
TRADE CREDIT AND BANK FINANCE: FINANCING SMALL FIRMS IN RUSSIA

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EXECUTIVE SUMMARY

This paper argues that Russian financial markets are more developed than typically supposed. I show that non-financial firms, suppliers of credit to other firms, support the role of financial intermediaries in helping to surmount problems of information asymmetries. Trade credit works as a signal; firms receiving it obtain access to bank loans. I test this hypothesis using data from my survey of 352 firms in Russia in 1995. Firms using trade credit are shown to have a higher probability of acquiring bank credit. © 1999 Elsevier Science Inc.

INTRODUCTION

As recently as 1997, empirical evidence has emerged to shed light on the special challenges to entrepreneurship during economic transition in Russia. Results of a survey by Andrei Shleifer of 55 small private Moscow shops, for example, support the view that the greatest financial problems small Russian firms face, taxes and lack of access to capital on reasonable terms, have persisted.¹ A motive for pursuing the research, as presented below, is to examine credit market arrangements that have evolved in response to the capital market imperfections reported by managers in Russia. In particular, this report will seek to explain the unique role that non-financial firms play in financing small enterprises in Russia.

Explanations of the financing motive of trade finance have been proposed in the financial intermediation literature. It appears that their implications can be applied to the less-developed markets in Russia. Financial models rely on capital market imperfec-

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¹ Shleifer (1997).

tions, such as information or transactions costs to explain trade finance.² In short, the cost of credit to firms set by financial intermediaries is prohibitively high because of costs associated with ascertaining the credit worthiness of less-established firms. Thus, these models note that non-financial firms have a financing advantage over banks in lending to other non-financial firms by collecting information more quickly and completely than financial intermediaries. However, empirical tests of these theories have produced mixed results. For instance, Long, Malitz, and Ravid (1993) find no support for the financing motive: less creditworthy non-financial firms do not apply to more creditworthy non-financial firms for financing due to credit-market constraints, as these models predict. On the contrary, Petersen and Rajan (1996) find that firms use trade credit relatively more when credit from financial institutions is not available and that firms with more access to credit from financial institutions offer more trade credit. Similarly, Calomiris, Himmelberg, and Wachtel (1995) find that the issuance of commercial paper by high-quality firms to finance the extension of trade credit to lesser-quality firms is counter-cyclical. In a credit crunch, inter-firm financial intermediation increases as lesser-quality firms substitute higher-cost bank debt for accounts payable.

The Western trade-finance literature can justifiably be applied to the Russian case. During the Soviet period and immediately afterwards, highly specialized enterprises formed an arabesque network of trade and credit relationships.

Firms received inter-enterprise credit³ indirectly from the state through subsidies to partner firms, as well as directly through subsidies to firms themselves. Gosbank (the State Bank) alone was responsible for managing the financial transactions of enterprises and extending credit to finance inventories and working capital. Afterwards, in the transition period, significant production, information, and credit channels were destroyed by privatization, subsidy withdrawal, and liberalization of capital markets.

In such an environment, I would expect borrower-side and lender-side information problems to arise. Long-standing banking relationships simultaneously have been created and destroyed. Due to the decentralization of the banking system, firms are allowed to hold accounts at more than one bank and are not restricted to maintaining accounts with their previously assigned Soviet-era banks. Thus, any previously gathered information that would serve as a credit history would remain the private information of the firm's former bank. To the extent that banks desire to lend and have the capacity to value firm net worth, the creation of completely new firms and the privatization of thousands of others have made it extremely costly for banks to collect data on firms, a traditional function of commercial banks in developed market economies.⁴ A 1995 survey of prominent banks in Moscow, St. Petersburg, Voronezh, and Novgorod revealed that loan proposals were poorly constructed by new firms (only between 1 and 10% were "financeable") and that monitoring the management of these firms was personnel-inten-

² See Schwartz (1974); Emery (1984); Smith (1987); Brennan, Maksimovic, and Zechner (1988).

³ The terms: inter-enterprise credit, accounts receivable, and trade credit will be used interchangeably throughout the paper to mean (buyers) borrowing from non-financial firms (suppliers). Likewise, the terms: inter-enterprise debt, accounts payable, and trade debt (loans) will be used interchangeably to mean lending by non-financial firms (suppliers) to other non-financial firms (buyers). Trade finance refers to either trade credit or trade debt.

⁴ The definition of commercial bank is slightly different in Russia from its traditional definition in the United States. It will be used throughout the paper to refer to a bank that issues demand deposits. As a universal bank, it can also hold corporate securities, unlike an American commercial bank (until recently). Investment banks, on the other hand, are comparable in the two cases.

sive.⁵ There has likely been a substantial erosion of the relative cost advantage enjoyed by banks in gathering and disseminating information commensurate with the erosion of traditional bank-firm relations in Russia.

Buyer-supplier networks also have been restructured during transition, and credit-worthiness has been introduced into these relationships. Under central planning, suppliers had an explicit guarantee from the planning authorities of repayment. Plan fulfillment, not customer creditworthiness, governed buyer-supplier relations in socialist Russia. Specifically, a bill of exchange was submitted to a bank that settled both the account receivable and the account payable. Such a centralized system internalized the negative externalities associated with obtaining external finance. Information asymmetries arising from deregulation, then, could make the cost of bank finance prohibitively high, and finance-based theories of trade credit predict that firms would seek to lower information costs. Ostensibly, these costs may be reduced by exploiting old ties and information about former trading partners. Empirically, however, the use of Soviet-era relationships to aid finance has been difficult to establish. Evidence from Russia shows that firms entering into these relationships are neither state-owned enterprises (SOEs) nor former state enterprises (FSEs).⁶ New firms are obtaining trade finance. Further, firms using trade finance seem to be more successful at obtaining bank loans. Thus, trade credit may diminish information costs through an alternative mechanism.

Suppliers, not banks, appear to be special relative to other lenders in post-socialist Russia. Non-financial firms may be the minimum-cost collectors and providers of information in the early stages of financial-system development. This paper seeks to examine how credit quality is established in Russia and, further, to determine where the comparative advantage lies among lenders with respect to information collection and provision.

Data were analyzed that were collected on 352 firms and 151 financial intermediaries in Russia to test an hypothesis derived from a model in which decentralization and the withdrawal of subsidies allow banks to distinguish between good and bad firms with the help of non-financial firms. It was noted that firms using trade finance have a higher probability of acquiring bank credit.

The empirical analysis is based on a survey of Moscow-based banks and firms conducted from June to August 1995. This data set is described in the fourth section. The richness of the survey derives from detailed financial data collected on small firms in all sectors of economic activity.

An important implication of this research is that the use of trade finance in transition economies should be reevaluated. Many economists following Kornai (1980) have argued, since the start of the Russian transition that the vast system of inter-enterprise relationships should be reduced to the fullest extent possible. Otherwise, soft budget constraints, or lack of financial discipline, would delay restructuring if inter-enterprise lending were allowed.⁷ In fact, the evidence now points in the opposite direction: firms seek trade credit as a means of financing from very short-term projects to relatively longer-term ones. With imperfect capital markets, trade debt may diminish the adverse effect of asymmetries in information.

⁵ Bazhan and Buyske (1996). The criteria used to assess financeability of loan proposals are not given in their report.

⁶ Author's calculations, Hirvensalo (1995), Ickes et al. (1995), and Richter and Schaffer (1995).

⁷ Although the usage throughout is consistent with the usage in Kornai (1980), a more precise sense of "soft budget constraint" follows Dewatripont and Maskin (1995), in which it is used to mean that investors are unable to commit *ex ante* not to refinance a firm *ex post*.

TABLE 1 International Comparison of Bank Assets

Country	Year	Number of Banks	Assets (percent GDP)	Average Assets per Bank (billions of dollars)
Russia	1995	2517	0.23	0.036
Czech and Slovak Republics	1994	51	1.42	1.25
Germany	1993	270	0.56	3.93
Great Britain	1990	559	2.7	4.60
Japan	1993	140	1.59	44.47
United States	1993	10,922	0.58	0.34
Venezuela	1994	42	0.36	0.51

Source: Warner (1996).

