Mike Burkart and Tore Ellingsen

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In-Kind Finance: A Theory of Trade Credit

By MIKE BURKART AND TORE ELLINGSEN*

It is typically less profitable for an opportunistic borrower to divert inputs than to divert cash. Therefore, suppliers may lend more liberally than banks. This simple argument is at the core of our contract theoretic model of trade credit in competitive markets. The model implies that trade credit and bank credit can be either complements or substitutes. Among other things, the model explains why trade credit has short maturity, why trade credit is more prevalent in less developed credit markets, and why accounts payable of large unrated firms are more countercyclical than those of small firms. (*JEL* G32)

A remarkable feature of short-term commercial lending is the central role played by input suppliers. Suppliers not only sell goods and services, but extend large amounts of credit as well. Available evidence on trade credit poses three broad challenges to economic theory. First and foremost, why does trade credit exist at all, with a majority of nonfinancial firms simultaneously taking credit from their suppliers and giving credit to their customers? Second, why does the magnitude of trade credit vary across countries, across categories of firms, and over time?[1] Third, why is trade credit less cyclical than bank credit?[2]

In the presence of specialized financial intermediaries, it is far from obvious why the exchange of goods is bundled with a credit transaction: When trade credit is cheaper than bank credit, as is often the case, the puzzle is that suppliers are willing to lend. When trade credit is more expensive, the puzzle is that banks are unwilling to lend. Indeed, a sizable fraction of firms repeatedly fail to take advantage of early payment discounts and thus end up borrowing from their suppliers at annual interest rates above 40 percent, having already exhausted their bank credit line (Petersen and Rajan, 1994, 1997). Why do not banks increase these firms' credit lines instead?

A common explanation for trade credit is that suppliers have a monitoring advantage over banks. In the course of business, suppliers obtain information about the borrower which other lenders can only obtain at a cost, as argued by Robert A. Schwartz and David Whitcomb

* Burkart: Department of Finance and SITE, Stockholm School of Economics, Sveavägen 65, Box 6501, SE-113 83 Stockholm, Sweden (e-mail: mike.burkart@hhs.se); Ellingsen: Department of Economics, Stockholm School of Economics, Sveavägen 65, Box 6501, SE-113 83 Stockholm, Sweden (e-mail: tore.ellingsen@hhs.se). This paper is produced as part of a CEPR project on Understanding Financial Architecture: Legal Framework, Political Environment, and Economic Efficiency, funded by the European Commission under the Human Potential-Research Network Training program (contract number HPRN-CT-2000-00064). Financial support from Riksbankens Jubileumsfond is gratefully acknowledged. We thank Denis Gromb, Bengt Holmström, Andreas Madestam, Raghuram Rajan, Andrei Shleifer, Javier Suarez, Jean Tirole, and seminar participants at Bank of Norway, Bank of Sweden, CentER (Tilburg), the CEPR workshop on Banking and Financial Markets (Barcelona, 1999), ESSFM 2001, European Central Bank, IUI (Stockholm), Norwegian School of Economics and Business Administration, Norwegian School of Management, Saïd Business School (Oxford), SITE (Stockholm), and at the Universities of Basel, Lausanne, Munich, Salerno, and Stockholm for their comments. The comments of three anonymous referees were particularly helpful. Any remaining errors are our own.

[1] In the early 1990's accounts receivable of listed firms in the G7 countries varied from 15 to 30 percent of assets on average. Accounts payable were slightly smaller, typically about 15 percent of assets on average (Raghuram G. Rajan and Luigi Zingales, 1995). Trade credit tends to be rather more important for unlisted firms (Mariassunta Giannetti, 2003), except possibly in the United States (Mitchell A. Petersen and Rajan, 1997). For a historical account of trade credit, see Rondo Cameron (1967).

[2] See Allan H. Meltzer (1960), Valerie A. Ramey (1992), Stephen Oliner and Glenn Rudebusch (1996), and Jeffrey H. Nilsen (2002).

(1978, 1979), Gary Emery (1987), Xavier Freixas (1993), Bruno Biais and Christian Gollier (1997), Neelam Jain (2001), and others. While the monitoring advantage theory is intuitively appealing, existing models suffer from two shortcomings. First, they often fail to explain why a bank, being specialized in the evaluation of borrowers' creditworthiness, would frequently have less information than suppliers do. Second, if we accept that many suppliers have information that banks do not have, why is the suppliers' lending so closely tied to the value of the input transaction? That is, the theories do not explain why suppliers regularly lend inputs, but only very rarely lend cash.

In the present paper, we develop a new theory of trade credit. Like earlier theories it attributes a monitoring advantage to the supplier, but the advantage applies exclusively to input transactions. Hence, our theory is immune to the above criticisms. Specifically, we argue that the source of the suppliers' informational advantage is the input transaction itself. Unlike other lenders, an input supplier automatically knows that an input transaction has been completed. Other lenders can only obtain this information by incurring monitoring costs. The value of input monitoring stems in turn from the fundamental difference between inputs and cash. Cash is easily diverted, in particular if diversion is interpreted broadly as any use of resources which does not maximize the lenders' expected return. Most inputs are less easily diverted, and input illiquidity facilitates trade credit.

A salient result of our model is that the availability of trade credit increases the amount that banks are willing to lend. For a given bank loan, additional trade credit permits the borrower higher levels of diversion as well as investment. However, due to the relative illiquidity of trade credit the borrower's return from investing increases by more than the return from diversion. Anticipating that available trade credit boosts investment rather than diversion, banks are willing to increase their lending. Hence, bank credit and trade credit are complements for firms whose aggregate debt capacity constrains investment. By contrast, for firms with sufficient aggregate debt capacity, trade credit is a substitute for bank credit.

Variation in trade credit across countries and across time can also be understood within our model. With perfect legal protection of creditors, trade credit loses its edge, because it becomes as difficult to divert cash as to divert inputs. More generally, the importance of trade credit compared to bank credit should be greater when creditor protection is weaker, and when firms are undercapitalized due to entrepreneurs' lack of wealth. This may explain the finding by Asli Demirgüç-Kunt and Vojislav Maksimovic (2001) that trade credit is relatively more prevalent in countries with worse legal institutions.

As for variation over the business cycle, Meltzer (1960) famously argued that trade credit provides a cushion through which wealthy firms insure poorer firms against the consequences of tight money. Our model explains why the cushion is provided by most suppliers, not just the wealthy ones, and suggests that the cushion against tight money is most valuable for entrepreneurs with intermediate amounts of wealth. Very wealthy entrepreneurs do not need the cushion, and very poor entrepreneurs should see their trade credit limits move in tandem with their bank credit limits. This is consistent with Nilsen's (2002) finding that trade credit is more countercyclical for large firms (except for firms with a bond rating, as these firms never need to take costly trade credit).

Many firms offer trade credit despite having to take (bank and) trade credit to finance their operations. We argue that firms simultaneously give and take trade credit because receivables can be collateralized. Once an invoice is pledged as a collateral, it becomes completely illiquid from the firm's perspective, and the firm can obtain additional bank credit against the receivable. Thus, offering an additional dollar of trade credit does not force a firm to reduce its real investment by one dollar. However, since banks optimally cap their lending against receivables, there is some crowding out. Accordingly, firms that are credit constrained but highly profitable abstain from investing in receivables, leaving the extension of trade credit to firms that either have better access to funds or are constrained and relatively unprofitable. Petersen and Rajan (1997) document that firms in financial distress increase their supply of trade credit, a result that they consider surprising. To the extent that financial distress goes together with lower expected returns from investment, this finding is what our theory would predict. Note that it is the illiquidity of the collateralized receivables, not the illiquidity of the inputs, that matters for the firms' ability to fund trade credit extension. Hence, this line of argument would also be valid in other models of trade credit.

Finally, we demonstrate that trade credit should have shorter maturity than bank credit. The reason is that trade credit loses its advantage once illiquid input is transformed into liquid output. Thus, we can explain why bank credit is routinely rolled over, whereas trade credit is not.

At the core of our model is the conventional idea that moral hazard at the investment stage gives rise to credit rationing of poor entrepreneurs. When bank credit is the only source of funds, our competitive credit market model behaves like virtually any other model in the vast literature on credit rationing. To this generic model we add a competitive input market and our two crucial assumptions: Inputs are less easily diverted than cash is, and input transactions are more easily observed by suppliers (who take part in them) than by banks.[3]

As regards earlier theoretical work on trade credit, the most closely related paper is Biais and Gollier (1997). Like us, they highlight the relationship between trade credit and bank finance. However, we think that their work is best seen as a general model of multiple lenders. Biais and Gollier's key assumption is that the bank and the supplier have different signals about the borrower's creditworthiness; heterogeneous signals apart, there is no difference between bank credit and trade credit.[4]

Before presenting our model, let us briefly relate our work to the broader set of trade credit theories. M. Ishaq Nadiri (1969) is a notable early contribution to the literature, being first to formally consider trade credit extension as part of an optimal selling policy.[5] With the advent of contract theory, authors have identified more precisely how the extension of trade credit differs from a decrease in price or an increase in advertising, and why trade credit is not crowded out by bank credit. Apart from monitoring advantage, explanations of trade credit are based on buyers' private information about their own willingness or ability to pay and the sellers' resulting incentive to price discriminate (Janet K. Smith, 1987; Michael J. Brennan et al., 1988); on suppliers' private information about product quality (Smith, 1987; Yul W. Lee and John D. Stowe, 1993; and Michael S. Long et al., 1993); on suppliers' advantage in liquidating collateral (Murray Frank and Maksimovic, 1998); on tax effects (Ivan E. Brick and William K. H. Fung, 1984), and on long-term buyer/seller relationships (Benjamin S. Wilner, 2000). While all these theories have merit, they also have shortcomings. Price discrimination theories cannot account for trade credit in competitive markets; the collateral liquidation theory cannot account for trade credit in service industries; product quality theories cannot account for trade credit in homogeneous goods industries, and the long-term relationship theory cannot account for trade credit in single business transactions. Our theory can explain the use of trade credit in all those instances. At the same time, it abstracts from potentially important features of products and institutions that the other theories capture. Therefore, our theory complements the alternative explanations, and empirical studies will have to decide its quantitative importance.

I. Model

We consider a risk-neutral entrepreneur who has observable wealth, $\omega \geq 0$, and has the opportunity to invest in a project. To begin with, we shall assume that the wealth consists entirely

[3] The general idea that illiquid assets facilitate borrowing by limiting the borrower's discretion has earlier been explored by Stewart C. Myers and Rajan (1998). They argue that banks are able to attract depositors precisely because banks' loan portfolios are relatively illiquid.

[4] A related distinction is that Biais and Gollier focus on the problem of borrower screening whereas we are concerned with borrower moral hazard. In screening models there is no obvious distinction between lending cash and lending inputs.

[5] Another early theoretical contribution is J. Stephen Ferris (1981), who argues that trade credit allows the supplier and the customer to pool liquidity risks. However, Ferris does not explain why the risk pooling is not handled by financial intermediaries.

of cash, but we modify this assumption later. The entrepreneur's objective is to maximize his return to ω.[6]

The entrepreneur has access to a project that transforms an input into an output. (Multiple inputs would not affect the basic insights.) Let q denote the amount of purchased input. This quantity is observable to the input supplier, but not to outside parties (the bank). We refer to the input quantity that is put into the project as the *investment,* and denote it by I. The project transforms input into output according to the production function $Q(I)$ that is deterministic, increasing, and concave. The investment I is not verifiable to outsiders. The entrepreneur is a price taker in both the input and the output markets; the input price is normalized to 1, and the output price is denoted by p. The revenues pQ are assumed to be verifiable. In order to rule out trivial solutions, we assume that $Q(0) = 0$ (it is impossible to produce any output without input), and that $pQ'(0) > 1$ (neglecting interest rates, it is always profitable to produce a strictly positive quantity).

