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For Peer Review

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Trade Credit and Bank Relationships:
Evidence from Pre-World War I Belgium

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University of Antwerp

Abstract

We investigate the determinants of trade credit granted by suppliers in a historical environment which was characterized by high information asymmetries and strong banks, focusing on the role of bank-firm relationships. Our results, which are based on a unique sample of 535 firm-year observations for 125 listed Belgian firms in four dominant industries in the period 1905-1909, are generally consistent with the financing role of trade credit. They suggest that trade credit was a tool for channeling funds from firms with close bank ties to other firms, which is consistent with findings for contemporary developing countries.

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I. Introduction

For many firms, trade receivables are an important part of their assets. This raises the question why firms extend credit to their customers. It has been argued that trade credit is used to reduce the transaction costs of paying bills (Schwartz, 1974; Ferris, 1981), to smooth demand and price discriminate (Emery, 1987; Brennan et al., 1988), or to allow customers to assess product quality before paying (e.g. Smith, 1987; Lee and Stowe, 1993; Bastos and Pindado, 2007). Finance based trade credit models argue that suppliers have significant cost advantages over financial institutions in providing credit to their customers (e.g. Schwartz, 1974, Emery, 1984; Biais and Gollier, 1997). Furthermore, suppliers desiring to maintain a long-term relationship with customers may grant more concessions to a customer who is in need for extra liquidity than would be granted lenders in a competitive credit market (Wilner, 2000; Cuñat, 2007). In countries where formal financial institutions are underdeveloped, trade credit may be an important *informal* financial institution (McMillan and Woodruff, 1999; Demirgüç-Kunt and Maksimovic, 2001; Fisman and Love, 2003; Cull et al., 2007): firms with better access to credit channel short-term funds from financial institutions via trade credit to financially weaker firms.

In this paper, we go back to the start of the 20th century to test the hypothesis that bank-affiliated firms with better access to credit redistributed funds via trade credit to financially weaker customers. Belgium before World War I provides a particularly interesting environment to test this hypothesis. Investors were poorly protected and faced severe information problems (Théate, 1905), while the banking sector was strongly developed (e.g. Rajan and Zingales, 2003). A limited

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2
3 number of universal banks offered a wide range of services to firms (e.g.
4 Durviaux, 1947; Kurgan-Van Hentenryk, 1991), and many Belgian firms had
5 close ties with these banks (Van Overfelt et al., 2009). We investigate the
6 determinants of trade credit granted by suppliers to their customers. Our findings,
7 based a sample of 535 firm-year observations for 125 listed firms in the coal-
8 mining, tramways, railways and textile industries in the period 1905-1909,
9 generally confirm the financing role of trade credit. We find that firms in which a
10 bank had an equity stake redistributed capital via trade credit to other firms.
11 However, firms with a banker on their board but without a bank equity stake did
12 not provide more credit to their customers. Older firms and firms with higher cash
13 flows also provided more trade credit. Consistent with findings for contemporary
14 developing countries, our results suggest that a century ago, trade credit was a tool
15 for channelling funds from firms with close bank ties to other firms. As such, our
16 study provides a unique contribution to the literature.

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The remainder of the paper is structured as follows. Section 2 discusses the financing role of trade credit, while section 3 focuses on trade credit and bank relationships in pre-World War I Belgium. The sample and the construction of the variables is discussed in section 4. Regression results are presented in section 5. Section 6 concludes.