The paper is organized as follows. The second section provides a brief introduction to the institutional and macroeconomic environment in which this investigation takes place. The third section links asymmetric information to trade finance. The fourth and fifth sections give the data, a probit model of financing, and results. The final section concludes and offers further lines of research.

CREDIT CONDITIONS

Important changes in credit allocation have taken place over the course of transition to the market in Russia. To give the ensuing investigation context, the most salient institutional and macroeconomic features of credit markets will be present briefly.

Banks and Bank Finance

Russian banks are universal banks, similar to German and Japanese banks, which are allowed to hold corporate securities (unlike American banks traditionally). Russian banks differ from banks in market economies in at least two principal ways. First, the size of Russian bank assets (individually and in the aggregate) are very small by international standards. Thus, there is no significant intermediation (of savings to investment) function of banks. Russians hold much of their savings in non-financial forms, such as cash (typically dollars),⁸ hoarded goods, and real estate. These are frequently held as a hedge against ruble inflation. Average assets per bank in Russia total \$36 million; the comparable figure for the U.S. is \$340 million, and for the Czech and Slovak Republics \$1.3 billion. Table 1 offers other international comparisons. Second, and quite important for this research, lending practices are different in the banking environments of developed market economies and Russia. Loans are a smaller share of assets of Russian banks relative to American ones, for example: nearly 10% in Russia versus 58% in the U.S. And few loan maturities in Russia are long-term, as they are usually for 1 month and rarely greater than 1 year. Data from balance sheets from a representative sample of 563 Moscow banks are presented in Table 2 for illustration. In comparison, in the U.S., roughly one tenth of all short-term commercial and industrial loans have maturities of

⁸ According to Bazhan and Buyske (1996), an estimated \$20–30 billion is stored in Russian homes, an amount that would increase the assets of the banking system by a minimum of 18%.

TABLE 2 Composition of Russian Bank Assets, Selected Banks (in percent)

	1995	1996
Total Non-earning Assets	51.77	31.77
Cash	1.70	1.40
Correspondent accounts	33.31	12.78
Required reserves with CBR	2.18	3.72
Settlements	10.40	8.00
Fixed capital and merchandise	1.77	3.37
Other assets	2.26	1.99
Total Earning Assets	48.23	68.53
Short-term loans		
in rubles	9.83	14.11
in foreign currency	20.34	22.64
Long-term loans	0.28	0.50
Arrears on commercial loans	0.93	1.53
Discounted bills	0.72	3.39
Interbank loans	10.94	16.13
Arrears on interbank loans	0.19	0.47
Federal government securities	4.55	8.37
Other securities	0.70	1.89
TOTAL ASSETS	100	100

Source: Warner (1996). Data are aggregated from balance sheets of 563 Moscow banks from January 1 of given year.

1 month or less, while nearly one third of all short-term loans have maturities of more than 1 month and less than 1 year.⁹

Firms and Trade Finance

Inter-enterprise loans in Russia differ in two significant ways from those found in other market economies. First, bills of exchange are rarely used in the trade-finance transaction; therefore, it is difficult to define the maturity of a Russian trade loan. In the U.S., for instance, trade loans are often structured to include two fixed due dates: a *discount date* and a *due date*. The amount of discount for payment by the discount date is also typically given. In market economies interest rates rarely vary across buyers, for a given good. Rather, suppliers ration credit, imposing quantity restrictions on loans to buyers. In this respect, Russian trade finance works similarly, and rates charged on trade loans appear comparable to U.S. trade loans.¹⁰ The maturity of trade loans also differs across market economies. Trade credit in Russia is extended for 1 to 6 months, longer than the 1-month maturity in the U.S. and closer to the 2-month maturity in Western Europe. Second, unlike in market economies, collateralized receivables are rare in Russia. Certainly, before instituting a market system there was no need to collateralize such loans; payment was implicitly guaranteed by the state. Currently, receivables are difficult to collateralize because of ill-defined property rights and lack of contract enforcement. Not only are the ownership rights of firm assets not firmly established, but in case of

⁹ *Annual Statistical Digest of the Board of Governors of the Federal Reserve System, 1993*, p. 225, Table 65. Data are for 1993.

¹⁰ The average (monthly) rate is 58% in my sample versus nearly 44% in the U.S. retail sector, which is cited in Petersen and Rajan (1996). American and Russian interest rates are close since most transactions between Russian firms of this size seem to be conducted in hard currency (usually dollars).

TABLE 3 Credit Conditions

Period	CPI	PPI	Net Credit to Commercial Banks (billions of rubles)	Total Real Receivables (trillions of 1993 rubles)
1992	2614.9	3377.7	312	—
1993	841.6	902.6	2,686	—
1994	202.7	235.1	1,493	—
1995	131.4	181.1	-3,300	—
January	17.8	22.0	—	3.4
February	11.0	17.0	—	3.3
March	8.9	11.0	7,300	3.2
April	8.5	15.0	—	3.4
May	7.9	9.0	—	—
June	6.7	6.0	-6,800	—
July	5.4	7.0	—	—
August	4.6	7.0	—	—
September	4.5	6.0	-3,400	—
October	4.7	5.0	—	—
November	4.5	3.0	—	—
December	3.2	2.0	—	—

Sources: Goskomstat, Russian Economic Trends, OECD Economic Survey, The Russian Federation (1995). Monthly data are for 1995. Price indices are reported as percent change, end of period. Annual data are also end of period.

default the transfer of ownership of collateral from debtor to creditor has not been established, neither in principle nor in practice.

Credit Conditions

Table 3 chronicles the economic environment in which banks and enterprises extended loans. The Russian economy was in the throes of hyperinflation, by most definitions, between 1992 and 1993. The rate of increase of consumer and producer prices slowed in 1994 and further decreased in 1995, though it was still not low by the end of 1995. Average monthly (consumer price) inflation was 6.7% for May, June, and July 1995, the period during which I conducted my survey. The rate of increase of producer prices fluctuated prior to and during the survey period but slowed afterwards. Both deposits in commercial banks and credit to firms were falling at the time of the survey. Banks had fewer sources of funds, exploited more profitable investment opportunities, and were extending less credit than commercial lenders.¹¹ In fact, there was a dramatic reversal of credit extension to banks between the first quarter and second and third quarters of 1995. Real total receivables increased steadily from nearly 3.5 trillion rubles to nearly 4.8 trillion rubles between September 1993 and September 1994, declined precipitously between October 1994 and March 1995 to approximately 3.2 trillion rubles, and began to recover in April 1995.¹²

¹¹ For instance, GKO's (*Gosudarstvennye Kratkosrochnye Obyazatelstva*), Russian Treasury bills denominated in rubles, averaged a minimum return of 50% in annualized dollar terms for 1995.

¹² OECD Economic Surveys, Russian Federation (1995: 84). Data are recorded in 1993 rubles and are for industrial enterprises, excluding small enterprises and enterprises with foreign investment.

ASYMMETRIC INFORMATION AND TRADE DEBT

Now that I have reviewed the economic climate prevailing at the time of this investigation, I will turn to the theoretical context in which this investigation takes place.

Theories of Asymmetric Information and Trade Debt

In general, theories of financial intermediation ascribe a cost or information advantage to one type of intermediary or another. One set of theories assigns the locus of information advantage to banks. Diamond (1984) develops a theory in which a financial intermediary's net cost advantage relative to direct lending and borrowing derives from diversification within the intermediary. Given the high cost of monitoring loan contracts and the resulting incentive problems, the financial intermediary, on his view, is the cost-minimizing collector of information when the alternatives are duplicating effort (each lender monitors each borrower) and free-riding (no lender monitors). Unlike direct lenders, it is possible for a financial intermediary to diversify the types of loan contracts it monitors and to lower monitoring costs because of this varied experience to monitoring.