In the absence of wealth constraints, the optimal investment is given by the solution to the first-order condition $pQ'(I) - 1 = 0$. More generally, in a perfect credit market with an interest rate r_B, the entrepreneur would ideally want to implement the first-best investment level, $I^*(r_B)$, where

$$pQ'(I^*) = 1 + r_B. \tag{1}$$

We assume that the entrepreneur is wealth constrained and cannot fund first-best investment internally, i.e., $\omega < I^*(r_B)$. Apart from his wealth, the entrepreneur has two potential sources of funding, bank credit and trade credit. Credit is going to be limited, because the entrepreneur cannot commit to invest all available resources into the project. More precisely, the entrepreneur may use (part of) the available resources to generate nonverifiable private benefits. Following current practice (e.g., Oliver Hart, 1995, p. 101–06), we refer to such opportunistic activities as *diversion.*

While both output and sales revenues are verifiable and can therefore be pledged to outside investors, neither the input purchase nor the investment decision are contractible. Thus, the entrepreneur enjoys project returns only after honoring all repayment obligations. Diverted resources, on the other hand, can be enjoyed in full and are only repaid to the extent that project returns are available. If all resources are diverted, nothing is repaid. The assumption that diverted resources yield zero return to outside investors is mainly for simplicity.[7]

Crucial to the model is that the two sources of external funding differ in their exposure to moral hazard. For each unit of cash that the entrepreneur diverts, he realizes $\phi < 1$ units of private benefit, while he obtains only $\beta\phi$ units of private benefit for each unit of input that he diverts.[8] We interpret ϕ as the level of *creditor vulnerability* (creditors are better protected if ϕ is small), whereas $\beta \in [0, 1)$ is a measure of *input liquidity*. When β is large, the input can be transformed into private benefits almost as easily as cash. If β is small, the input cannot easily be diverted. An input can be illiquid for several (related) reasons: It may have a very specific application (like a service or like special purpose machinery), it may be easy for creditors to monitor use and resale transactions, or the input may have a low second-hand value.[9]

In the absence of diversion opportunities ($\phi = 0$), legal protection of creditors is perfect, and it would be possible to fund first-best in-

[6] The entrepreneur could also be thought of as a manager acting in the interest of existing shareholders, who have provided the equity capital ω.

[7] While looting of companies by insiders is a relevant problem even in the United States, as documented by George Akerlof and Paul M. Romer (1993), empire building and other milder forms of opportunistic behavior are probably more important.

[8] The linearity of the "diversion technology" could be relaxed with no change in the results. What we need for some of our results is that diversion is never socially desirable.

[9] In a similar vein, P. V. Viswanath and Mike Frierman (1995) distinguish *asset fungibility,* which measures the scope for manipulating returns from investment (like ϕ), from *asset flexibility,* which measures the scope for redeploying the asset (like β). However, Viswanath and Frierman are concerned with redeployment of assets by creditors, following a default, rather than immediate redeployment by the entrepreneur.

vestment even for a penniless entrepreneur. In order to make our problem interesting, we thus make the assumption that

$$\phi > \underline{\phi} = \frac{pQ(I^*(0)) - I^*(0)}{I^*(0)}. \tag{2}$$

In words, diversion yields a marginal private benefit exceeding the average rate of return to first-best investment at an interest rate of zero.

As already indicated, banks and suppliers are competitive. We assume that both banks and suppliers offer credit in the form of overdraft facilities $\{(L_i, (1 + r_i)L_i)\}_{L_i \leq \bar{L}_i}$, where L_i is the loan, $(1 + r_i)L_i$ is the repayment obligation, and $\bar{L}_i$ is the credit limit.[10] Subscripts $i \in \{B, S\}$ indicate whether the contract is offered by a bank (B) or by a supplier (S). We interpret the trade credit interest rate r_S as the implicit cost of eschewing a cash discount.[11]

Neither banks nor suppliers can condition their lending on the investment I. The key difference between banks and suppliers is that suppliers can more easily condition their lending on the input purchase q. In order to capture the difference as simply as possible, we restrict $\bar{L}_B$ to being a number, whereas we allow $\bar{L}_S(q)$ to be any real-valued function.

For simplicity, we assume that lending is exclusive, in the sense that the entrepreneur may not borrow from multiple banks or multiple suppliers at the same time.

We conclude the description of the model by specifying the sequence of events.

1. Banks and suppliers simultaneously make their contract offers.
2. The entrepreneur chooses among the contract offers.
3. The entrepreneur chooses L_B, L_S, and q.
4. The entrepreneur makes the investment/diversion decision.
5. The payoff realizes and repayments are made.

Our framework precludes the possibility that contracts are conditioned on each other. For example, the bank cannot condition its load on the entrepreneur's choice of trade credit contract. Without this assumption, the bank could indirectly contract on input purchases. This would blur the distinction between trade credit and bank credit. For similar reasons, we assume that the entrepreneur can visit each lender only once. If multiple visits were feasible, the entrepreneur could purchase some inputs before asking for a further bank loan. The second bank loan would then depend on the input purchase. We briefly discuss the effect of multiple visits in Section III.

II. Pure Bank Finance

In order to highlight the various features of the model, we first derive the subgame-perfect equilibrium of the contracting game when trade credit is unavailable. Showing that the model generates conventional credit rationing due to moral hazard in this setting is helpful for evaluating the additional results that are generated once trade credit is introduced.

For simplicity, we assume that banks have access to unlimited funds at zero marginal cost. With constant marginal costs, competition drives banks' equilibrium profits to zero. Nonetheless, banks do not lend unlimited funds, because a sufficiently large loan tempts the entrepreneur to divert all the resources—in which case the bank would make a loss.

Suppose for the moment that the entrepreneur abstains from diversion. Given a credit limit $\bar{L}_B$ and an interest rate r_B, a nondiverting entrepreneur either borrows enough to undertake the efficient investment $I^*(r_B)$, or he fully exhausts the credit limit $\bar{L}_B$. That is, he utilizes the overdraft facility up to the point

$$L_B^u = \min\{I^*(r_B) - \omega, \bar{L}_B\}. \tag{3}$$

[10] As shown in Burkart and Ellingsen (2002), overdraft facilities are optimal contracts in our setting, so this restriction is without loss of generality.

[11] If the contract merely specifies 30 days net, we would thus say that $r_S = 0$, neglecting the penalties involved if the payment is late (late payment is typically considered a contract violation). Many suppliers offer a discount if the bill is paid within a certain number of days, n. Our formulation abstracts from the complication arising when $n > 0$. Whenever a firm faced with such a contract elects to pay within n days, our model depicts the firm as utilizing bank credit only. An invoice specifying 30 days net and -2 percent if paid within 10 days has an annualized trade credit interest rate of 44.6 percent.

However, the entrepreneur is assumed to be opportunistic, so investment cannot be taken for granted. Once the entrepreneur gains access to the overdraft facility, he chooses I, q, and L_B to maximize utility,

$$U = \max\{0, pQ(I) - (1 + r_B)L_B\} + \phi[\beta(q - I) + (\omega + L_B - q)], \tag{4}$$

subject to the constraints

$$q \leq \omega + L_B,$$

$$I \leq q,$$

$$L_B \leq \bar{L}_B.$$

The maximand's first term is the residual return from investment, taking into account the entrepreneur's limited liability. The second term is the private benefit associated with diversion of inputs and cash, respectively. The constraints say that (i) input purchase is constrained by the available funds, (ii) investment is constrained by the input purchase, and (iii) bank borrowing is constrained by the credit limit.

The illiquidity of the input ($\beta < 1$) implies that the entrepreneur prefers diverting cash to diverting input. The inefficiency of the diversion technology ($\phi < 1$) and the certain investment return $pQ(I)$ imply that the entrepreneur never finds it optimal to divert only a fraction of the available cash, $\omega + \bar{L}_B$.[12] Thus, diversion is essentially an all-or-nothing decision. The entrepreneur behaves prudently if and only if his residual return from investing exceeds the payoff from diverting all funds. That is, the credit line $\bar{L}_B$ has to satisfy the "global incentive constraint"

$$pQ(\omega + L_B^u) - (1 + r_B)L_B^u \geq (\omega + \bar{L}_B)\phi. \tag{5}$$

(Recall that $L_B^u = \bar{L}_B$ whenever the credit line constrains investment, which is the primary case of interest.) If (5) did not hold, all resources would be diverted, but then the banks would not lend.[13]

Since diversion and hence default do not occur in equilibrium, the equilibrium interest rate must be $r_B = 0$, as this is the only interest rate that yields zero profit for the banks. It remains to determine the equilibrium credit limit and consequent investment.

PROPOSITION 1: *For any pair of parameters* (ϕ, p) *satisfying our assumptions, there exists a critical wealth level* $\hat{\omega}(\phi, p) > 0$ *such that entrepreneurs with less wealth than* $\hat{\omega}$ *are credit constrained and invest strictly less than* $I^*(0)$. *Entrepreneurs with more wealth than* $\hat{\omega}$ *borrow less than their credit limit and invest* $I^*(0)$.

To finance first-best investment, a poor entrepreneur with $\omega < \hat{\omega}$ would need to borrow substantially. The resulting large repayment obligation would leave him with a residual return below the payoff from diverting all available funds. Consequently, his credit limit constrains investment and is given by the binding incentive constraint

$$pQ(\omega + \bar{L}_B) - \bar{L}_B = (\omega + \bar{L}_B)\phi. \tag{6}$$

(Lemma A1 in the Appendix shows that this constraint is binding for all wealth levels close enough to zero.) The credit limit cannot be lower in equilibrium. Otherwise, there would exist a contract with a higher limit and a higher interest rate that would be preferred by the bank as well as the constrained entrepreneur. By contrast, wealthy entrepreneurs need to borrow less in order to fund first-best investment. With a smaller repayment obligation, the residual return from in-

[12] The more detailed argument why partial diversion is dominated goes as follows: Once the entrepreneur plans to repay the loan in full, the marginal benefit from investment is at least $1 + r_B$, which is larger than the marginal benefit from diversion ϕ. If, on the other hand, the entrepreneur were to invest too little to repay the loan in full, there is no point in investing any resources at all, since any additional return would be claimed by the bank. Furthermore, if the entrepreneur diverts borrowed funds, he should also divert his own funds. Otherwise, these will be claimed by the bank upon default.

[13] As it stands, our model does not explain why diversion exists. However, it only takes a minor alteration to generate inefficient diversion in equilibrium. If ϕ is a random variable and its realization is privately known to the entrepreneur, the equilibrium (for some distributions of ϕ) has the feature that the entrepreneur diverts if ϕ is sufficiently high and invests otherwise.

vestment exceeds the diversion payoff, and hence the entrepreneur's investment is unconstrained.[14]

Finally, we note that there is no other contract that outperforms the overdraft facility. The straightforward reason is that a larger investment would require a larger repayment for the bank to break even. Since we have already shown that a larger repayment would violate the entrepreneur's incentive compatibility constraint, the conclusion follows.

III. Bank Finance and Trade Credit

When suppliers can extend credit, a new trade-off emerges. On the one hand, the use of trade credit improves the investment incentive because the supplier lends inputs, which are less easily diverted than cash. Unlike the bank, the supplier can also condition the trade credit limit on the input purchase. On the other hand, the entrepreneur has more diversion opportunities. As before, the entrepreneur may divert cash. In addition (or alternatively), the entrepreneur may now divert inputs. This option was dominated above, because all inputs had to be paid in cash. With trade credit, it becomes possible to cheat the supplier as well.

We will discuss the determination of trade credit interest rates in Section III, subsection D. For the moment, let us just assume that the suppliers' marginal cost of funds is constant at some rate $\sigma > 0$. Since trade credit will ease the bank credit constraint, we also need to strengthen our earlier parameter restriction. We now assume that

$$(7)\quad \phi > \underline{\phi}(\beta) = \frac{pQ(I^*(\sigma)) - [1 + (1-\beta)\sigma]I^*(\sigma)}{\beta I^*(\sigma)}.$$

It will be shown below that a penniless entrepreneur borrows a fraction β of the investment funds from the bank. Condition (7) thus requires that a penniless entrepreneur should have a return to diversion which exceeds the average return from investment $I^*(\sigma)$ [funded with bank credit $L_B = \beta I^*(\sigma)$ and trade credit $L_S = (1 - \beta)I^*(\sigma)$]. Otherwise, the diversion opportunity does not constrain investment.

Since competition drives the profits of banks and suppliers to zero, we know that equilibrium interest rates are $r_B = 0$ and $r_S = \sigma$, respectively. We shall say that the bank credit limit is binding if $I^*(r_B) > \bar{L}_B + \omega$ and that the trade credit limit is binding if $I^*(r_S) > \bar{L}_B + \bar{L}_S(q) + \omega$.

Because $r_S > 0$, the entrepreneur utilizes trade credit in equilibrium only if he is sufficiently tightly rationed in the bank credit market. More precisely, trade credit is desired at an interest rate r_S if and only if $\bar{L}_B + \omega < I^*(r_S)$. Suppose that $\bar{L}_B$ is such that this inequality holds. If the entrepreneur abstains from diversion, he purchases inputs $q = \omega + \bar{L}_B + L_S$ and utilizes trade credit

$$(8)\quad L_S^u = \min\{I^*(r_S) - \bar{L}_B - \omega, \bar{L}_S(q)\}.$$

That is, a nondiverting entrepreneur takes just enough trade credit to sustain the efficient investment level given the marginal cost of funds, r_S. If first-best investment is beyond reach, the nondiverting entrepreneur invests as much as the credit lines allow.

