from a bank-based reverse-factoring program in Germany shows, financial shocks affecting the financial system and overall financing conditions also spur their implementation. In this context, the effects of the implementation of Basel III are regularly expected to have significant negative effects, especially on SME suppliers' external funding.

Alongside the financial system, the legal framework shows an impact on the macro-level. This manifests itself in limitations to grant credit (e.g. regulated by the German Banking Act) to contractors that are not directly related to supplies and services as well as risks arising from supporting suppliers with financial problems such as the risk to be held responsible for delayed filing of insolvency, liability issues and the risk of an obligation to consolidate the sup-

plier. Additionally, the possibilities and time necessary to enforce legal rights also differ according to the judicial system, affecting the willingness of trade partners to engage in inter-firm financing relationships.

6 Conclusion

As the present study shows, the automotive industry is currently concerned with developing and implementing instruments of inter-firm finance that are used to optimize and strengthen the financial and thus the productive supply chain. Especially in an economic environment that affects the overall financing situation of all suppliers independent of their specific characteristics, instruments of inter-firm finance appear to be of specific value to enable lead firms to keep their production networks competitive and running. As our results indicate, at least for the time being, lead firms represent the key actors in the implementation and design of instruments of inter-firm finance. And as the designs of the observed instruments first of all mirror their motives and requirements, the concept of collaborative finance appears less glorious than its connotation might first suggest. Rather, one might also argue that instruments of inter-firm finance initiated by lead firms are merely a tool to maintain (exploitative) relationships and the uneven distribution of financial burdens in place.

Nonetheless, collaborative finance does present an approach that in actual fact can create mutual advantages for firms in production networks, i.e. lead to situations in which not only the OEMs, but also suppliers benefit. This is particularly the case for suppliers in markets with high interest rate levels and/or restricted access to external finance; and, in turn, it reflects the potential of inter-firm finance programs to contribute to regional development. The reverse factoring program of the BDMG can be considered a particularly promising case in this regard. As has been reported, such valuable routines may diffuse within GPNs to different locations around the globe. There are thus good reasons to further intensify the investigation of GPNs with a greater focus on financial relations in general and inter-firm finance in particular not only in corporate perspective, but also from a local and regional development point of view.

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Appendix

Type of company	Home country	Location of Interview	No. of Interviews	Interview function	Date of Interview	Interview code
OEM						
	Germany	Germany, Brazil	3	a) Senior manager treasury b) and c) Head of financial supplier risk management	a) 06.04.2011 b) 06.04.2011 c) 12.09.2012	OEM1_GER_a OEM1_GER_b OEM1_BRA_c
	Germany	Germany	5	a) Manager corporate finance b) Manager corporate finance c) Head of project finance d) Raw materials manager e) Supplier risk Manager	a) 16.01.2011, 22.05.11 b) and c) 27.10.2011 b) 17.11.2011, 31.07.2012, 04.12.2012 d) 11.08.2011 e) 21.07.2011	OEM2_GER_a OEM2_GER_b OEM2_GER_c OEM2_GER_d OEM2_GER_e
	Germany	Germany, Brazil	4	a) Supplier risk manager b) Procurement manager c) Senior procurement manager d) Manager production and logistics	a) 02.01.2013 b) 03.08.2012 c) 12.09.2012 d) 19.09.2012	OEM3_GER_a OEM3_GER_b OEM3_BRA_c OEM3_BRA_d
	Germany	Germany	1	Procurement manager	18.10.2012	OEM4_GER
	USA	Brazil	1	PR director and vice president syndicate A	17.10.2012	OEM5_BRA
	Italy	Brazil	1	Supplier development manager	06.12.2012	OEM6_BRA
	Germany	Brazil	1	Head of Treasury OEM captive	12.09.2012	OEM7_BRA
Tier-1 supplier						
	Germany	Germany	1	Logistics manager	06.05.2011	Tier1_1_GER
	Germany	Germany	1	Head of treasury	21.08.2012	Tier1_2_GER
	Germany	Brazil	1	CFO	05.09.2012	Tier1_3_BRA
	Germany	Brazil	1	a) Head of treasury b) Accounts receivables coordinator	30.08.2012	Tier1_4_BRA_a Tier1_4_BRA_b
	USA	Brazil	1	Managing director	13.09.2012	Tier1_5_BRA
Other suppliers						
	Germany	Germany	1	Sales manager	22.06.2012	Supplier1_GER
	Germany	Germany	1	Managing director	09.08.2012	Supplier2_GER
	Germany	Germany	1	Manager corporate finance		Supplier3_GER
	Germany	Germany	1	Head of treasury	27.07.2012	Supplier4_GER
	Italy	Brazil	1	Controller	25.10.2012	Supplier5_BRA
	Germany	Brazil	1	Controller	06.09.2012	Supplier6_BRA
	Brazil	Brazil	1	Managing director	30.08.2012	Supplier7_BRA
Financial sector						
	Italy	Germany	1	Head of trade finance	29.06.2012	Fin1_GER
	Austria	Germany	1	Key account manager factoring	03.07.2012	Fin2_GER
	Switzerland	Germany	1	Manager investment Banking	17.02.2012	Fin3_GER
	Brazil	Brazil	1	a) and b) Industrial Area Manager	05.09.2012	Fin4_BRA_a Fin4_BRA_b
	Brazil	Brazil	1	PR manager	20.09.2012	Fin5_BRA
Network partners						
	Brazil	Brazil	1	Board member syndicate B	29.08.2012	NP1_BRA
	Germany	Brazil	1	Branch director consulting firm	11.09.2012	NP2_BRA
	Germany	Brazil	1	Representative	31.08.2012	NP3_BRA
	UK	Brazil	1	a) and b) executive consultants	28.08.2012	NP4_BRA_a NP4_BRA_b
	Brazil	Brazil	1	University professor	06.09.2012	NP5_BRA
	Brazil	Brazil	1	Project manager, IT consultancy	21.09.2012	NP6_BRA
Others						
	Germany	Germany	1	Head of procurement, OEM from the machine building industry	07.03.2012	OEMm1_GER
Total			40			

Table A1. Conducted interviews in Brazil and Germany

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