According to Ramakrishnan and Thakor (1984), individual information-providers (financial intermediaries) are likely to generate unreliable information, which will not reduce incentive costs associated with the lending-borrowing relationship (comparable to Diamond's direct lenders). Coalitions of information-providers act as a diversified information broker, an intermediary, and as such reduce information-production costs as group size (collective reputation) increases. Boyd and Prescott (1986), too, describe intermediaries as coalitions of agents that reduce the cost of information production. They develop a model in which financial institutions arise endogenously in response to the investment opportunities of agents that are private information, that is, unknown to the financial institutions.

A corresponding empirical literature has provided evidence that banks provide a unique function in the economy. From an investigation of the incidence of the reserve-requirement tax and the sensitivity of stock prices to announcements of bank loans, private placements, and public straight debt issues, James (1987) establishes that bank loans have and convey unique information. Lummer and McConnel (1989) refine the question of banks as unique collectors and providers of information by examining types of bank loans. They find that the uniqueness hypothesis is supported for loan renewals and not supported for new loans. Empirical evidence adduced by Berger and Udell (1995) from data on loan rates, collateral requirements, and lines of credit also suggests that for small firms, for whom information problems are typically acute relative to large corporations, banks attenuate information asymmetries more cheaply than other securities holders.

Another set of theories of intermediation attribute an information advantage to non-financial firms. It is plausible that suppliers' detailed and frequently collected information on the financial position of the firm could reduce the relative cost of external capital, a cost raised in the presence of imperfect information. Industry-specific knowledge aids suppliers in valuing cash flow and net worth. Silk manufacturers in northern Italy, for example, have historically financed each other, a relatively cheaper means of obtaining external finance than bank finance.

Smith (1987) considers suppliers who offer two-part credit terms, since they are able to identify prospective defaults more quickly than financial intermediaries. Trade

credit can be viewed as an investment undertaken by the supplier to generate both sales from buyers and information on buyer default risk. Schwartz (1974) shows that suppliers with access to relatively low-cost funds will offer trade credit to their customers who face higher costs from financial intermediaries. And Emery (1984) develops a model in which suppliers have a comparative advantage in information collection vis-à-vis third-party intermediaries. In both models, suppliers are able to obtain information on customer ability to pay at a relatively low cost, and they use this information to invest in either marketable securities or trade credit.^{13,14}

The empirical trade-finance literature attempts to test these theories. The results have given mixed support for these models which are grounded in capital market imperfections.¹⁵

This analysis follows this second strand of the financial intermediation literature. Acute information problems introduced on both the bank and the firm sides suggest that Emery (1984) and similar models of trade credit come closest to an appropriate theoretical framework for studying the financing of small firms. Underdevelopment of the banking system likely intensifies the degree to which borrowers and lenders are asymmetrically informed.

Banks in Russia are not yet specialists in information. In the early stages of market formation, they behave as consumers of information rather than producers; they rely on suppliers for credit evaluations that would otherwise be conducted by banks in developed market economies. Credit extended by suppliers contains information that may be useful for their own and other intermediaries' credit decisions. In underdeveloped banking systems, such as Russia's, the supplier-as-minimum-cost-information-provider hypothesis seems more compelling. Further, it has been shown that in less-developed markets, and thus systems, creditor (bank) passivity is commonplace. This is consistent with the possibility that suppliers, in the early stages of financial system development, are the minimum-cost monitors of loan contracts. Below the model of trade-credit, that captures this intuition, is summarized; this model is formally developed in Cook (1997).

Trade Credit and Credit Quality in Russia

A motive for formally capturing the intuition behind the link between bank and trade finance is that finance-based explanations of trade finance are inadequate to explain what appears to be an ulterior motive for Russian firms to obtain trade credit: to use trade finance as a stepping-stone to access bank credit. Hence, trade finance is only an intermediate, rather than final, goal of a firm in need of external finance.

At the start of transition, the existence of subsidies impaired financial intermediar-

¹³ Similar models are presented in Brennan, Maksimovic, and Zechner (1988) and Biais, Golier, and Viala (1993).

¹⁴ Omitted here are alternative sets of explanations of trade credit motivated by pricing considerations and transactions costs. Nadiri (1969) and Schwartz and Whitcomb (1979) are models in the former literature. These models hinge critically on the assumption that the cost to a user of trade credit is greater than the provider's cost. There is little empirical evidence of price discrimination or a pricing motive for trade finance in Russia. Therefore, these theories are beyond the scope of the present investigation. Theories that motivate trade finance by its ability to reduce transactions costs of paying bills, such as Ferris (1981), do not seem compelling in the Russian context either. In these models, buyers amass obligations and pay them monthly or quarterly. Although this explanation appears attractive, the lack of bills of exchange in Russia makes it difficult to measure payment cycles. Due to lack of empirical evidence of a transactions-cost motive of trade credit, this class of models will not be considered here either.

¹⁵ See Long et al. (1993) and Petersen and Rajan (1996) mentioned above.

ies' ability to distinguish between profit-maximizing behavior and nonprofit-maximizing behavior. The availability of subsidies and inter-enterprise credit regardless of firm performance provided no incentive to maximize profits. In the later transition period, this signal has been endowed with value by the reduction in subsidies and the decentralization of credit markets. The proposition that trade finance acts as a screening device for bank finance in the presence of asymmetric information will be tested in the next section. Although this proposition is motivated by the Russian experience, one may find many common features between the results of this model and the historical experience of credit-market organization in developed market economies and the current experience of emerging market economies.

In the next section the data is introduced that will be used to test the hypothesized relationship between trade and bank credit.

SURVEY DATA

The notion that trade credit is a vehicle to obtain bank credit arose from a preliminary investigation of data collected from banks and firms in 1995. The prevailing wisdom in Russian financial circles in 1995 was that firms, particularly small and new ones, neither borrowed from banks nor from each other. Early studies of the market transition, such as Ickes and Ryterman (1992), supported this view.

The year 1995 seemed an important year to test this hypothesis and examine the extent to which a formal market for credit had evolved over the period of market transition in Russia. Tightened monetary and fiscal policy, started in late 1994, should have begun to produce their intended results. Market reforms eliminating subsidized loans and grants to firms had been in place for nearly a year.¹⁶ Financial liberalization, initiated in 1988, should have created a more competitive and developed market for credit. The monthly rate of inflation fell below 10% by the end of the first quarter for the first time since prices were liberalized in 1992.¹⁷ Due to lower inflation real interest rates turned positive during the first quarter, a development that should have made saving in banks and lending more attractive. Currency volatility fell in the wake of October 1994's "Black Tuesday," when the ruble lost 20% of its value. And a crawling ruble band (the "ruble corridor"), introduced in July 1995, solidified the monetary authorities' commitment to exchange-rate stability. Banking infrastructure had grown considerably since 1991, both in the number of banks (a five-fold increase to over 2,500) and in deposits held in the banking system. Finally, the Russian gross national saving rate¹⁸ had remained high relative to other transition economies at roughly 22%.¹⁹

Instead of more intermediation by banks, however, there was less. Short-term (1- to 3-month) bank deposits—the largest component of deposits—fell in real terms from a 1995 high of 5.1 trillion rubles to 4.5 trillion in July 1995 (and would continued falling).¹⁹ Correspondingly, real volume of credits, a measure of bank lending, steadily declined from a 1995 high of nearly R10 trillion.²⁰ How is it that the net effect of these opposing

¹⁶ Credit flows from the Central Bank of the Russian Federation (CBR) fell from 36% of GDP in 1992 to 12% in 1994. See *Russian Economic Trends*, 1994 and 1995.

¹⁷ See Table 3 below.

¹⁸ The ratio of gross private domestic and government saving to GDP.

¹⁹ Central Bank of the Russian Federation (1996). These deposits are of enterprises, organizations, and cooperatives.