As noted above, investment cannot be taken for granted. The entrepreneur's problem after having accepted the contract offers of one bank and one supplier is to choose q, I, L_B, and L_S to maximize his utility

$$(9)\quad U = \max\{0, pQ(I) - L_B - (1 + r_S)L_S\} + \phi[\beta(q - I) + (\omega + L_B + L_S - q)]$$

subject to the constraints

$$q \le \omega + L_B + L_S,$$

$$I \le q,$$

$$L_B \le \bar{L}_B,$$

$$L_S \le \bar{L}_S(q).$$

Compared to the entrepreneur's optimization

[14] In this case, there is an interval of possible credit lines that yield first-best investment $I^*(0)$ and hence the same utility for the entrepreneur. We abstract from the multiplicity of equilibrium credit lines by focusing on the equilibrium in which banks offer the *maximum* credit line, as given by, $pQ(I^*(0)) - (I^* - \omega) = (\omega + \bar{L}_B)\phi$.

problem under pure bank finance (4), the only real modification is that trade credit, L_S, enters the maximand and the set of constraints in an analogous fashion to bank credit, L_B. Observe that we do not impose the constraint, $L_S \leq q$, so suppliers could in principle lend cash. Since the entrepreneur diverts any spare cash, suppliers nonetheless only lend inputs in equilibrium.

The introduction of trade credit does not change the feature that diversion is an all-or-nothing decision. As above, the entrepreneur never finds it optimal to divert a fraction of inputs or cash because of the inefficient diversion technology ($\phi < 1$). Consequently, there are only two relevant temptations facing the entrepreneur. First, he may exhaust the available trade credit only to divert all inputs and any remaining cash. This temptation is only resisted (in favor of investing in the project) if

$$pQ(\bar{L}_B + L_S^u + \omega) - \bar{L}_B - (1 + r_S)L_S^u \geq \phi[\beta q + (\bar{L}_B + \bar{L}_S + \omega - q)].$$

The left-hand side of the inequality is the entrepreneur's maximum return from investment; the right-hand side is the entrepreneur's return from borrowing a maximum amount and then diverting all resources.[15]

A noteworthy property of this expression is that any transformation of cash into input reduces the value on the right-hand side. Hence, the maximum incentive-compatible trade credit limit is increasing in q and reaches its maximum when all funds are used to buy inputs. We refer to this maximum trade credit limit as $\bar{L}_S$, which is defined as the solution to the equation

$$(10) \quad pQ(\bar{L}_B + L_S^u + \omega) - \bar{L}_B - (1 + r_S)L_S^u = \phi\beta(\bar{L}_B + \bar{L}_S + \omega).$$

The second relevant temptation is not to purchase any inputs at all (in which case the supplier does not offer any trade credit, so $L_S = 0$) and to divert the cash $\omega + \bar{L}_B$. The entrepreneur abstains from diverting all cash only if

$$(11) \quad pQ(\bar{L}_B + L_S^u + \omega) - \bar{L}_B - (1 + r_S)L_S^u \geq \phi(\bar{L}_B + \omega).$$

Hence, the equilibrium credit limits are determined by the incentive constraints (10) and (11).

As we have already seen, sufficiently wealthy entrepreneurs do not utilize trade credit. As wealth decreases, some trade credit is used, and the investment level is determined by the first-order condition

$$pQ'(I) - (1 + r_S) = 0.$$

Eventually, for the poorest entrepreneurs, both bank credit and trade credit limits are fully exhausted.

PROPOSITION 2: *For given parameters* (β, ϕ, p) *there exist critical wealth levels* $\tilde{\omega}_1 > 0$ *and* $\tilde{\omega}_2 > \tilde{\omega}_1$ *such that:* (*i*) *entrepreneurs with wealth above* $\tilde{\omega}_2$ *take no trade credit and invest* $I \in [I^*(r_S), I^*(0)]$; (*ii*) *entrepreneurs with wealth in-between* $\tilde{\omega}_1$ *and* $\tilde{\omega}_2$ *take trade credit and invest* $I^*(r_S)$; (*iii*) *entrepreneurs with wealth below* $\tilde{\omega}_1$ *exhaust both bank and trade credit limits and invest less than* $I^*(r_S)$.

The investment of entrepreneurs with wealth above $\tilde{\omega}_2$ is unaffected by the availability of trade credit, because they can already invest $I^*(r_S)$ or more. However, all entrepreneurs with less wealth than $\tilde{\omega}_2$ would have invested less than $I^*(r_S)$ if trade credit were unavailable. Compared to the pure bank lending regime, the introduction of trade credit therefore increases efficiency. (For a complete proof of Proposition 2, see the Appendix.)

Because our assumed sequence of moves allows the entrepreneur to visit the supplier only once, banks play an unrealistically passive role. Consider for instance the modified setting where the entrepreneur can visit the supplier twice—before and after contracting with a bank—and where banks can inspect the entrepreneur's balance sheet. In this setting, banks would lend more. Indeed, if the entrepreneur

[15] Since revenues are verifiable, the bank can claim project returns even if all the bank's money has been diverted. Thus, diverting all resources dominates diverting some (or all) of the bank loan and investing some (or all) trade credit.

first purchases inputs with all his wealth ω and this is observed by the banks, the constraint that the entrepreneur should not divert cash is given by

$$pQ(\bar{L}_B + L_S^u + \omega) - \bar{L}_B - (1 + r_S)L_S^u$$
$$\geq \phi(\bar{L}_B + \beta\omega).$$

Compared to equation (11), the right-hand side is reduced by $\phi(1 - \beta)\omega$, which translates into a higher bank credit line $\bar{L}_B$. In the extreme case that the entrepreneur could costlessly move back and forth between the supplier and the bank arbitrarily many times, and balance sheet monitoring as well as other transaction costs were zero, trade credit would vanish. Except in this extreme case, more active bank monitoring would, however, not eliminate trade credit.

A. *Properties of the Credit Limits*

Having shown that trade credit eases credit rationing, we now describe how the two credit limits, $\bar{L}_B$ and $\bar{L}_S$ [given by equations (10) and (11)], are affected by parameter changes.

PROPOSITION 3: (*i*) *For an entrepreneur with wealth smaller than* $\tilde{\omega}_1$ *the equilibrium credit lines* $\bar{L}_B$ *and* $\bar{L}_S$ *are increasing in the output price* (p) *and in the entrepreneur's wealth* (ω) *and are decreasing in the creditor vulnerability* (ϕ), *in the input liquidity* (β), *and in the trade credit interest rate* (r_S). (*ii*) *For* $\omega \in [\tilde{\omega}_1, \tilde{\omega}_2)$, *the same results hold, except that* $\bar{L}_B$ *is independent of* β.

PROOF:

See the Appendix.

When we consider the aggregate credit limit $\bar{L}_B + \bar{L}_S$, these results are quite intuitive. A higher output price increases the profitability of investment relative to diversion, and must therefore increase the aggregate credit limit. Likewise, an increase in wealth increases the entrepreneur's residual return to investment for a given loan size, making larger repayment incentive compatible. As a result, the aggregate credit limit must increase. On the other hand, an increase in creditor vulnerability or input liquidity increases the profitability of diversion relative to investment, and therefore decreases the aggregate credit limit.

The more surprising feature of Proposition 3 is that bank credit and trade credit *always* move in the same direction. For example, a decrease in β entails an increase in both $\bar{L}_B$ and $\bar{L}_S$. Why does lower input liquidity not simply entail substitution from bank credit to trade credit? The complementarity between the bank credit limit and the trade credit limit arises because more trade credit always makes investment of a given bank loan more valuable compared to diversion of the loan. [Technically, the left-hand side of (11) is increasing in L_S^u.] In other words, any entrepreneur who is rationed in the bank credit market is offered more bank credit when trade credit becomes available.

We would like to stress that input illiquidity increases the aggregate credit limit partly because inputs are worthless as collateral in our model. Whenever there is bankruptcy, there are no assets left for the creditors to seize. In models where creditors can seize assets when the entrepreneur defaults, but diversion by the borrower is ruled out, asset illiquidity instead tends to reduce the borrower's debt capacity (Myers, 1977; Hart, 1995, Ch. 6). Thus, in a more general model with exogenous payoff uncertainty and collateral, the relationship between asset liquidity and aggregate debt capacity is ambiguous. From a funding perspective, the ideal asset is difficult for the entrepreneur to divert and at the same time has a high collateral value.

Proposition 3 is only concerned with the amount of trade credit available to the entrepreneur. When this amount is not a binding constraint, the entrepreneur exhausts the bank credit limit and uses trade credit to the extent that the marginal return from investment $pQ'(I)$ equals the marginal cost $(1 + r_S)$.

PROPOSITION 4: *For entrepreneurs with wealth* $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ *trade credit utilization* L_S *is decreasing in the entrepreneur's wealth* (ω) *and increasing in creditor vulnerability* (ϕ). *An increase in the output price* (p) *or in the trade credit interest rate* (r_S) *have an indeterminate effect on* L_S.

PROOF:

See the Appendix.

These entrepreneurs exhaust the bank credit limit and invest $I^*(r_S)$, which is independent of both wealth and creditor vulnerability. Following a change in either ω or ϕ, the entrepreneurs continue to invest $I^*(r_S)$ and compensate the reduction (increase) in $\bar{L}_B$ fully by an increase (reduction) in L_S. In other words, there is only a *credit substitution* effect. This reasoning does not apply to variations in the output price or in the trade credit interest rate, because these parameters also affect $I^*(r_S)$. Therefore there is a *credit volume* effect as well. For example, an increase in r_S leads to a decrease in $I^*(r_S)$ as well as in $\bar{L}_B$. The overall effect on trade credit utilization depends on which reduction is larger. Notably, trade credit can be a "Giffen good," in the sense that trade credit demand is, over some range, an increasing function of r_S. The Giffen phenomenon only requires that I^* is relatively insensitive to r_S, in which case the credit substitution effect dominates the credit volume effect.

B. *Credit Over the Business Cycle*

Our theory predicts a sharp difference in trade credit dynamics depending on whether the borrower is rationed in the trade credit market or not. For those entrepreneurs that are constrained, bank credit volumes and trade credit volumes move in the same direction. For those who are not constrained by their trade credit limits, bank credit and trade credit should typically move in opposite directions. If we interpret a business cycle as a fluctuation in entrepreneurs' net worth, our model yields the following predictions.

PROPOSITION 5: *For any entrepreneur whose bank credit limit binds:* (*i*) *Bank credit is procyclical.* (*ii*) *Trade credit is procyclical for entrepreneurs who exhaust their trade credit limit and countercyclical for those that do not.*

When there is a general credit crunch due to a drop in corporate wealth, all firms face tighter bank credit limits. Constrained firms also have to reduce their use of trade credit in tandem with the tighter bank credit limits. Firms that are unconstrained in the trade credit market instead increase their trade credit borrowing.

Proposition 5 sheds light on the recent finding by Nilsen (2002), that large U.S. firms without a bond rating increase their use of trade credit during monetary contractions more than unrated small firms do. This finding has been considered puzzling because large firms are considered to be financially sounder and hence supposedly less dependent on trade credit than small firms are. We think that this is indeed true. The crux is that those (often small) firms that are most dependent on trade credit *cannot* increase their trade credit borrowing in recessions because they already exhaust their trade credit limit. To put it bluntly: The only thing worse than having to increase trade credit borrowing is to be unable to do so. Conventional wisdom therefore holds only for the comparison between rated versus unrated firms. Firms with a bond rating do not need to utilize costly trade credit even in a recession, so their trade credit volumes should be cyclical, tracking the change in input purchases.

If unconstrained firms dominate among those that take trade credit, our model produces countercyclical swings in trade credit, as has been observed in U.S. data by Ramey (1992).[16] In less developed economies, it is likely that constrained firms dominate, in which case trade credit should be procyclical with respect to wealth shocks.[17]

C. *Cross-Sectional Predictions*

While input illiquidity provides the rationale for trade credit, we have not yet shown that a higher degree of input liquidity, β, leads to a smaller amount of trade credit. When the entrepreneur is credit rationed, the hypothesis is true.

[16] Ramey's finding is sensitive to data set and method. For example, Oliner and Rudebusch (1996) do not find a countercyclical movement in trade credit.

[17] When the cycle is caused by swings in demand (p) rather than changes in entrepreneurs' wealth, the model's predictions are more ambiguous, because unconstrained firms may use either more or less trade credit as demand changes.