²⁰ *ibid.*, p. 44.

trends was less intermediation? Of course, a partial explanation is lack of financial depth, or the ratio of M2 to GDP: at 16%, the ratio of liquid liabilities of the financial system relative to GDP is very low by international standards.²¹ Although the gross national saving rate may be relatively high, Russians invest their savings outside the financial system, such as in inventories, real estate, cash dollars, and capital flight to other countries. Nonetheless, there was financial intermediation at the margin, which leads to two questions. First, how did this happen? Second, are there other forms of intermediation that may have gained in importance outside the banking system?

Anecdotal evidence abounded, but little systematic empirical evidence had been collected in Russia to address this question by the beginning of 1995. A survey by De Melo and Ofer in 1994 of 86 St. Petersburg private service firms revealed that financing for initial capital, working capital, and new investments was provided overwhelmingly by owner equity and retained earnings. Further, the proportion of small enterprises receiving institutional credit was below the average in industrial countries, where 25 to 50% of small and medium-sized enterprises use bank credit.

A 1994 World Bank survey of 439 industrial firms in various geographical locations within Russia analyzed by Richter and Schaffer (1995) revealed that *de novo* firms were in better financial condition than their privatized and state-run counterparts, as measured by the firms' expectations about future performance, financing, and payment arrears.

The De Melo and Ofer (1994) and Richter and Schaffer (1995) studies were limited to the service and manufacturing sectors of the Russian economy. Further, the World Bank study exhibited a survivorship bias: a 1991 database was used for a survey distributed in 1994. The data set does not allow for entry and exit and thus can only report the activity of surviving firms, "winners."²²

I conducted the surveys in collaboration with the Institute for the Study of Reforms in Moscow from June to August 1995. Questionnaires were completed by personal interview, which typically lasted 45 minutes. Firm managers and owners were interviewed for the firm survey.

The sample was drawn at random from a database of firms compiled by the Institute. Firms must register with the Central Bank of the Russian Federation; therefore, the database was extracted primarily from relevant CBR sources.²³

Tax collection is problematic in Russia. Corporate marginal tax rates are high, purportedly 71 to 110% of revenue in many cases,²⁴ and are changed frequently by lawmak-

²¹ In 1995, this ratio was 0.91 for the Czech Republic, 0.23 for Latvia, 0.67 for France, and 1.1 for England. *Russian Economic Trends*, Vol. 5(3), 1996.

²² My own surveys attempted to correct for both sectoral and survivorship bias. First, I extended the sample to all sectors of the economy: trade, services, and manufacturing. Second, I employed a contemporaneous data set from which a random sample of firms was drawn to obtain a representative cross section of firms existing in 1995. Finally, I obtained evidence from financial intermediaries themselves; a more complete account of credit-market evolution would include lenders as well as borrowers. The previous surveys had omitted banks, a potentially significant source of external finance. The bank data are indirectly incorporated into the analysis which follows but are not used explicitly in estimation below. Cook (1997) includes more analysis of bank data.

²³ Among them were *Krugly stol biznesa Rossii* (Russian Business Roundtable), *Fond sodeistviia razvitiia malykh form predpriatii v nauchno-tekhnicheskoi sfere* (Development Assistance Fund for Small Enterprises in the Technology Industry), and *Fond podderzhki predpriatii malogo biznesa pri pravitel'stve Moskvi* (Fund for the Development of Small-Enterprise Privatization in Moscow). The complete list is contained in Cook (1997).

²⁴ Author's interviews 1995 and *Russian Economic Trends*, April 1997.

ers. Such conditions typically lower compliance to tax and licensing laws, which in turn depresses registration rolls. For small Russian firms, estimates of underestimation range from roughly 100,000 (Anti-Monopoly Committee) to over 300,000 (GOSKOMSTAT).²⁵ Estimates based on electricity consumption in a sample of Newly Independent States²⁶ between 1989 and 1994 corroborate the finding that economic activity is understated. According to these estimates, the share of unofficial activity in the economy increased an average of 12 to 37%.²⁷ To correct for under-reporting, other Russian sources that collect their own data on small enterprises (also named in Footnote 24) were consulted.²⁸ This study goes farther than others to address this problem by expanding the database to include unofficially operating firms to make the data more representative.

As the city with the most developed banking system, Moscow is a natural location for this study. At the beginning of 1994, 480,000 small firms were registered in Russia, one third of which were located in Moscow.²⁹ Most firms in the sample were founded in 1991.

There are 352 small firms in the sample, 320 of them in the city. I chose small firms, because information about them is more accessible than that about larger firms, and they are among the most active in the search for external finance in Russia. The CBR classifies a firm as "small" if it has at least 1 but not more than 200 employees. The average size of firms (at the time of founding) in this sample, 23 employees, is the average size of small enterprises in Moscow. The distribution of enterprises follows roughly the contribution by sector to GDP in Russia: 103 (29%) in wholesale and retail trade, 112 (32%) in manufacturing, 113 (32%) in services, and the balance of firms, 24 (7%), is engaged in some combination of these activities.³⁰ Of the 352 firms in the sample, 78 are closed (to stock trading) joint-stock companies, 10 are open joint-stock companies, 228 are mutual liability partnerships, 16 are sole proprietorships, 3 are "combined" firms, and 17 take unspecified ownership forms. Fifty-seven percent of firms are formerly state-owned, and 6% are at least 25% state-owned. Out of those reporting, average 1994 cash flow was R740 million (1995 \$231,670). Income was slightly higher for *de novo* firms, R744 million, and substantially lower for FSEs, R567 million. A summary of firm data appears in Table 4.

Firm Financing

Firms amassed a mean of 4.1 million rubles (roughly 1995 \$922) for start-up capital. This initial capital comprised several sources, 70% of which was from personal means.

Of the 352 firms surveyed, 29 possessed bank loans when operations began. Of

²⁵ European Bank for Reconstruction and Development (1995:2).

²⁶ Armenia, Azerbaidzhan, Belarus, Estonia, Georgia, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Moldova, Russia, Tadjikistan, Turkmenistan, Ukraine, and Uzbekistan.

²⁷ *World Bank Development Report* (1996: 19 and 27).

²⁸ Admittedly, such an addition can capture only a small share of the underground economy missed by official records. Thus, the data are truncated, representing only the observable fraction of economic activity. One should be careful, then, in extrapolating results obtained from this data set to the entire population, given sample selection bias.

²⁹ European Bank for Reconstruction and Development 1995:2.

³⁰ The sole discrepancy between my data and official data appears to be simply a feature of reporting. The European Bank for Reconstruction and Development (1995:2) reports that 40% of small enterprises in Russia are manufacturing firms versus 32% in my sample. Since mixed-activity firms may engage in manufacturing, adding the share of firms in combined activities would eliminate this discrepancy.

TABLE 4 Characteristics of Firms in 1995

Firm Attributes	Current Bank				Retained Earnings
	All Firms	Loan	Trade Finance	Investor	
Total	352	86	55	107	253
Trade	103	16	15	24	75
Manufacturing	112	50	22	40	98
Services	113	13	14	27	79
Mixed Activity	24	7	4	16	21
1994 Revenue (Rmillion)	740.0	849.0	231.7	873.2	670.0
Revenue Change					
increase	172	59	26	55	147
decrease	22	5	2	6	10
same	82	13	18	23	60
Initial Capital (Rmillion)	4.1	2.7	0.001	2.5	1.7
FSE	151	23	9	28	101
SOE	22	10	2	5	18
Employees	22.7	21.7	22.8	22.6	23.9
Interest on Loan					
(average, nominal)		84.8	58.1		
Loan Term (months)			3.2		

"Investor" is firm investing in six- to nine-month project. "Retained Earnings" is firm using profit to fund firm development. "Increase," "decrease," and "same" in revenue refer to greater than or less than 20% change or no change in nominal revenue from 1993 to 1994; entries correspond to number of firms in each category.

these, all used the funds to train personnel, and most invested in capital goods. Nearly one third of firms with start-up loans are former state enterprises, while under one fifth are state-owned.

More than three times the number of those with initial bank loans, 86 currently have bank loans,³¹ whose average principal is R4.6 million (1995 \$1034). To secure the loan, 21 used pledges or collateral. Over half had an account at the lending institution. Most, 52, purchased equipment out of the borrowed funds, while a much smaller proportion of the loan went to obtain space, personnel training, wages, and renovation.³² Twenty-seven percent of new borrowers are FSEs, and nearly 12% are state-owned firms.³³

Seventy-eight firms recorded borrowing outside formal credit channels, i.e., friends, family, loan sharks, mafia, and the like. The number is only slightly lower than the number that had commercial bank loans. On the one hand, "unofficial" loans are overwhelmingly dollar-denominated, carry lower interest rates, and have longer maturities: 55 of the 78 had 4-month loans, and (nominal) rates ranged from 0 to 180%, in contrast to a range of 30 to 360% on most bank loans (3-month loans).

An alternative source of external finance was trade credit. Fifty-five firms reported

³¹ Eighty-eight respondents answered indirect questions about current bank loans, although only 86 responded to the direct question, "Is your firm currently borrowing from a bank?"

³² As the average bank loan term is 1 month, it only seems possible to purchase small amounts or used equipment with bank loans, if it is assumed that principal and interest will be repaid out of the return on this investment.

³³ Curiously, most (68%) of SOEs in the samples are *de novo* firms. This resulted in a distortion due to survey design. On the one hand, 199 firms answered "no" to the question, "Was your firm formerly state owned?" On the other hand, when the variable SOE was defined as 25% or greater state ownership, 16 firms were found to be non-FSEs and six FSEs. Therefore the more precise term would be "non-FSE," but the terms "*de novo*," "new," and "non-FSE" will be synonymous in the paper, unless otherwise stated.

accounts payable or receivable (or both).³⁴ The average interest rate on trade loans was 58%, and their average maturity was 3 months. Most enterprises extending or receiving trade finance are new firms, which is unexpected; older firms would seem more likely candidates for this kind of finance, which was prevalent during the Soviet period.

To summarize, small Russian firm managers financed operations initially from personal funds and subsequently from a variety of sources, including bank loans and inter-enterprise loans. These findings corroborate the general conclusions of similar studies on Russian firms: banks are not the chief source of firm financing. It is still not obvious how intermediation through formal channels, however small, takes place nor that credit markets are seriously underdeveloped, as has been asserted. At least 25% of firms in the sample borrowed from banks, which suggests greater credit-market development than previously believed.

CORRELATIONS AND PROBIT RESULTS

Before formally testing the hypothesis derived from the model summarized above, it may be worth noting the most prominent patterns that appear in the data that emerge from bivariate analysis. Correlations will help ascertain the individual relationship between debt instruments and other firm characteristics.

If either the financing motive for trade credit or the traditional view of economists who study firm finance in Russia were the point of departure, one would expect to observe substitution between bank and trade credit. However, the data do not support a mutual-exclusivity hypothesis. Simple correlations between bank credit and other variables in the firm data set are reported in Table 4. Access to a bank loan is positively correlated with familiar determinants of high credit quality in developed market economies: a marked increase in 1994 income (INCR), manufacturing (PROD), and possessing a start-up loan (BEGLOAN). Access to bank funds is negatively associated with the trade and service sectors (TR and SERV).

Associations between trade credit and firm characteristics are generally weak, and certainly weaker than those for bank credit. The only firm attributes that produce close relationships are former state enterprise (FSE) and possessing a trade or bank loan (TRADE or CURRLOAN). The connection between external finance, either bank or inter-firm, and former state enterprises is negative. An initial interpretation is that both types of lender believe that these firms are high credit risks. This will be explored more fully, along with other potential determinants of bank finance, when the probits are presented. The other close relationship that emerged was between bank and trade finance. Though firms with trade finance constituted only 17% of the firms in the data set, 31% of firms with bank loans had trade credit. Such a finding is inconsistent with the financing motive for trade finance, which suggests that bank and trade finance are substitutes.

Further, firms may not want bank loans, because there are implicit costs associated with borrowing from banks. It is widely held that firms likely to seek soft budget constraints are particularly the ones to seek inter-enterprise debt. Hirvensalo summarizes this view: giving and receiving trade-related credits has become the most widely-used avenue where budget constraints have yielded and provided companies a way of adapting without making other, more difficult changes in their operations, such as cutting

³⁴ The question was whether the firm was currently using loans from buyers or suppliers.

production or laying off employees.³⁵ On this view, bank finance and trade finance should be substitutes. And elsewhere³⁶ new and privatized firms have been largely excluded from both sources of external finance. After observing these correlations, a natural first question was: Does trade finance influence access to bank credit, and, if so, by what means? This was the point of departure for developing a new model of trade finance incorporating asymmetries in information.

Three Functions of Trade Finance

From the associations reported above, three means by which trade finance may mitigate the problem of severe information asymmetries in financing Russian firms are identified. First, suppliers have up-to-date and other private information on the business conditions of their partners. Second, firms may seek trade finance to demonstrate to other providers of credit (banks) creditworthiness. Not only do supplying firms, in general, have more timely information than financial intermediaries, but their roles as information accumulators may surpass that of financial intermediaries if this role is ignored or underdeveloped.³⁷ Third, longer-term investment may be facilitated by trade credit. In the presence of imperfect information, financial institutions (or other external funding sources) may be reluctant to supply long-term finance. Trade credit, which typically finances working capital, may free up internally-generated funds for fixed investment. Table 5 describes the role of trade loans in financing projects, not simply of very short duration but also for periods conducive to exploiting longer-term investment opportunities.³⁸

A Probit Model of Trade Debt as a Screening Device

Firm attributes that permit access to bank finance may not be sufficiently summarized by trade credit. Therefore, the analysis was extended to include additional firm characteristics to test the theory that the presence of trade credit contains valuable credit quality information to other lenders. This empirical investigation differs from others in the trade-credit literature. In general, these tests are of one set of established explanations against others. Petersen and Rajan (1996), for instance, test three sets of theories (financing advantage, price discrimination, and transactions costs) to explain variation in trade-credit data. As mentioned in Section 3, other classes of models appear irrelevant to the Russian credit environment, with the exception of those motivated by imperfect information. Hence, a testable implication of the incomplete information model is presented in Cook (1997) in which trade credit is a screening device for bank credit. Trade credit may summarize for Russian banks the type of information on creditworthiness

³⁵ pp. 175–176. Authors of the OECD Economic Survey, The Russian Federation (1995) elaborate this view. See pp. 103–104.

³⁶ See, for example, Ickes et al. (1995), Richter and Schaffer (1995), and *World Development Report 1996*.

³⁷ Peter Rona, former head of the Hungarian Enterprise Fund which has invested significantly in Hungarian start-ups, suggests that the organization of small firms and financial intermediaries, particularly in Central and Eastern Europe, may be diametrically opposed. Flatly organized small firms and hierarchical banks, he contends, may have inherent barriers to communication. Therefore, bankers may not view themselves as direct information accumulators and will rely on a third party for information transmission. Attorneys perform this role in developed market economies, while (larger, more established) firms may serve this purpose in transition economies.

³⁸ Although included in this synopsis, the investment role of trade finance is beyond the scope of this paper but is the subject of Chapter 3 in Cook (1997).