PROPOSITION 6: *For entrepreneurs who exhaust their trade credit limit, trade credit as a fraction of investment is decreasing in input liquidity, β.*

The proof is easy. Divide equation (10) by (11) to get

$$L_S = (\omega + L_B)(1 - \beta)/\beta.$$

It follows immediately that the ratio of trade credit to investment is

$$\frac{L_S}{\omega + L_B + L_S} = 1 - \beta. \tag{12}$$

The intuition is also straightforward. Higher input liquidity reduces both credit limits, but does not affect the entrepreneur's wealth. The result, that poor users of liquid inputs utilize relatively less trade credit than do poor users of illiquid inputs, is a unique prediction of our model.[18]

A limitation of Proposition 6 is that it applies only to firms that exhaust their trade credit limit. This result is quite difficult to test unless one has good empirical measures of credit constraints. As it turns out, other results hold regardless of whether firms exhaust their trade credit limit. The model gives clear predictions both with respect to entrepreneurs' wealth and with respect to creditor protection.

PROPOSITION 7: *The ratio of trade credit to investment is nonincreasing in wealth* (ω) *and nondecreasing in creditor vulnerability* (ϕ).

For firms that are constrained in both markets, we know from (12) that the ratio L_S/I depends only on β. For firms that are only constrained in the bank credit market, bank and trade credit are substitutes with respect to changes in ω and ϕ (Proposition 4). Hence, the ratio of trade credit to investment is decreasing in ω and increasing in ϕ. Proposition 7 is broadly confirmed by the balance sheet data of Rajan and Zingales (1995) and Giannetti (2003), which indicate that trade credit is more important in countries with worse creditor protection.[19] In Giannetti's sample of (predominantly) unlisted firms in eight European countries, accounts payable constitute on average 29 percent in Italy, 30 percent in France, and 36 percent in Portugal, while being only 11 percent in Netherlands and 15 percent in the United Kingdom. More systematic evidence is offered in the recent study by Demirgüç-Kunt and Maksimovic (2001) covering large manufacturing firms in 40 countries. As predicted by our model, they find that trade credit as a fraction of sales is significantly negatively related to law and order.

D. *Extending Trade Credit*

Until now, we have considered an entrepreneur who starts up a new venture, endowed with cash only. This framework suffices for studying accounts payable, but cannot capture accounts receivable. In order to have a role for accounts receivable, we need to consider an entrepreneur with a going concern.

Suppose for simplicity that a stock of output with market value ω is the sole asset being left over from last period, once all outstanding debts have been repaid. As should be clear from the derivation of (10) and (11), it is generally not desirable to sell all the output on credit: If the customer faces a binding bank credit limit of the form (11), an input purchase $q > 0$ financed exclusively with trade credit will induce the customer to divert and default, as the right-hand side of (11) increases by βq. Denote by θ the highest fraction of output sold on trade credit that keeps the customer from diverting. When selling a fraction θ on credit at an interest rate s,

[18] For entrepreneurs who do not exhaust their trade credit limit, the bank credit limit is independent of β, as shown in Proposition 3. It follows that trade credit utilization is independent of β as well.

[19] Recent empirical work by Raymond Fisman and Inessa Love (2003) indicates that the difference in firms' performance across countries is smaller in industries that rely heavily on trade credit, as measured by trade credit use in the United States. A possible interpretation of their finding is that U.S. firms' funding advantage on average is smaller in these industries than in other industries; i.e., ϕ_{US} is relatively high and ω_{US} is relatively low. Alternatively, these industries rely on sufficiently illiquid input everywhere, and so do not face binding credit constraints.

the entrepreneur obtains a cash balance of $(1 - \theta)\omega$ and trade credit claims with a face value of $\theta\omega(1 + s)$. Would the entrepreneur be willing to do this, considering the need for investment funds? Clearly, the answer depends on whether it is possible to borrow against the trade credit claims or not. Suppose transaction costs are zero, and that the trade credit claim is safe and verifiable. Then the entrepreneur can go to a bank and borrow $\theta\omega(1 + s)$ against it. If $s > 0$, it is optimal to extend trade credit, because this financial investment does not interfere with the real investment. On the contrary, the extension of trade credit leaves the entrepreneur with liquid wealth of $\omega(1 + \theta s)$. He can thus fund a larger project than before.[20]

The frictionless case is a useful benchmark, but it is a poor description of reality. Banks are rarely willing to lend fully against the face value of trade credit claims; as a rule of thumb, banks offer to lend only 80 percent (and sometimes less) of accounts receivable (Shezad L. Mian and Clifford W. Smith, 1992). Within our model, the lending cap can be explained as a response to the problem of reckless trade credit extension. If firms could lend fully against receivables, they would be tempted to lift their customers' trade credit limit beyond the incentive compatible level θ. The entrepreneur may lend recklessly to customers, with the objective himself to divert all resources after having borrowed against the receivables.[21]

Capping Receivable Secured Lending.—To avoid reckless lending by suppliers, banks need to cap their lending against receivables. Suppose for a moment that customers cannot use side-payments to bribe suppliers into reckless extension of trade credit. By capping lending against receivables at a fraction below $1/(1 + s)$, the bank completely eliminates recklessness. Due to the cap, an entrepreneur who plans to divert resources prefers selling all the inputs for cash to lending recklessly. (Since project revenues are verifiable, it does not make sense to lend recklessly and invest proceeds in the project.) If side-payments from customers to suppliers are feasible, receivable secured lending may have to be capped at a level κ well below $1/(1 + s)$. However, even with a tight cap on receivable secured lending, it can be quite attractive to offer trade credit. For an entrepreneur who is rationed by banks and suppliers, it is optimal to offer trade credit as long as a dollar of trade credit yields as high a return as a dollar of real investment. Since a one-dollar receivable translates into $1 + s$ dollars at the end of the period, and yields an immediate additional bank loan of κ dollars, to be invested in the project and repaid at the end of the period, extending trade credit is profitable if

$$1 + s + \kappa(pQ'(I) - 1) \geq pQ'(I).$$

PROPOSITION 8: *On the margin, the entrepreneur is willing to extend trade credit if and only if* $s \geq (1 - \kappa)(pQ'(I) - 1)$.

Note that if $\kappa = 0.8$ the interest rate on trade bills s only needs to exceed 20 percent of the return to real investment in order for the entrepreneur to be willing to offer trade credit.[22] By the same token, an entrepreneur who takes trade credit at an interest rate r_S, but who is not rationed by suppliers, is willing to offer trade credit if and only if $s \geq (1 - \kappa)r_S$. With $\kappa = 0.8$, the marginal trade credit cost therefore has to be five times the marginal trade credit revenue before the entrepreneur stops giving trade credit.

The fundamental reason why firms are willing to extend trade credit at a lower rate than they themselves pay is that an extra dollar invested in receivables is not funded by an extra dollar of payables, because receivables create additional bank funding. Any model in which receivables can be used as collateral has this feature, not just ours. However, it is worth

[20] In equilibrium, the interest rate s should be competed down to zero. More on this below.

[21] The argument presumes that banks cannot observe directly whether a trade bill is likely to be paid back or not. We think that this assumption is natural, because the supplier's bank often has no credit relation with the customer.

[22] Of course, the entrepreneur may alternatively sell trade bills to a factoring company. In our stylized model there is little difference between receivable secured lending and factoring with recourse; we refer to Mian and Smith (1992) and Ben J. Sopranzetti (1998) for further discussions of the costs and benefits of factoring.

pointing out that receivables have the capacity to support additional bank credit precisely because an invoice can easily be made illiquid. When lending against an invoice, the bank obtains the right to the money that the customer owes the entrepreneur, and the bank will collect the customer's payment in case the entrepreneur defaults on the bank loan. Thus, from the entrepreneur's perspective the invoice is completely illiquid once it is offered as collateral.

Trade Credit Interest Rates.—Can the model explain observed trade credit interest rates? In a competitive market, equilibrium trade credit interest rates are not driven by the financial status of a single supplier. The trade credit interest rate increases above the bank rate only if the suppliers are *collectively* credit rationed. This is our explanation for why trade credit terms are so similar within industries, and so heterogeneous across industries and countries (Chee K. Ng et al., 1999; Guiseppe Marotta, 2001). If firms in a competitive industry differ widely in the degree to which they are credit constrained, we would expect to see some (constrained) firms avoiding to give trade credit and others being very willing to offer it, but not to see firms offering trade credit at different interest rates.

With perfect competition among suppliers, our model implies quite low trade credit interest rates in equilibrium. As an extreme example, suppose that all industries use inputs from at least one other industry and that the marginal firm offering trade credit in each industry is itself unconstrained by its trade creditors. In this economy, the only candidate for an equilibrium trade credit interest rate is the bank rate: Firms that borrow at positive trade credit interest rates would offer trade credit at a lower rate (a smaller premium on the bank rate) than they take it. Since all industries cannot have lower interest rates than their suppliers in other industries, the trade credit interest rate in all industries must equal the bank rate. But even in an industry consisting entirely of heavily credit-constrained suppliers, who all have a marginal rate of return on investment $(pQ'(I) - 1) > 0$, our model predicts a trade credit interest rate equal to $(pQ'(I) - 1)(1 - \kappa)$, i.e., only about a fifth of the marginal return to investment for typical values of the lending cap κ.

We contend that the small equilibrium differential between the bank interest rate and the trade credit interest rate could explain the widespread use of net terms. Instead of offering trade credit at the bank rate, or a rate so close to the bank rate that few buyers bother to pay before the bill is due, suppliers might as well offer net terms only, i.e., include the (bank) interest rate in the price to be paid in, say, 30 days.[23] On the other hand, as mentioned in the introduction, there are quite a few industries with very high trade credit interest rates, frequently in the form of big discounts for early payment. It seems to us that real trade credit interest rates of 40 percent per year must, with few exceptions, be due to lack of competition among suppliers.[24]

E. *Loan Maturity*

In reality, trade credit has much shorter maturity than bank credit. Overdraft facilities are typically renewed once a year, and renewal is regularly granted if the borrower has been able not to draw on the overdraft facility for at least 30 days during the preceding year. Trade credit, on the other hand, generally matures in 30 or 60 days.

To explore the different maturity of bank and trade credit, we consider a sequence of two periods, each period corresponding to the model analyzed in subsections A–C of this section. In each period the entrepreneur borrows from a bank and a supplier, purchases input, and makes an investment decision. The entrepreneur repays at the end of periods 1 or 2 depending on maturity. For simplicity, we assume that bank and trade credit limits bind in both periods and abstract from the possibility that the entrepreneur extends trade credit himself.

[23] Net terms, in their turn, explain why many firms rely so little on short-term bank credit, using it primarily for funding inputs for which trade credit is unavailable or too short. (As pointed out by a referee, another explanation for net terms is that sellers want to induce buyers to purchase early, in order to save inventory costs.)

[24] One such exception is if the traded good invites *ex post* haggling over quality. Prevention of renegotiation might be a reason why large cash discounts are offered to retailers of fashionable clothes.

PROPOSITION 9: (*i*) *The equilibrium maturity of bank credit is indeterminate.* (*ii*) *Trade credit has short maturity in equilibrium.*

The proof has three steps. Suppose first that bank and trade credit both have short maturity, implying that loans taken at the beginning of period 1 are repaid at the end of period 1. After repaying first-period debts, the entrepreneur enters period 2 in a similar situation as in the beginning of period 1. However, since the entrepreneur makes a profit in the first period (otherwise he would have diverted all resources), his wealth is higher. That is, $\omega^2 > \omega^1$. Since the credit limits are increasing functions of wealth, we know that $\bar{L}_B^2 > \bar{L}_B^1$ and $\bar{L}_S^2(q) > \bar{L}_S^1(q)$.

Let us next consider a long-term bank loan. The entrepreneur could borrow $\bar{L}_B^1$ from the bank at the beginning of period 1, but ask that the bank loan does not mature before the end of period 2. Given that the credit limit can be increased from $\bar{L}_B^1$ to $\bar{L}_B^2$ at the beginning of period 2, the entrepreneur's incentives are exactly the same as under the short-term bank contract. The only difference is that the entrepreneur keeps $\bar{L}_B^1$ at the end of period 1 and thus only receives the smaller additional loan $\bar{L}_B^2 - \bar{L}_B^1$ at the beginning of period 2. In other words, the maturity of the bank loan is irrelevant for investment incentives. Thus, equilibrium maturity is indeterminate, proving part (i) of Proposition 9.