TABLE 5 Correlation Between Variables

Variable	Share of Variable of Interest	Correlation
Correlation with CURRLOAN		
INCR	72.80	0.22
DECR	6.20	-0.02
SAME	16.00	-0.13
FSE	26.70	-0.19
SOE	11.60	0.12
TR	18.60	-0.14
PROD	58.10	0.32
SERV	15.10	-0.20
BEGLOAN	20.90	0.26
TRADE	30.90	0.22
Correlation with TRADE		
INCR	50.00	-0.02
DECR	3.80	-0.06
SAME	34.60	0.09
FSE	16.70	-0.24
SOE	3.60	-0.05
TR	27.30	-0.02
PROD	40.00	0.08
SERV	25.50	-0.06
BEGLOAN	5.50	-0.04
CURRLOAN	45.50	0.22

CURRLOAN is a zero-one dummy indicating whether firm possesses bank loan; INCR is a zero-one dummy for at least 20% increase in 1994 sales; DECR is a zero-one dummy indicating at least 20% decrease in 1994 sales; SAME is a zero-one dummy for no change in 1994 sales; TR is a zero-one dummy for retail or wholesale trade; PROD is a zero-one dummy for manufacturing; SERV is a zero-one dummy for a service; and TRADE is a zero-one dummy indicating use of trade loan.

they would collect if the banking system were more developed. The hypothesis will be tested by estimating a probit equation using traditional determinants of bank-loan allocation.³⁹

The equilibrium allocation of loans is determined both by supply effects (credit extended to the buyer) and demand effects (buyer's demand for funds).⁴⁰ To estimate the loan decision, firm characteristics that are standard in the literature and specific to the Russian context will be used. Further, a probit model will be employed, since the data provide consistent information on the binary choice of obtaining or not obtaining a bank loan rather than the level of borrowing. Specifically, the model is

$$\Pr(\text{CURRLOAN} = 1) = F(X) \quad (1)$$

The event CURRLOAN is a bank loan at the time of the survey (June to August 1995). The matrix X of regressors contains firm characteristics that may explain differential access to bank loans. Specifically, the components of X are INCR, DECR, SAME, FSE, SOE, TR, PROD, SERV, TRADE, BEGLOAN, and each will be discussed in turn.

³⁹ With cross-section data, it will not be possible to test hypotheses about early-transition events; such tests would require time-series data.

⁴⁰ Data on the specific suppliers of bank credit are not available; thus, it will be difficult to identify supply and demand factors in estimating the likelihood of obtaining a bank loan, although it would be desirable to do so.

TABLE 6 Three Functions of Trade Debt

Type of Finance	Term	Trade Finance Function
Trade finance	1 to 6 months	Loans to partner firms
Bank loan	1 to 3 months	Credit rating service
Investment	6 to 9 months, short-term capital projects	Increase availability of funds

The fundamental regression (Equation 1) is estimated and then amended to more precisely capture potential sources of information asymmetries. My firm data differs from official data for the entire (small, medium-sized, and large) enterprise sector for this period. Specifically, bank loans in the sample outnumber inter-enterprise loans during this period, when the volume of bank credit was declining in the total population of firms. Inter-firm finance rose at the same time that bank finance fell for the population, while in my sample bank finance was more prevalent. Furthermore, most bad loans were concentrated in smaller banks.⁴¹ In estimation, the difference is distinguished between the contribution of a trade loan extended to a firm whose financial position is worsening from one whose position is ostensibly better. That is, the presence of a bank loan is conditioned not only on a trade loan but also on having a trade loan that signals profit maximization and creditworthiness. Firms known to seek or operate under soft budget constraints will be isolated by controlling for additional firm characteristics. Thus, in models (2), (3), and (4) given in Table 5, the trade loan variable is interacted with other explanatory variables to estimate more precisely the contribution of an inter-enterprise loan. For instance, SOEs may benefit from political ties within the banking system or with bank regulators. Although possibly non-profit-maximizing, an SOE may be able to obtain a bank loan, despite the absence of other signals of creditworthiness, such as a trade loan (Table 6).

Finally, I think it would be most meaningful for the reader to interpret the probit results as a useful summary of the partial correlations in the data. Trade credit, hypothesized in Equation 1 to be exogenous as a regressor, may not in fact be strictly exogenous. Access to bank loans, for example, may influence the firm's decision to obtain trade credit. This is an important point, and will be revisited in the discussion of the probit results. The summary statistics and the probit regressions should be taken together as correlations between bank finance and firm characteristics.

Summary statistics are given in Table 7, estimation results in Tables 8 and 9. A discussion of the principal coefficients follows.

Credit Quality of Firms

The effect associated with trade credit (TRADE) is positive and statistically different from zero at conventional levels. Having trade finance raises the likelihood that a firm obtains a bank loan. In preliminary tests, this result was robust to changes in sample size. Firms were divided into FSEs and non-FSEs, pre-privatization-period firms and post-privatization-period firms, and SOEs and non-SOEs. In these subsamples, too, the coefficient on TRADE was positive and significant at all conventional levels. Thus,

⁴¹ In turn, it is relatively smaller banks that extend credit to small firms.

TABLE 7 Summary Statistics

Variable	Mean	Minimum	Maximum	Standard Deviation
CURRLOAN	0.25	0.00	1.00	0.43
INCR	0.53	0.00	1.00	0.50
DECR	0.01	0.00	1.00	0.26
SAME	0.25	0.00	1.00	0.44
FSE	0.43	0.00	1.00	0.50
SOE	0.06	0.00	1.00	0.24
TR	0.29	0.00	1.00	0.46
PROD	0.33	0.00	1.00	0.47
SERV	0.31	0.00	1.00	0.46
MIXED	0.08	0.00	1.00	0.27
TRADE	0.17	0.00	1.00	0.37
BEGLOAN	0.08	0.00	1.00	0.28
INVEST	0.33	0.00	1.00	0.47
PERCDEV	35.86	0.00	100.00	36.10

304 valid observations

banks appear to incorporate possessing trade finance in their calculation as related to more efficiently allocate capital.

One explanation for the positive performance associated with buyer-supplier agreements is consistent with the models of Emery (1984), Brennan, Maksimovic, and Zechner (1988), and Biais, Golier, and Viala (1993). Suppliers have an information advantage relative to direct lenders and banks due to the specialized information they collect in the course of business. Hence, banks are not unique, or minimum-cost brokers of information, at the start of financial-system development. Rather, trade credit may serve as a form of inside debt if suppliers have inside information about the value of the firm's growth prospects, and trade credit terms, particularly the number of loans, reflect this information. Given the specificity of knowledge typically required to enter into and sustain a buyer-supplier relationship, a positive coefficient on trade credit is in line with a trade-credit-as-inside-debt hypothesis.⁴²

This finding represents somewhat of a reversal of the role that financial intermediaries play in developed market economies, in which non-financial firms largely rely on financial intermediaries to provide information about firm creditworthiness. This finding also does not support traditional models of trade finance which predict mutual exclusivity of bank and trade loans. Capital market imperfections, namely information problems, according to these models, make bank finance too costly for less-known firms. Trade finance is the only alternative to self finance. Because of its higher implicit interest rates, trade finance would only be used if other opportunities for external finance did not exist.

However, this finding is consistent with experience of small and medium-sized firms in transition economies.⁴³ One interpretation of trade finance is finance from a leasing company. Lease financing for machinery, for example, has proven to work well where collateral laws remain weak and where bank loans may be scarce. Banks price credit using credit histories, which are rarely obtainable in transition economies, and leasing firms price credit using the value of the leased asset, which is straightforward to obtain.

⁴² Without data on other debt instruments, this hypothesis is not testable.

⁴³ Footnote 39 suggests that organizational differences may divide small and new firms from financial institutions.

TABLE 8 Bank Loan Probit Estimates

Independent Variable	(1)	(2)	(3)	(4)	(5)
Constant	-1.38 (-3.56)	-1.43 (-3.66)	-1.38 (-3.55)	-1.12 (-3.15)	-1.75 (-2.65)
INCR	1.02 (2.93)	1.04 (2.97)	1.01 (2.92)	0.81 (2.34)	0.68 1.41
DECR	1.16 (2.57)	1.17 (2.57)	1.16 (2.56)	0.94 (2.08)	0.95 (2.08)
SAME	0.45 (1.18)	0.41 (1.08)	0.45 (1.18)	0.58 (1.60)	-0.003 (-0.005)
FSE	-0.44 (-2.11)	-0.31 (-1.40)	-0.44 (-2.10)	-0.53 (-2.60)	0.12 (0.16)
SOE	0.85 (2.22)	0.81 (2.12)	0.83 (2.14)	0.81 (2.15)	1.05 (2.04)
TR	-0.86 (-2.25)	-0.88 (-2.28)	-0.85 (-2.24)	-0.76 (-2.01)	-0.94 (-2.00)
PROD	0.21 (0.60)	0.20 (0.57)	0.21 (0.60)	0.30 (0.87)	0.10 (0.27)
SERV	-0.62 (-1.64)	-0.63 (-1.67)	-0.61 (-1.64)	-0.58 (-1.57)	-0.59 (-1.57)
BEGLOAN	1.21 (3.95)	1.25 (4.06)	1.21 (3.96)	1.14 (3.75)	1.33 (3.43)
TRADE	0.97 (4.17)				
NFTRADE		1.16 (4.27)			
FTRADE		0.35 (0.69)			
NSTRADE			0.97 (4.12)		
STRADE			2.76 (0.17)		
INCTRADE				1.07 (3.38)	
DECTRADE				1.21 (1.24)	
TRADE					4.02 (0.97)
Number of observations	304	304	304	304	304
Percent correctly predicted	81.3	81.3	81.3	79.0	78.6
Likelihood ratio test	Reject	Reject	Reject	Reject	Reject

The fundamental model is given by Equation 1 in the text and is estimated as (1). Asymptotic *t*-statistics are given in parentheses. The null hypothesis of the Likelihood Ratio test is that all coefficients are not significantly different from zero.

The presence of lease financing, then, serves as a credit history for banks to use in the lending decision.

Relationships With Financial Institutions

If the positive response to buyer-supplier agreements is the result of some benefit from the intermediation process, though not specific to non-financial intermediation, one would expect to observe a similar response to the existence of another or a previous commercial bank loan.

TABLE 9 Propensity score estimates

	TRADE	TR	BEGLOAN
Weighted average	1.69 (0.54)	-1.31 (0.52)	2.36 (0.60)
Full sample	0.97 (0.23)	-0.86 (0.38)	1.21 (0.31)

Notes: Propensity scores are obtained from a ranking of the fitted probabilities of using trade finance (TRADE). TR (engaging in wholesale or retail trade) and BEGLOAN (possessing start-up loan from a bank) are the only explanatory variables available in all stages of estimation. Standard errors are in parentheses.

Previous bank finance increases the probability of obtaining a bank loan. The effect is positive and significant at conventional levels. In developed market economies the conventional wisdom is that a bank's decision on a loan application sends a public signal about the financial position of a potential borrower (which is why it is typically held to be confidential). The empirical investigations of Petersen and Rajan (1994) and Petersen and Rajan (1995) for evidence from small firms in the U.S., among others, suggest that having a relationship with a financial institution positively influences the probability that it will provide finance.

Firms were asked whether they had start-up loans (BEGLOAN) and were currently borrowing from a bank (CURRLOAN). It is difficult to know the precise length of bank-firm relationships, as many may have had bank loans between the initial and current periods that would have gone unrecorded. However, even without this information about continuity of relationships between the banks and firms, it is still reasonable to believe that having had a prior relationship with a financial institution is meaningful information for a potential lender. If, on the other hand, signals from other providers of finance are particularly uninformative in the Russian environment, having had a past relationship will be of little value in helping a firm to obtain another bank loan. Two pieces of evidence may be adduced to demonstrate why Russian banks may be skeptical of information provided by other Russian banks. First, as mentioned earlier, many bad loans were extended at the beginning of transition and continue to be extended by less prudent banks. Nearly 10% of the Russian commercial bank loan portfolio today consists of non-performing loans.⁴⁴ Second, Russian banks participating in the interbank market suspended lending to each other in late August 1995, because participants could not verify the collateral of other participants. Even before the crisis, subsets of participants who deemed each other creditworthy had banded together to minimize the information costs associated with increasingly risky participation in the interbank market. Thus, loans from other banks may have little, no, or an adverse effect on the lending decision.

At first glance, the robustness of this parameter to specification changes may suggest that it is truly a screening device for bank loans in the current period. This particular result must be interpreted, therefore, with caution. Reporting biases may have distorted the results. Loans are often rolled over; thus, a loan at the beginning of operations could become a current loan. Banks are reluctant to record delinquency or defaulted loans for fear of revealing declining or negative net worth to auditors. Recent accounts by advisers to the Central Bank point to greater severity of the problem in Russia than

⁴⁴ *Russian Economic Trends*, Quarterly Report, 1997:1.

in other market economies.⁴⁵ There exist institutional incentives, with respect to both borrowing and lending, to misrepresent the term of a loan to mask delinquency or default. Although statistically compelling, the positive influence of a start-up loan on a current bank loan may be misleading.

Financial Position of the Firm

The variables that approximate a measure of expected profitability in the data set indicate whether a firm's revenue increased (INCR) or decreased (DECR) substantially (by 20%) stayed the same (SAME) from 1993 to 1994. Rapidly growing firms should face more investment opportunities and demand more credit than firms that are growing more slowly. A significant increase in previous year sales is used as a proxy for expected profitability, or credit demand.⁴⁶ The hypothesis that an increase or decrease in expected profitability increases the probability that a firm will obtain bank finance cannot be rejected. In addition, coefficient estimates seemed to pick up demand-like and supply-like effects: either a substantial increase or decrease in sales raises significantly the probability of receiving or of not receiving a bank loan. In high-growth periods, firms may need and apply for more finance to keep pace with growing opportunities. In declining-growth periods or in a generally unfavorable business climate, firms need and apply for more finance to stay afloat. High-growth firms are expected to be the most likely to apply for and receive external finance and no- or declining-growth firms are expected to be the least likely to receive credit when credit is allocated according to market principles. The issue of declining and increasing expected profitability will be revisited below.

Firm Ownership

Consistent with the correlations, the effect of former state ownership (FSE) turns out to be negative and significant in three of the four models: being a privatized firm lowers the probability of obtaining a bank loan. It is not unreasonable to suspect that former and current state-owned enterprises may require more funding than other firms due to a deteriorating capital stock and lack of demand for output (hence idle capital stock and decreased investment) existing in Russia when transition began. In addition, former state ownership may be a proxy for degree of asymmetric information. Most FSEs chose to become closed joint-stock companies (controlled by managers and workers) at the time of privatization. Thus, because of the dual effects of non-tradability of shares and structure of ownership, FSEs are reputed to be among the least transparent firms in the economy. Finally, the coefficient on FSE may summarize information about management. Older managers may not have adjusted to the new market for credit and may apply to banks for external finance less readily than new managers. Older managers would, instead, continue to lobby government authorities for financing, a practice held over from the Soviet period when credit was a grant or appropriation from the national budget and often depended on the lobbying activities of enterprise managers. Alternatively (and more likely), bank managers may guess that management turnover is low in FSEs and that it may still operate under Soviet-era assumptions. There was no sense

⁴⁵ Author's interviews 1995 and 1996.

⁴⁶ This follows the interpretation of Petersen and Rajan (1996).

in which credit had to be repaid once extended by Gosbank during the Soviet period. Thus, banks would believe that FSEs would be poor credit risks.

The finding that FSEs have greater difficulty than other firms securing external finance corroborates the findings of other research on firms in Russia, including the 1995 World Bank study, Ickes et al. (1995), and Bazhan and Buyske (1996) who report that more than half of all loans go to new enterprises.

Bad Loans

Coefficients on the interaction of TRADE with FSE (FTRADE), SOE (STRADE), and DECR (DECTRADE) are striking and support the signaling hypothesis. FSEs, SOEs, and declining-revenue (DECR) firms with trade loans are unlikely to obtain bank loans, as these interactive terms are all insignificant at conventional levels in models (2) to (4). This finding corroborates the estimated coefficient on TRADE. Since banks can immediately ascertain the probability of default of a firm (for example, high for FSEs and low for SOEs), they can extend or deny a loan without further information. In the presence of significant information costs, banks use the observation of a firm's receiving trade finance as a composite indicator of credit soundness. It is suggestive that "good" trade loans, granted to profit-maximizers, are the ones that serve as a signal. SOEs, for example, do not need trade loans to get bank loans; being a state-owned enterprise is enough.