By contrast, the maturity of trade credit does affect the entrepreneur's borrowing constraint. Suppose that the first period's trade credit L_S^1 matures at the end of period 2, and that additional trade credit can be taken at the beginning of period 2. First-period bank liabilities apart, the entrepreneur has liquid resources $\omega^2 + \bar{L}_S^1$ (in cash or output) when visiting the bank at the beginning of period 2. In analogy with (11), the constraint that the entrepreneur should not divert all the cash in period 2 becomes

$$pQ(\bar{L}_B^2 + \bar{L}_S^2 + \omega^2) - \bar{L}_B^2 - (1 + r_S)\bar{L}_S^2 \geq \phi(\omega^2 + \bar{L}_B^2 + \bar{L}_S^1).$$

If trade credit has short maturity, so L_S^1 is repaid at the end of period 1, the entrepreneur has only his wealth ω^2 when coming to the bank at the beginning of period 2. (Again we abstract from any outstanding period 1 bank debt.) Accordingly, the incentive constraint is

$$pQ(\bar{L}_B^2 + \bar{L}_S^2 + \omega^2) - \bar{L}_B^2 - (1 + r_S)\bar{L}_S^2 \geq \phi(\omega^2 + \bar{L}_B^2).$$

Since the entrepreneur has less cash when visiting the bank in the latter case, the right-hand side is now smaller, reflecting a smaller temptation to divert cash. As a result, the sustainable level of bank credit $\bar{L}_B^2$ is larger. Long-term trade credit contracts cannot appear in equilibrium, because a supplier could then make a profit by offering a short-term contract.

Intuitively, trade credit ceases to be useful in constraining diversion once illiquid input is transformed into liquid output. Therefore, sales revenues should be used to repay input suppliers as fast as possible, with new trade credit being granted only in connection with new input purchases.

IV. Final Remarks

Suppliers lend goods and banks lend cash. This simple observation has been shown to provide a coherent explanation for the existence of trade credit, even in competitive credit and product markets. Confronting the theory with broadbrush evidence from previous studies, we think it stands up well. In future work we hope to investigate empirically the additional predictions that the theory generates.

The theory itself might also be extended in several directions by admitting, for example, a richer temporal structure, uncertainty, multi-input technologies, collateral, and imperfect competition.

Finally, trade credit is not the sole instance of in-kind finance. Leasing contracts and postpayment of wages and salaries are two other examples. Future work will show whether the commitment value of illiquid assets is helpful in explaining such contractual arrangements.

Appendix

PROOF OF PROPOSITION 1:

Proposition 1 is proved in the main text, with the exception of the existence and uniqueness of $\hat{\omega}(\phi, p)$.

LEMMA A1: *There exists a unique threshold* $\omega = \hat{\omega}(\phi, p) > 0$ *such that* $\bar{L}_B + \omega = I^*(0)$ *and* $pQ(\bar{L}_B + \omega) - (1 + \phi)\bar{L}_B - \phi\omega = 0$.

PROOF:

Recall that the credit line $\bar{L}_B$ is given by the binding incentive constraint (6),

$$pQ(\bar{L}_B + \omega) - \bar{L}_B - \phi(\bar{L}_B + \omega) = 0. \tag{A1}$$

Observe that the constraint is only binding if $pQ'(\bar{L}_B + \omega) - (1 + \phi) < 0$. (Otherwise L_B could be increased without violating the incentive constraint.) In order to show that there is a unique value of ω such that $\omega + \bar{L}_B(\omega) = I^*(0)$, it suffices to show (i) that $0 + \bar{L}_B(0) < I^*(0)$ and (ii) that $\bar{L}_B$ is (continuously) increasing in ω. Part (i) follows immediately from our assumption that $\phi > \underline{\phi}$ [equation (2)]. Part (ii) is established by differentiating the incentive constraint, to get

$$[pQ'(I) - (1 + \phi)]\, d\bar{L}_B + [pQ'(I) - \phi]\, d\omega = 0,$$

or equivalently,

$$\frac{d\bar{L}_B}{d\omega} = -\frac{[pQ'(I) - \phi]}{[pQ'(I) - (1 + \phi)]}.$$

The numerator is positive, because $pQ'(I) \geq 1$ by the first-order condition, and $\phi < 1$. As shown above, the denominator is negative whenever the incentive constraint binds.

PROOF OF PROPOSITION 2:

Proposition 2 is proved in the main text, except for the existence and uniqueness of $\tilde{\omega}_1(\beta, \phi, p)$ and $\tilde{\omega}_2(\beta, \phi, p)$. Also we need to show that $\tilde{\omega}_2(\beta, \phi, p) > \tilde{\omega}_1(\beta, \phi, p)$. To prove these properties (and subsequent comparative-static results), it is helpful to define the function

$$h(I) = pQ'(I) - [1 + r_S + \beta(\phi - r_S)].$$

The following result is used repeatedly.

LEMMA A2: *For all* $I < I^*(r_S)$, $h(I) < 0$.

PROOF:

When both credit limits bind, (10) and (11) become

$$pQ(\bar{L}_B + \bar{L}_S + \omega) - \bar{L}_B - (1 + r_S)\bar{L}_S = \phi\beta(\bar{L}_B + \bar{L}_S + \omega) \tag{A2}$$

and

$$pQ(\bar{L}_B + \bar{L}_S + \omega) - \bar{L}_B - (1 + r_S)\bar{L}_S = \phi(\bar{L}_B + \omega). \tag{A3}$$

It follows that

$$\bar{L}_S = \frac{1-\beta}{\beta}[\bar{L}_B + \omega].$$

Thus, $\bar{L}_B + \bar{L}_S + \omega = I = (\bar{L}_B + \omega)/\beta$. Substituting into (A3) and rearranging, we have the following expression for the maximum incentive compatible investment level:

$$pQ(I) - [(1 + r_S)(1 - \beta) - \beta(1 + \phi)]I + \omega = 0. \tag{A4}$$

By virtue of being maximal, the expression must have a negative derivative, i.e.,

$$pQ'(I) - [(1 + r_S)(1 - \beta) - \beta(1 + \phi)] < 0.$$

Slight rearrangement yields the desired result.

We now complete the proof of Proposition 2 by establishing the existence and uniqueness of $\tilde{\omega}_1(\beta, \phi, p)$ and of $\tilde{\omega}_2(\beta, \phi, p)$ and $\tilde{\omega}_2(\beta, \phi, p) > \tilde{\omega}_1(\beta, \phi, p)$.

LEMMA A3: *For any $\phi > r_S$ there exists a pair of threshold values $\tilde{\omega}_1(\beta, \phi, p)$, $\tilde{\omega}_2(\beta, \phi, p)$ such that*

(*i*) $pQ(\bar{L}_B + \omega) - \bar{L}_B - \phi[\bar{L}_B + \omega] = 0$ *for* $\omega = \tilde{\omega}_2(\beta, \phi, p)$,
(*ii*) $pQ(\bar{L}_B + \bar{L}_S + \omega) - \bar{L}_B - (1 + r_S)\bar{L}_S - \phi[\bar{L}_B + \omega] = 0$ *and* $pQ(\bar{L}_B + \bar{L}_S + \omega) - \bar{L}_B - (1 + r_S)\bar{L}_S - \phi\beta[\bar{L}_B + \bar{L}_S + \omega] = 0$ *for* $\omega = \tilde{\omega}_1(\beta, \phi, p)$,
(*iii*) $\tilde{\omega}_2(\beta, \phi, p) > \tilde{\omega}_1(\beta, \phi, p) > 0$.

PROOF:

Part (i): The threshold $\tilde{\omega}_2(\beta, \phi, p)$ is the smallest wealth such that the entrepreneur can fund $I^*(r_S)$ using bank credit alone. The proof of existence and uniqueness of this threshold is analogous to the proof of Lemma A1 and hence omitted.

Part (ii): The threshold level $\tilde{\omega}_1(\beta, \phi, p)$ is the smallest wealth that admits investing $I = I^*(r_S)$ using both bank and trade credit. Since (A4) gives the maximum investment level for a given level of wealth, the threshold level of wealth must satisfy

$$\tilde{\omega}_1(\beta, \phi, p) = [\beta(1 + \phi) + (1 - \beta)(1 + r_S)]I^*(r_S) - pQ(I^*(r_S)). \tag{A5}$$

The threshold exists and is unique if both $\bar{L}_B$ and $\bar{L}_S$ are increasing in ω. Totally differentiating (A2) and (A3) and solving yields

$$\frac{d\bar{L}_B}{d\omega} = -\frac{pQ'(I) - [(1-\beta)(1+r_S) + \beta\phi]}{h(I)} > 0$$

and

$$\frac{d\bar{L}_S}{d\omega} = -\frac{1-\beta}{h(I)} > 0,$$

where the inequalities follow directly from Lemma A2. Thus, both credit limits are increasing in ω.

Part (iii): It follows from $\phi > r_S$ that $[\beta(1 + \phi) + (1 - \beta)(1 + r_S)] < (1 + \phi)$ and hence $\tilde{\omega}_2(\beta, \phi, p) > \tilde{\omega}_1(\beta, \phi, p)$. Finally, $\tilde{\omega}_1(\beta, \phi, p) > 0$ follows from the assumption that $\phi > \underline{\phi}(\beta)$.

The threshold levels have the following properties.

LEMMA A4: *The critical threshold $\tilde{\omega}_1(\beta, \phi, p)$ increases with the ease of diversion (ϕ) and the input liquidity (β), while a change in either the output prices (p) or in the interest rate (r_S) has an indeterminate effect on $\tilde{\omega}_1(\beta, \phi, p)$.*

PROOF:

Differentiation of (A5) yields

$$\frac{d\tilde{\omega}_1(\beta, \phi, p)}{d\phi} = \beta I^*(r_S) > 0,$$

$$\frac{d\tilde{\omega}_1(\beta,\phi,p)}{d\beta} = (\phi - r_S)I^*(r_S) > 0,$$

$$\frac{d\tilde{\omega}_1(\beta,\phi,p)}{dr_S} = [\beta(1 + \phi) + (1 - \beta)(1 + r_S) - pQ'(I)]\frac{dI^*(r_S)}{dr_S} + (1 - \beta)I^*(r_S),$$

and

$$\frac{d\tilde{\omega}_1(\beta, \phi, p)}{dp} = [\beta(1 + \phi) + (1 - \beta)(1 + r_S) - pQ'(I)]\frac{dI^*}{dp} - Q(I^*(r_S)).$$

From Lemma A2 we know that $[\beta(1 + \phi) + (1 - \beta)(1 + r_S) - pQ'(I)] > 0$ and hence that the first term of $d\tilde{\omega}/dr_S$ is negative. As the second term is positive, the overall sign is indeterminate. Similarly, the sign of $d\tilde{\omega}/dp$ is indeterminate.

LEMMA A5: *The threshold $\tilde{\omega}_2(\beta, \phi, p)$ increases with the ease of diversion (ϕ) and decreases with the interest rate (r_S), while a change in the output prices (p) has an indeterminate effect on $\tilde{\omega}_2(\beta, \phi, p)$.*

PROOF:

The threshold $\tilde{\omega}_2$ is given by

$$pQ(I^*(r_S)) - (1 + \phi)I^*(r_S) + \tilde{\omega}_2(\beta, \phi, p) = 0,$$

and since the investment is maximal, we have that $pQ'(I^*(r_S)) - (1 + \phi) < 0$. Differentiation yields

$$\frac{d\tilde{\omega}_2(\beta, \phi, p)}{d\phi} = I^*(r_S) > 0,$$

$$\frac{d\tilde{\omega}_2(\beta,\phi,p)}{dr_S} = [(1 + \phi) - pQ'(I)]\frac{dI^*(r_S)}{dr_S} < 0,$$

and

$$\frac{d\tilde{\omega}_2(\beta, \phi, p)}{dp} = [(1 + \phi) - pQ'(I)] \frac{dI^*}{dp} - Q(I^*(r_S)).$$

As for $d\tilde{\omega}_2/dp$, the sign is indeterminate, because the first term is positive and the second term is negative.

PROOF OF PROPOSITION 3:

PROPOSITION 3: (*i*) *For an entrepreneur with wealth smaller than* $\tilde{\omega}_1$ *the equilibrium credit lines* $\bar{L}_B$ *and* $\bar{L}_S$ *are increasing in the output price* (p) *and in the entrepreneur's wealth* (ω) *and are decreasing in the creditor vulnerability* (ϕ), *in the input liquidity* (β), *and in the trade credit interest rate* (r_S). (*ii*) *For* $\omega \in [\tilde{\omega}_1, \tilde{\omega}_2)$, *the same results hold, except that* $\bar{L}_B$ *is independent of* β.

PROOF:

We start by proving part (i). For entrepreneurs with $\omega < \tilde{\omega}_1(\beta, \phi, p)$ the bank and trade credit limits are given by (A2) and (A3). Differentiating these two equations with respect to $\bar{L}_B$, $\bar{L}_S$, and p yields (after some manipulation)

$$\frac{d\bar{L}_B}{dp} = \frac{-\beta Q(I)}{h(I)}$$

and

$$\frac{d\bar{L}_S}{dp} = \frac{-(1 - \beta)Q(I)}{h(I)},$$

which are both positive (the denominators are negative by Lemma A2).

The proof that $d\bar{L}_B/d\omega > 0$ and that $d\bar{L}_S/d\omega > 0$ is already provided in Lemma A3.

Differentiating (A2) and (A3) with respect to $\bar{L}_B$, $\bar{L}_S$, and ϕ yields

$$\frac{d\bar{L}_B}{d\phi} = \frac{(\bar{L}_B + \omega)\beta}{h(I)}$$

and

$$\frac{d\bar{L}_S}{d\phi} = \frac{(\bar{L}_B + \omega)(1 - \beta)}{h(I)},$$

which are both negative by Lemma A2.

Differentiating (A2) and (A3) with respect to $\bar{L}_B$, $\bar{L}_S$, and β yields

$$\frac{d\bar{L}_S}{d\beta} = -\frac{[\bar{L}_B + \bar{L}_S + \omega][pQ'(I) - (1 + \phi)]}{h(I)}$$

and

$$\frac{d\bar{L}_B}{d\beta} = \frac{[\bar{L}_B + \bar{L}_S + \omega][pQ'(I) - (1 + r_S)]}{h(I)}.$$

By Lemma A2, the denominator $h(I)$ is negative, and so is the numerator of $d\bar{L}_S/d\beta$. The numerator of $d\bar{L}_B/d\beta$ is positive, because $pQ'(I) > 1 + r_S$ at $I < I^*$.

Differentiating (A2) and (A3) with respect to $\bar{L}_B$, $\bar{L}_S$, and r_S yields

$$\frac{d\bar{L}_B}{dr_S} = \frac{\beta\bar{L}_S}{h(I)}$$

and

$$\frac{d\bar{L}_S}{dr_S} = \frac{(1-\beta)\bar{L}_S}{h(I)},$$

which are both negative by Lemma A2.

Part (ii) of Proposition 3 is proved in similar fashion. For entrepreneurs with $\omega \in [\omega_1(\beta, \phi, p), \hat{\omega}_2(\beta, \phi, p))$ bank and trade credits are given by

$$pQ(\bar{L}_B + L_S + \omega) - \bar{L}_B - (1 + r_S)L_S - \phi[\bar{L}_B + \omega] = 0$$

and

$$pQ'(\bar{L}_B + L_S + \omega) - (1 + r_S) = 0.$$

The comparative static results are established by totally differentiating these two equations. We omit the details, except noting that β no longer appears in any of the expressions.

PROOF OF PROPOSITION 4:

PROPOSITION 4: *For entrepreneurs with wealth* $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ *trade credit utilization* L_S *is decreasing in the entrepreneur's wealth* (ω) *and increasing in creditor vulnerability* ϕ. *The effects on* L_S *of an increase in the output price* (p) *or in the trade credit interest rate* (r_S) *are indeterminate.*

For changes in ϕ and ω we prove an even more precise result.

LEMMA A6: *Following an increase in the ease of diversion* (ϕ) *entrepreneurs with* $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ *fully substitute the reduction in bank credit* (*supply*) *with trade credit, i.e.,*

$$\frac{d\bar{L}_B}{d\phi} = \left|\frac{dL_S}{d\phi}\right|.$$

PROOF:

For entrepreneurs with $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ bank and trade credit demand are independent of β and given by

$$pQ(\bar{L}_B + L_S + \omega) - \bar{L}_B - (1 + r_S)L_S - \phi[\bar{L}_B + \omega] = 0 \tag{A6}$$

and

$$pQ'(\bar{L}_B + L_S + \omega) - (1 + r_S) = 0. \tag{A7}$$

Differentiating (A6) and (A7) with respect to $\bar{L}_B$, L_S, and ϕ yields

$$[pQ'(I) - (1 + \phi)]\, d\bar{L}_B + [pQ'(I) - (1 + r_S)]\, dL_S - [\bar{L}_B + \omega]\, d\phi = 0$$

and

$$pQ''(I)\, d\bar{L}_B + pQ''(I)\, dL_S = 0.$$

Solving yields

$$\frac{d\bar{L}_B}{d\phi} = -\frac{[\bar{L}_B + \omega]}{(\phi - r_S)} < 0.$$

LEMMA A7: *Following an increase in wealth, entrepreneurs with $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ fully substitute trade credit with bank credit.*

PROOF:

Differentiating (A6) and (A7) with respect to $\bar{L}_B$, L_S, and ω yields

$$\frac{d\bar{L}_B}{d\omega} = -\frac{[pQ'(I) - (1 + r_S)]}{[pQ'(I) - (1 + \phi)]}\frac{dL_S}{d\omega} - \frac{[pQ'(I) - \phi]}{[pQ'(I) - (1 + \phi)]}$$

and

$$\frac{dL_S}{d\omega} = -\left[1 + \frac{d\bar{L}_B}{d\omega}\right].$$

Solving yields

$$\frac{d\bar{L}_B}{d\omega} = \frac{1}{(\phi - r_S)} - 1 > 0,$$

and

$$\frac{dL_S}{d\omega} = -\frac{1}{(\phi - r_S)} < 0.$$

Finally, we show that the effect of changes in p and r_S are indeterminate.

LEMMA A8: *Following an increase in the trade credit interest rate r_S, entrepreneurs with $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ may demand more or less trade credit.*

PROOF:

Differentiating (A6) and (A7) with respect to $\bar{L}_B$, L_S, and r_S (and solving) yields

$$\frac{d\bar{L}_B}{dr_S} = \frac{[pQ'(I) - (1 + r_S)]/pQ''(I) - L_S}{(\phi - r_S)} < 0$$

and

$$\frac{dL_S}{dr_S} = \frac{L_S}{(\phi - r_S)} - \frac{[pQ'(I) - (1 + \phi)]}{pQ''(I)(\phi - r_S)} \gtrless 0.$$

LEMMA A9: *Following an increase in the output price* (p), *entrepreneurs with* $\omega \in (\tilde{\omega}_1, \tilde{\omega}_2)$ *may demand more or less trade credit.*

PROOF:

Totally differentiating bank and trade credit demands with respect to $\bar{L}_B$, L_S, and p (and solving) yields

$$\frac{d\bar{L}_B}{dp} = \frac{Q(I)}{(\phi - r_S)} - \frac{[pQ'(I) - (1 + r_S)]}{(\phi - r_S)} \frac{Q'(I)}{pQ''(I)} > 0$$

and

$$\frac{dL_S}{dp} = -\frac{Q(I)}{(\phi - r_S)} + \frac{[pQ'(I) - (1 + \phi)]}{(\phi - r_S)} \frac{Q'(I)}{pQ''(I)} \lesseqgtr 0.$$

REFERENCES

Akerlof, George and Romer, Paul M. "Looting: The Economic Underworld of Bankruptcy." *Brookings Papers on Economic Activity*, 1993, (2), pp. 1–60.

Biais, Bruno and Gollier, Christian. "Trade Credit and Credit Rationing." *Review of Financial Studies*, Winter 1997, *10*(4), pp. 903–37.

Brennan, Michael J.; Maksimovic, Vojislav and Zechner, Josef. "Vendor Financing." *Journal of Finance*, December 1988, *43*(5), pp. 1127–41.

Brick, Ivan E. and Fung, William K. H. "Taxes and the Theory of Trade Debt." *Journal of Finance*, September 1984, *39*(4), pp. 1169–76.

Burkart, Mike and Ellingsen, Tore. "In-Kind Finance." Centre for Economic and Policy Research Working Paper No. 3536, 2002.

Cameron, Rondo. *Banking in the early stages of industrialization.* New York: Oxford University Press, 1967.

Demirgüç-Kunt, Asli and Maksimovic, Vojislav. "Firms as Financial Intermediaries: Evidence from Trade Credit Data." Unpublished manuscript, World Bank, 2001.

Emery, Gary. "An Optimal Financial Response to Variable Demand." *Journal of Financial and Quantitative Analysis*, June 1987, *22*(2), pp. 209–25.

Ferris, J. Stephen. "A Transactions Theory of Trade Credit Use." *Quarterly Journal of Economics*, May 1981, *94*(2), pp. 243–70.

Fisman, Raymond and Love, Inessa. "Trade Credit, Financial Intermediary Development and Industry Growth." *Journal of Finance*, February 2003, *58*(1), pp. 353–74.

Frank, Murray and Maksimovic, Vojislav. "Trade Credit, Collateral, and Adverse Selection." Unpublished manuscript, University of Maryland, 1998.

Freixas, Xavier. "Short-Term Credit versus Accounts Receivable Financing." Universitat Pompeu Fabra, Economics Working Paper No. 27, 1993.

Giannetti, Mariassunta. "Do Better Institutions Mitigate Agency Problems? Evidence from Corporate Finance Choices." *Journal of Financial and Quantitative Analysis*, March 2003, *38*(1), pp. 185–212.

Hart, Oliver. *Firms, contracts, and financial structure.* Oxford: Oxford University Press, 1995.

Jain, Neelam. "Monitoring Costs and Trade Credit." *Quarterly Review of Economics and Finance*, Spring 2001, *41*(1), pp. 89–110.

Lee, Yul W. and Stowe, John D. "Product Risk, Asymmetric Information, and Trade Credit."

Journal of Financial and Quantitative Analysis, June 1993, *28*(2), pp. 285–300.

Long, Michael S.; Malitz, Ileen B. and Ravid, S. Abraham. "Trade Credit, Quality Guarantees, and Product Marketability." *Financial Management,* Winter 1993, *22*(4), pp. 117–27.

Marotta, Guiseppe. "Is Trade Credit More Expensive than Bank Loans? Evidence from Italian Firm-Level Data." Unpublished manuscript, Università di Modena e Reggio Emilia, 2001.

Meltzer, Allan H. "Mercantile Credit, Monetary Policy, and Size of Firms." *Review of Economics and Statistics,* November 1960, *42*(4), pp. 429–37.

Mian, Shezad L. and Smith, Clifford W. "Accounts Receivables Management Policy: Theory and Evidence." *Journal of Finance,* March 1992, *47*(1), pp. 169–200.

Myers, Stewart C. "Determinants of Corporate Borrowing." *Journal of Financial Economics,* November 1977, *5*(2), pp. 147–75.

Myers, Stewart C. and Rajan, Raghuram G. "The Paradox of Liquidity." *Quarterly Journal of Economics,* August 1998, *113*(3), pp. 733–71.

Nadiri, M. Ishaq. "The Determinants of Trade Credit in the U.S. Total Manufacturing Sector." *Econometrica,* July 1969, *37*(3), pp. 408–23.

Ng, Chee K.; Smith, Janet K. and Smith, Richard L. "Evidence on the Determinants of Credit Terms in Interfirm Trade." *Journal of Finance,* June 1999, *54*(3), pp. 1109–29.

Nilsen, Jeffrey H. "Trade Credit and the Bank Lending Channel." *Journal of Money, Credit, and Banking,* February 2002, *34*(1), pp. 226–53.

Oliner, Stephen and Rudebusch, Glenn. "Monetary Policy and Credit Constraints: Evidence from the Composition of External Finance: Comment." *American Economic Review,* March 1996, *86*(1), pp. 300–09.

Petersen, Mitchell A. and Rajan, Raghuram G. "The Benefits of Lending Relationships: Evidence from Small Business Data." *Journal of Finance,* March 1994, *49*(1), pp. 3–37.

______ **.** "Trade Credit: Theory and Evidence." *Review of Financial Studies,* Fall 1997, *10*(3), pp. 661–91.

Rajan, Raghuram G. and Zingales, Luigi. "What Do We Know about Capital Structure? Some Evidence from International Data." *Journal of Finance,* December 1995, *50*(5), pp. 1421–60.

Ramey, Valerie A. "The Source of Fluctuations in Money." *Journal of Monetary Economics,* November 1992, *30*(2), pp. 171–93.

Schwartz, Robert A. and Whitcomb, David. "Implicit Transfers in the Extension of Trade Credit," in Kenneth E. Boulding and Thomas F. Wilson, eds., *The channels of redistribution through the financial system.* New York: Praeger, 1978, pp. 191–208.