Summary

Trade finance consistently predicts which firms obtain bank finance. Profit-maximizing small firms without an obvious signal of ability to repay (SOE or FSE) use trade loans to increase their chances of obtaining bank loans. Banks appear to use trade finance as a proxy for financial soundness. This is consistent with my hypothesis that suppliers perform the function of credit-quality assessment, for its own purposes and for banks.

We, however, may want to be concerned about two potential problems in obtaining estimates of the parameters of the model: unobserved heterogeneity and identification. It is possible that some unobserved process leads to the observation of coincident trade and bank finance. It is also possible that the data may be consistent with an hypothesis of reverse causation: bank loans may serve as a screening device for trade loans. Each problem will be addressed in turn.

Propensity Score Estimates

It may be the case that firms with and without trade finance are not drawn from the same underlying population. To control for problems of unobserved heterogeneity, the estimation is modified to account for the non-random incidence of trade finance. Firms use trade debt when it is the least-cost means to produce a desired effect, such as relaxing liquidity constraints. Therefore, trade finance is observed where it would have the greatest effect; problems of selectivity may render biased coefficient estimates of the average effect of trade finance. To obtain unbiased estimates, the propensity score will be conditioned or the fitted probability that a firm will possess a trade loan.⁴⁷

⁴⁷ This procedure closely follows Bordo and Eichengreen (1996).

The estimation proceeds as follows. First, there is implementation of a logit model designed to predict whether or not trade finance is present as a function of x_i , a vector of factors determining the probability of trade finance. The elements of x_i are INFORM, a dummy for use of informal finance; FSE; INCR; SAME; PART, a dummy for being a subsidiary of a larger firm; and CLOSED, a dummy for joint-stock company whose stock is not publicly traded. Then, the coefficients from this model are used to derive the propensity score, or ranking by fitted probability, of a firm having a trade loan. Finally, the sample is arranged in thirds to obtain subsamples of firms with similar propensity scores to compare the bank loans of firms with and without trade finance within each third. For this comparison, a logit model is used that is identical to the probit model (Equation 1) estimated above.⁴⁸ To obtain the average effect of trade loans on the population, the average is taken of the estimated coefficients from the subsample regressions. To compute the standard error, two assumptions are required. First, the propensity score for each observation is measured without error such that all observations are in the correct third of the sample. Second, the coefficients from each subsample are independent of each other. Therefore, the standard error of the weighted average of coefficients can be computed using the formula for the variance of a weighted sum of independent random variables.

Only the major results presented in Table 8(a) will be discussed.⁴⁹ It is interesting that BEGLOAN (start-up loan) declines in significance in the estimated model as the probability of obtaining trade finance increases. These results also suggest that trade debt is used as a measure of creditworthiness. Non-financial firms sort the profit-maximizing firms from the non-profit-maximizing firms; this information helps banks decide among investment opportunities. Hence, the results accounting for unobserved heterogeneity are consistent with the probit results presented above.

Simultaneity

A second, more serious problem in estimation is associated with the model itself. My data consist of observations of trade and bank loans that represent credit market equilibria. Unobserved is the underlying structure that renders a relationship between the two. Thus, the data support both my model and one that postulates that the direction of causation runs from bank finance to trade finance. Possessing a trade loan may, in fact, be endogenous, so maximum likelihood estimation would render inconsistent parameter estimates. Correction is made for the presence of an endogenous variable among the explanatory variables in Equation 1 in Cook (1997) using a method of moments estimator. This approach renders consistent, though not efficient, estimates of TRADE. Although other estimated parameters of the model are comparable to those described above, the role of trade credit appears to be ambiguous. A refinement of instruments for TRADE should help in deciding between these mixed results.

The probits taken by themselves cannot establish causality between trade and bank credit. However, revisiting Table 4 may be suggestive in distinguishing between cause and effect in this instance. The average firm with trade credit reported income in 1994

⁴⁸ The comparison is of firms with similar but not necessarily identical propensity scores; thus, not all of the bias will be removed. Rosenbaum and Rubin (1984) show that this method is likely to remove approximately 90% of the bias due to heterogeneity.

⁴⁹ In preliminary estimation, there is no meaningful difference between the logit regression in the full sample and the split sample regressions. Thus, the model appears to be robust to sample fluctuations.

of R232 million, whereas the average firm with bank credit generated more than three times that, R849 million. Admittedly, income is a less-than-perfect indicator of size in Russia, namely for reasons of disclosure, as aforementioned. However, this finding is consistent with trade credit preceding bank credit. Creditworthiness is generally difficult to assess among the smallest firms in most economies. Thus, smaller firms may have greater access to trade credit and may use it as a credit rating to gain access to bank credit. Although this is not direct evidence of the direction of causality running from trade credit to bank credit, it is suggestive.

Clearly, further empirical work is required. In addition to correcting econometrically for endogeneity, it would also be useful to obtain better data, particularly more data from banks on the bank loan decision. The bank survey did not contain a question addressing whether or how the presence of trade finance enters the decision to extend a commercial loan. Such direct questions about trade finance will be included in the next wave of the survey.

CONCLUSION AND FUTURE RESEARCH

The shock to the Russian economy since transformation began in 1991 has had wide-ranging implications for credit relationships. Specifically, there has been a radical change in the way credit is allocated, and the new allocation is not simply driven by price nor is it determined by central planning. With the *ex nihilo* emergence of firms and financial intermediaries, information about firms' creditworthiness could plausibly be considered to be poor. Trade debt serves a tripartite role in overcoming capital market imperfections stemming from hidden information. First, between firms it mitigates hidden information problems, because suppliers have privileged information on the business conditions of their partners. Second, for the sake of demonstrating to banks creditworthiness, firms may seek trade debt. Banks, then, are able to lend on the basis of this signal.

My theoretical model predicts that the trade-credit signal becomes meaningful to credit markets without subsidies. Good firms can be distinguished from bad firms in the absence of subsidies. Both subsidy elimination and information gathering and lending by non-financial firms aid banks in achieving an optimal allocation of credit. Second, critics of the organization of the Russian economy with its vast system of inter-enterprise relationships argued early in the transition that these relationships should be eliminated, or at least reduced, as much as possible. In fact, the evidence now points in the opposite direction: firms have sought trade credit as a means of financing projects of varying duration. With imperfect capital markets, trade debt may diminish the adverse effect of asymmetries in information.

Several extensions of this research are possible. A natural extension would be to link the real and financial sectors, as introduced in Section 5. In Cook (1997), empirical testing showed whether possessing trade finance increases a firm's likelihood of undertaking physical investment. Second, it would be instructive to extend the data sets to obtain information on trade finance for both firms and banks. No questions on the bank survey directly addressed trade debt's relevance to the lending decision.⁵⁰ With such data testing could show directly whether banks outsource credit-quality assessment to

⁵⁰ I gave respondents to the bank survey a list of criteria used in lending to small firms and asked respondents to rank them. The presence of trade finance was not among the options.

non-financial firms. It would also be desirable to obtain a time series to test the extent to which a change in macroeconomic conditions influences the bank-finance-trade-finance relationship that have been presented here. With increasing financial depth I would expect to see greater resources available for financial intermediation, including for lending. With falling real interest rates and lower returns on government securities, I would expect a shift in the bank portfolio away from lending to the government budget to lending to enterprises, among other investment opportunities. Banks, under either scenario, would have an incentive to collect data on firms themselves to determine credit-worthiness rather than rely on credit information now provided by the presence of trade finance. Last, this investigation can be extended beyond Russia's borders. Many economies in the world are undergoing privatization, and many are liberalizing their financial sectors. As in Russia, such programs can increase both borrower-side and lender-side information asymmetries, particularly where there may have previously been significant government intervention in the credit-allocation process. Non-financial firms, then, may aid financial intermediaries in performing their traditional functions in more- and less-developed market economies.

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