______ **.** "The Trade Credit Decision," in James L. Bicksler, ed., *Handbook of financial economics.* Amsterdam: North-Holland, 1979, pp. 257–73.

Smith, Janet K. "Trade Credit and Informational Asymmetry." *Journal of Finance,* September 1987, *42*(4), pp. 863–69.

Sopranzetti, Ben J. "The Economics of Factoring Accounts Receivable." *Journal of Economics and Business,* July–August 1998, *50*(4), pp. 339–59.

Viswanath, P. V. and Frierman, Mike. "Asset Fungibility and Equilibrium Capital Structures." *Journal of Economics and Business,* October 1995, *47*(4), pp. 319–34.

Wilner, Benjamin S. "The Exploitation of Relationships in Financial Distress: The Case of Trade Credit." *Journal of Finance,* March 2000, *55*(1), pp. 153–78.

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1. KLENIO BARBOSA, HUMBERTO MOREIRA, WALTER NOVAES. 2017. Interest Rates in Trade Credit Markets. *Journal of Money, Credit and Banking* **49**:1, 75-113. [CrossRef]
2. Pengxiang Zhai, Rufei Ma. 2017. Does ownership structure affect trade credit policy in small- and medium-sized firms? Evidence from China. *Ensayos sobre Política Económica* . [CrossRef]
3. Jaideep Shenoy, Ryan Williams. 2017. Trade credit and the joint effects of supplier and customer financial characteristics. *Journal of Financial Intermediation* **29**, 68-80. [CrossRef]
4. Sekyung Oh, Woo Sung Kim. 2016. Growth opportunities and trade credit: evidence from Chinese listed firms. *Applied Economics* **48**:56, 5437-5447. [CrossRef]
5. Qigui Liu, Jinbo Luo, Gary Gang Tian. 2016. Managerial professional connections versus political connections: Evidence from firms' access to informal financing resources. *Journal of Corporate Finance* **41**, 179-200. [CrossRef]
6. Daniela Fabbri, Leora F. Klapper. 2016. Bargaining power and trade credit. *Journal of Corporate Finance* **41**, 66-80. [CrossRef]
7. Sadok El Ghoul, Xiaolan Zheng. 2016. Trade credit provision and national culture. *Journal of Corporate Finance* **41**, 475-501. [CrossRef]
8. Madhuparna Kolay, Michael Lemmon, Elizabeth Tashjian. 2016. Spreading the Misery? Sources of Bankruptcy Spillover in the Supply Chain. *Journal of Financial and Quantitative Analysis* **51**:06, 1955-1990. [CrossRef]
9. Jisang Lee, Duk Hee Lee, Sung-Guan Yun. 2016. Systemic Risk on Trade Credit Systems: with the Tangible Interconnectedness. *Computational Economics* . [CrossRef]
10. Alan Finkelstein Shapiro, Federico S. Mandelman. 2016. Remittances, entrepreneurship, and employment dynamics over the business cycle. *Journal of International Economics* **103**, 184-199. [CrossRef]
11. JEAN-NOËL BARROT. 2016. Trade Credit and Industry Dynamics: Evidence from Trucking Firms. *The Journal of Finance* **71**:5, 1975-2016. [CrossRef]
12. Brooks Douglas H., Kurmanalieva Elvira, Yang Doo Yong. 2016. Trade, Trade Finance, and Global Liquidity in Asia; Markov-Switching FAVAR Approach. *East Asian Economic Review* **20**:3, 339-363. [CrossRef]
13. Jiri Chod. 2016. Inventory, Risk Shifting, and Trade Credit. *Management Science* . [CrossRef]
14. Darush Yazdanfar, Peter Öhman. 2016. The impact of trade credit use on firm profitability: empirical evidence from Sweden. *Journal of Advances in Management Research* **13**:2, 116-129. [CrossRef]
15. Daniela Fabbri, Anna Maria C. Menichini. 2016. The commitment problem of secured lending. *Journal of Financial Economics* **120**:3, 561-584. [CrossRef]
16. Gerard McGuinness, Teresa Hogan. 2016. Bank credit and trade credit: Evidence from SMEs over the financial crisis. *International Small Business Journal* **34**:4, 412-445. [CrossRef]
17. Harri Lorentz, Tomi Solakivi, Juuso Töyli, Lauri Ojala. 2016. Trade credit dynamics during the phases of the business cycle – a value chain perspective. *Supply Chain Management: An International Journal* **21**:3, 363-380. [CrossRef]
18. Alessandra Guariglia, Simona Mateut. 2016. External finance and trade credit extension in China: does political affiliation make a difference?. *The European Journal of Finance* **22**:4-6, 319-344. [CrossRef]
19. Andriy Bodnaruk, William O'Brien, Andrei Simonov. 2016. Captive finance and firm's competitiveness. *Journal of Corporate Finance* **37**, 210-228. [CrossRef]

20. Mihir A. Desai, C. Fritz Foley, James R. Hines. 2016. Trade Credit and Taxes. *Review of Economics and Statistics* **98**:1, 132-139. [CrossRef]

21. Go Yano, Maho Shiraishi. 2016. Two Forms of Trade Credit Finance in China. *Comparative Economic Studies* **58**:1, 60-92. [CrossRef]

22. SANTIAGO CARBÓ-VALVERDE, FRANCISCO RODRÍGUEZ-FERNÁNDEZ, GREGORY F. UDELL. 2016. Trade Credit, the Financial Crisis, and SME Access to Finance. *Journal of Money, Credit and Banking* **48**:1, 113-143. [CrossRef]

23. Andreas Hoefele, Tim Schmidt-Eisenlohr, Zhihong Yu. 2016. Payment choice in international trade: Theory and evidence from cross-country firm-level data. *Canadian Journal of Economics/Revue canadienne d'économique* **49**:1, 296-319. [CrossRef]

24. David J. A. Gonsalvez, Robert R. Inman. 2016. Supply chain shared risk self-financing for incremental sales. *The Engineering Economist* **61**:1, 23-43. [CrossRef]

25. Mine Uğurlu 51. [CrossRef]

26. Tao Jia, Feng Lin, Zhengwen He, Nengmin Wang. 2016. Line-of-Credit Payment Scheme and Its Impact on the Retailer's Ordering Policy with Inventory-Level-Dependent Demand. *Mathematical Problems in Engineering* **2016**, 1. [CrossRef]

27. Olanrewaju Abdul Balogun, Ansary Nazeem, Justus Ngala Agumba. 2016. Determinants Predicting Credit Accessibility within Small and Medium-sized Enterprises in the South African Construction Industry. *Procedia Engineering* **164**, 473-480. [CrossRef]

28. Simona Mateut, Paul Mizen, Ydriss Ziane. 2015. Inventory composition and trade credit. *International Review of Financial Analysis* **42**, 434-446. [CrossRef]

29. Shingo Goto, Gang Xiao, Yan Xu. 2015. As told by the supplier: Trade credit and the cross section of stock returns. *Journal of Banking & Finance* **60**, 296-309. [CrossRef]

30. Ana Paula Matias Gama, Howard Van Auken. 2015. The Interdependence between Trade Credit and Bank Lending: Commitment in Intermediary Firm Relationships. *Journal of Small Business Management* **53**:4, 886-904. [CrossRef]

31. Maria Psillaki, Konstantinos Eleftheriou. 2015. Trade Credit, Bank Credit, and Flight to Quality: Evidence from French SMEs. *Journal of Small Business Management* **53**:4, 1219-1240. [CrossRef]

32. Joachim Gassen, Rolf Uwe Fülbier. 2015. Do Creditors Prefer Smooth Earnings? Evidence from European Private Firms. *Journal of International Accounting Research* **14**:2, 151-180. [CrossRef]

33. Nishant Dass, Jayant R. Kale, Vikram Nanda. 2015. Trade Credit, Relationship-specific Investment, and Product Market Power. *Review of Finance* **19**:5, 1867-1923. [CrossRef]

34. Marc Deloof, Maurizio La Rocca. 2015. Local financial development and the trade credit policy of Italian SMEs. *Small Business Economics* **44**:4, 905-924. [CrossRef]

35. Yothin Jinjarak. 2015. Supply Chains, Global Financial Shocks and Firm Behaviour towards Liquidity Needs. *The World Economy* **38**:3, 425-444. [CrossRef]

36. Yi Su, Gunnar Lucko. 2015. Synthetic Cash Flow Model with Singularity Functions. II: Feasible Prompt Payment Discount Scenarios. *Journal of Construction Engineering and Management* **141**:3, 04014079. [CrossRef]

37. Niels Hermes, Ernest Kihanga, Robert Lensink, Clemens Lutz. 2015. The determinants of trade credit use: the case of the Tanzanian rice market. *Applied Economics* 1-11. [CrossRef]

38. Machteld Van den Bogaerd, Walter Aerts. 2015. Does media reputation affect properties of accounts payable?. *European Management Journal* **33**:1, 19-29. [CrossRef]

39. Katharina Eck, Martina Engemann, Monika Schnitzer. 2015. How trade credits foster exporting. *Review of World Economics* **151**:1, 73-101. [CrossRef]

40. Sumon Kumar Bhaumik, Ralitza DimovaStrategic Implications of Familiness 43-67. [CrossRef]
41. Xiangfeng Chen. 2015. A model of trade credit in a capital-constrained distribution channel. *International Journal of Production Economics* **159**, 347. [CrossRef]
42. Alan Finkelstein Shapiro, Andres Gonzalez. 2015. Macroprudential Policy and Labor Market Dynamics in Emerging Economies. *IMF Working Papers* **15**:78, 1. [CrossRef]
43. Simona Mateut. 2014. Reverse trade credit or default risk? Explaining the use of prepayments by firms. *Journal of Corporate Finance* **29**, 303-326. [CrossRef]
44. Herbert Broens. 2014. Impact of the 2008 financial crisis on corporate trade finance. *Society and Economy* **36**:4, 511-528. [CrossRef]
45. Martina Engemann, Katharina Eck, Monika Schnitzer. 2014. Trade Credits and Bank Credits in International Trade: Substitutes or Complements?. *The World Economy* **37**:11, 1507-1540. [CrossRef]
46. Daehwan Kim, Jeffrey Nilsen. 2014. Why is the Inter-firm Credit Market in Korea Special? An Agency View of Trade Credit Use by Chaebols. *Global Economic Review* **43**:4, 429-452. [CrossRef]
47. A. Renucci. 2014. Bargaining with Venture Capitalists: When Should Entrepreneurs Show their Financial Muscle?. *Review of Finance* **18**:6, 2197-2214. [CrossRef]
48. Alan Finkelstein Shapiro. 2014. Self-employment and business cycle persistence: Does the composition of employment matter for economic recoveries?. *Journal of Economic Dynamics and Control* **46**, 200-218. [CrossRef]
49. Eddie Casey, Conor M. O'Toole. 2014. Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *Journal of Corporate Finance* **27**, 173-193. [CrossRef]
50. Volker Nocke, John Thanassoulis. 2014. VERTICAL RELATIONS UNDER CREDIT CONSTRAINTS. *Journal of the European Economic Association* **12**:2, 337-367. [CrossRef]
51. Gangshu George Cai, Xiangfeng Chen, Zhiguo Xiao. 2014. The Roles of Bank and Trade Credits: Theoretical Analysis and Empirical Evidence. *Production and Operations Management* **23**:4, 583-598. [CrossRef]
52. Xiaojun Shi, Shunming Zhang. 2014. Trade credit: the interaction of financing, marketing, operations, and risk behavior. *Review of Managerial Science* **8**:2, 225-248. [CrossRef]
53. Go Yano, Maho Shiraishi. 2014. Factors in the Development of Trade Credit: Case Study of Provinces in China. *Emerging Markets Finance and Trade* **50**:s2, 114-134. [CrossRef]
54. Gerhard Kling, Salima Y. Paul, Eleimon Gonis. 2014. Cash holding, trade credit and access to short-term bank finance. *International Review of Financial Analysis* **32**, 123-131. [CrossRef]
55. Bing Jing, Abraham Seidmann. 2014. Finance sourcing in a supply chain. *Decision Support Systems* **58**, 15-20. [CrossRef]
56. Pedro J. García-Teruel, Pedro Martínez-Solano, Juan P. Sánchez-Ballesta. 2014. Supplier Financing and Earnings Quality. *Journal of Business Finance & Accounting* **41**:9-10, 1193. [CrossRef]
57. Daisuke Tsuruta. 2013. Credit Contagion and Trade Credit: Evidence from Small Business Data in Japan. *Asian Economic Journal* **27**:4, 341-367. [CrossRef]
58. Matthew D. Hill, G. Wayne Kelly, G. Brandon Lockhart. 2013. Downstream Value of Upstream Finance. *Financial Review* **48**:4, 697-723. [CrossRef]
59. Andreas Madestam. 2013. Informal Finance: A Theory of Moneylenders. *Journal of Development Economics* . [CrossRef]
60. Cristina Martínez-Sola, Pedro J. García-Teruel, Pedro Martínez-Solano. 2013. Trade credit policy and firm value. *Accounting & Finance* **53**:3, 791-808. [CrossRef]

61. Harald Badinger, Thomas Url. 2013. Export Credit Guarantees and Export Performance: Evidence from Austrian Firm-level Data. *The World Economy* **36**:9, 1115-1130. [CrossRef]

62. Tim Schmidt-Eisenlohr. 2013. Towards a theory of trade finance. *Journal of International Economics* **91**:1, 96-112. [CrossRef]

63. Dileep More, Preetam Basu. 2013. Challenges of supply chain finance. *Business Process Management Journal* **19**:4, 624-647. [CrossRef]

64. Abdul Ghafar Ismail, Bayu Taufiq Possumah, Mohd Akil Muhamed Ali. 2013. What you sell is what you lend? Revealing complexity of riba in loan contract. *European Journal of Law and Economics* . [CrossRef]

65. Emilia Garcia-Appendini, Judit Montoriol-Garriga. 2013. Firms as liquidity providers: Evidence from the 2007–2008 financial crisis. *Journal of Financial Economics* **109**:1, 272-291. [CrossRef]

66. Mariarosaria Agostino, Francesco Trivieri. 2013. Does trade credit play a signalling role? Some evidence from SMEs microdata. *Small Business Economics* . [CrossRef]

67. Annalisa Ferrando, Klaas Mulier. 2013. Do firms use the trade credit channel to manage growth?. *Journal of Banking & Finance* . [CrossRef]

68. H Semih Yildirim, Yavuz Akci, Ibrahim Halil Eksi. 2013. The effect of firm characteristics in accessing credit for SMEs. *Journal of Financial Services Marketing* **18**:1, 40-52. [CrossRef]

69. Bidisha Lahiri, Xi Tian. 2013. Structural break between small and large firms' behaviour in trade credit and bank credit: evidence from India's retail sector. *Applied Economics Letters* **20**:2, 199-202. [CrossRef]

70. Kazuo Ogawa, Elmer Sterken, Ichiro Tokutsu. 2013. The trade credit channel revisited: evidence from micro data of Japanese small firms. *Small Business Economics* **40**:1, 101-118. [CrossRef]

71. Ted Lindblom, Gert SandahlThe Role of Trade Credit and the Cost of Capital 161-182. [CrossRef]

72. Hirofumi Uchida, Gregory F. Udell, Wako Watanabe. 2013. Are trade creditors relationship lenders?. *Japan and the World Economy* **25-26**, 24-38. [CrossRef]

73. I. LoveRole of Trade Finance 199-212. [CrossRef]

74. Santiago Carbo-Valverde, José Manuel Mansilla-Ferndndez, Francisco Rodriguez-FernandezMonetary Policy and Trade Credit: Evidence for Spain 68-82. [CrossRef]

75. Bing Jing, Xiangfeng Chen, Gangshu George Cai. 2012. Equilibrium Financing in a Distribution Channel with Capital Constraint. *Production and Operations Management* **21**:6, 1090-1101. [CrossRef]

76. Ying Qian-wei, Jiang Tian-jiao, Yang TianCan State Ownership Facilitate Trade Credit Financing? 59-63. [CrossRef]

77. Panos Kouvelis, Wenhui Zhao. 2012. Financing the Newsvendor: Supplier vs. Bank, and the Structure of Optimal Trade Credit Contracts. *Operations Research* **60**:3, 566-580. [CrossRef]

78. Nihat Aktas, Eric de Bodt, Frédéric Lobez, Jean-Christophe Statnik. 2012. The information content of trade credit. *Journal of Banking & Finance* **36**:5, 1402-1413. [CrossRef]

79. Xiangfeng Chen, Anyu Wang. 2012. Trade credit contract with limited liability in the supply chain with budget constraints. *Annals of Operations Research* . [CrossRef]

80. Daisuke Tsuruta. 2012. How Do Small Businesses Finance Their Growth Opportunities?-The Case of Recovery from the Lost Decade in Japan. *Managerial and Decision Economics* **33**:3, 189-210. [CrossRef]

81. Leora Klapper, Luc Laeven, Raghuram Rajan. 2012. Trade Credit Contracts. *Review of Financial Studies* **25**:3, 838-867. [CrossRef]

82. Carlos A. Molina, Lorenzo A. Preve. 2012. An Empirical Analysis of the Effect of Financial Distress on Trade Credit. *Financial Management* **41**:1, 187-205. [CrossRef]
83. Matthew D. Hill, G. Wayne Kelly, G. Brandon Lockhart. 2012. Shareholder Returns from Supplying Trade Credit. *Financial Management* **41**:1, 255-280. [CrossRef]
84. Christina Atanasova. 2012. How Do Firms Choose Between Intermediary and Supplier Finance?. *Financial Management* **41**:1, 207-228. [CrossRef]
85. E. Badu, D.J. Edwards, D. Owusu-Manu. 2012. Trade credit and supply chain delivery in the Ghanaian construction industry: Analysis of vendor interactions with small to medium enterprises. *Journal of Engineering, Design and Technology* **10**:3, 360-379. [CrossRef]
86. Panos Kouvelis, Wenhui ZhaoSupply Chain Finance 247-288. [CrossRef]
87. Anna Maria C. Menichini. 2011. Inter-Firm Trade Finance in Times of Crisis. *The World Economy* **34**:10, 1788-1808. [CrossRef]
88. Hui Huang, Xiaojun Shi, Shunming Zhang. 2011. Counter-cyclical substitution between trade credit and bank credit. *Journal of Banking & Finance* **35**:8, 1859-1878. [CrossRef]
89. Xiaolou Yang. 2011. Trade credit versus bank credit: Evidence from corporate inventory financing. *The Quarterly Review of Economics and Finance* . [CrossRef]
90. Xiangfeng Chen, Gangshu (George) Cai. 2011. Joint logistics and financial services by a 3PL firm. *European Journal of Operational Research* . [CrossRef]
91. Marc Deloof, Wouter Van Overfelt. 2011. Trade credit and bank relationships: evidence from pre-World War I Belgium. *Applied Economics* **43**:13, 1647-1655. [CrossRef]
92. Rongrong Zhang. 2011. The role of information sharing in trade credit distribution: evidence from Thailand. *Asian-Pacific Economic Literature* **25**:1, 133-149. [CrossRef]
93. Mariassunta Giannetti, Mike Burkart, Tore Ellingsen. 2011. What You Sell Is What You Lend? Explaining Trade Credit Contracts. *Review of Financial Studies* **24**:4, 1261-1298. [CrossRef]
94. Arup Daripa,, Jeffrey Nilsen. 2011. Ensuring Sales: A Theory of Inter-Firm Credit. *American Economic Journal: Microeconomics* **3**:1, 245-279. [Abstract] [View PDF article] [PDF with links]
95. Bing Jing, R Dewan, A SeidmannFinance Sourcing in a Supply Chain 1-9. [CrossRef]
96. Rajendra R. Vaidya. 2011. The Determinants of Trade Credit: Evidence from Indian Manufacturing Firms. *Modern Economy* **02**:05, 707-716. [CrossRef]
97. JaeBin Ahn. 2011. A Theory of Domestic and International Trade Finance. *IMF Working Papers* **11**:262, 1. [CrossRef]
98. Rocco Macchiavello. 2010. Vertical integration and investor protection in developing countries. *Journal of Development Economics* **93**:2, 162-172. [CrossRef]
99. Kyle Hyndman, Giovanni Serio. 2010. Competition and inter-firm credit: Theory and evidence from firm-level data in Indonesia#. *Journal of Development Economics* **93**:1, 88-108. [CrossRef]
100. F. Balmaceda, R. Fischer. 2010. Economic performance, creditor protection, and labour inflexibility. *Oxford Economic Papers* **62**:3, 553-577. [CrossRef]
101. Matthew D. Hill, G. Wayne Kelly, Michael J. Highfield. 2010. Net Operating Working Capital Behavior: A First Look. *Financial Management* **39**:2, 783-805. [CrossRef]
102. Pedro J. García-Teruel, Pedro Martínez-Solano. 2010. A Dynamic Approach to Accounts Receivable: a Study of Spanish SMEs. *European Financial Management* **16**:3, 400-421. [CrossRef]
103. Daniela Fabbri, Anna Maria C. Menichini. 2010. Trade credit, collateral liquidation, and borrowing constraints#. *Journal of Financial Economics* **96**:3, 413-432. [CrossRef]
104. Pedro J. García-Teruel, Pedro Martínez-Solano. 2010. A dynamic perspective on the determinants of accounts payable. *Review of Quantitative Finance and Accounting* **34**:4, 439-457. [CrossRef]

105. INESSA LOVE, RIDA ZAIDI. 2010. Trade Credit, Bank Credit and Financial Crisis. *International Review of Finance* **10**:1, 125-147. [CrossRef]
106. LAHCEN ACHY. 2009. CORPORATE CAPITAL STRUCTURE CHOICES IN MENA: EMPIRICAL EVIDENCE FROM NON-LISTED FIRMS IN MOROCCO. *Middle East Development Journal* **01**:02, 255-273. [CrossRef]
107. Özgür Arslan, Göknur Umutlu. 2009. Trade Credits and Bank Loans for SMEs in the Textile Sector. *Journal of Small Business & Entrepreneurship* **22**:4, 383-397. [CrossRef]
108. Andrea L. Eisfeldt, Adriano A. Rampini. 2009. Leasing, Ability to Repossess, and Debt Capacity. *Review of Financial Studies* **22**:4, 1621-1657. [CrossRef]
109. 2009. *Review of Financial Studies* **22**:4, 1747-1776. [CrossRef]
110. S BOUGHEAS, S MATEUT, P MIZEN. 2009. Corporate trade credit and inventories: New evidence of a trade-off from accounts payable and receivable. *Journal of Banking & Finance* **33**:2, 300-307. [CrossRef]
111. Kenneth Daniels, Gabriel G. Ramirez. 2008. Information, Credit Risk, Lender Specialization and Loan Pricing: Evidence from the DIP Financing Market. *Journal of Financial Services Research* **34**:1, 35-59. [CrossRef]
112. Gregory F. Udell. 2008. What's in a relationship? The case of commercial lending. *Business Horizons* **51**:2, 93-103. [CrossRef]
113. O.M. Rodríguez Rodríguez. 2008. EL CRÉDITO COMERCIAL: MARCO CONCEPTUAL Y REVISIÓN DE LA LITERATURA. *Investigaciones Europeas de Dirección y Economía de la Empresa* **14**:3, 35-54. [CrossRef]
114. Olga María Rodríguez-Rodríguez. 2008. Firms as credit suppliers: an empirical study of Spanish firms. *International Journal of Managerial Finance* **4**:2, 152-173. [CrossRef]
115. Hanan G. JacobyMoneylenders in Developing Countries 1-4. [CrossRef]
116. Rafael Bastos, Julio Pindado. 2007. An agency model to explain trade credit policy and empirical evidence. *Applied Economics* **39**:20, 2631-2642. [CrossRef]
117. Nancy Huyghebaert, Linda Gucht, Cynthia Hulle. 2007. The Choice between Bank Debt and Trace Credit in Business Start-ups. *Small Business Economics* **29**:4, 435-452. [CrossRef]
118. Vicente Cuñat. 2007. Trade Credit: Suppliers as Debt Collectors and Insurance Providers. *Review of Financial Studies* **20**:2, 491-527. [CrossRef]
119. Jonathan Conning, Christopher UdryChapter 56 Rural Financial Markets in Developing Countries 2857-2908. [CrossRef]
120. A BERGER, G UDELL. 2006. A more complete conceptual framework for SME finance#. *Journal of Banking & Finance* **30**:11, 2945-2966. [CrossRef]
121. Olga María Rodríguez-Rodríguez. 2006. Trade Credit in Small and Medium Size Firms: An Application of the System Estimator With Panel Data. *Small Business Economics* **27**:2-3, 103-126. [CrossRef]
122. Peter Egger, Thomas Url. 2006. Public Export Credit Guarantees and Foreign Trade Structure: Evidence from Austria. *The World Economy* **29**:4, 399-418. [CrossRef]