II. The financing role of trade credit

Finance based trade credit models argue that suppliers have significant cost advantages over financial institutions in providing credit to their customers. Petersen and Rajan (1997) point out that there are at least three sources of such cost advantages. First, the trading relationship gives suppliers an informational

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3 advantage over outside financial institutions. Size and timing of the buyer's orders
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5 and his ability to take advantage of early payment discounts help the supplier in
6
7 assessing the condition of the buyer's business and his creditworthiness. Second,
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9 the supplier has more control over the actions of the buyer if they have a repeated
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11 relationship. The supplier holds the threat of stopping the supply of inputs to the
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13 buyer if he has few alternative sources. The threat by a financial institution to
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15 withdraw future finance on the other hand may have little immediate impact on
16
17 the borrower. Third, if the buyer defaults, the supplier may be able to seize the
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19 goods he supplied. Furthermore, suppliers desiring to maintain a long-term
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21 relationship with customers may grant more concessions to a customer who is in
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23 need for extra liquidity than would be granted lenders in a competitive credit
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25 market. Suppliers know that they may have to help customers in financial distress,
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27 so they will charge them a higher trade credit interest rate as compensation for
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29 providing insurance against liquidity shocks (Wilner, 2000; Cuñat, 2007). Trade
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31 creditors may also alleviate the problems of bank information monopolies: when
32
33 the bank raises the interest rate to extract a rent, the borrowing firm can substitute
34
35 bank debt by trade debt (Tsuruta, 2008). Burkart and Ellingsen (2004) and Antov
36
37 and Atanasova (2007) argue that when suppliers have significant cost advantages
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39 over financial institutions in providing credit to their customers, trade credit may
40
41 not only be a substitute for institutional financing, but may actually *increase* the
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43 availability of institutional financing: trade credit use mitigates moral hazard
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45 problems and may be perceived as a favorable signal that is informative of the
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47 creditworthiness of the borrower.
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58 Recently, a new literature has emerged which argues that in countries where
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60 formal financial institutions are underdeveloped, trade credit is an important

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3 informal financial institution. McMillan and Woodruff (1999) find that
4
5 Vietnamese firms are more likely to extend trade credit if it trusts its customer
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7 enough to offer credit. They extend more credit to customers who find it hard to
8
9 locate an alternative supplier and customers belonging to network of similar firms.
10
11 Fisman and Love (2003) show that industries with higher dependence on trade
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13 credit financing have higher growth rates in countries with weaker financial
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15 institutions. In such countries, firms with better access to credit may redistribute
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17 capital via trade credit to financially weaker customers (e.g. Marotta, 1997;
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19 Demirgüç-Kunt and Maksimovic, 2001; Nilsen, 2002). These firms will act as
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21 “agents” for the financial institutions, channelling short-term funds from the
22
23 financial institutions to their best use. Consistent with this view, Love et al. (2007)
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25 find that after the emerging markets financial crises of the 1990s, firms with more
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27 vulnerable financial positions were more likely to reduce their supply of credit to
28
29 customers. Cull et al. (2007) find that state-owned Chinese firms, which have
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31 privileged access to loans, redistribute credit to private firms with less privileged
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33 access. Profitable private firms in China lend part of their formal credit via trade
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35 credit to their customers.
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45 **III. Bank relationships and trade credit in pre-World War I Belgium**

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48 As in many developing countries today, investors in pre-World War I Belgium
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50 were poorly protected and faced severe information problems. Théate (1905), a
51
52 contemporary Belgian law scholar, argued that investor protection was much
53
54 worse in Belgium than in other European countries such as Britain, France and
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56 Germany. In an environment characterized by high information asymmetries and
57
58 agency costs, it can be expected that trade credit is an important financing tool
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3 (e.g. McMillan and Woodruff, 1999; Fisman and Love, 2003). Miwa & Ramseyer
4
5 (2006) find that manufacturing firms in Japan at the turn of the last century indeed
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7 raised much of the money they needed through trade credit.
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11 While investor protection was weak, banks played an important role in pre-World
12
13 War I Belgium. The ratio of commercial and savings deposits over GDP indicates
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15 that the banking sector in 1913 was more important in Belgium (0.68) than in
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17 Germany (0.53), the U.S. (0.33), Japan (0.13) or the U.K. (0.10) (Rajan and
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19 Zingales, 2003). In the late 19th century and the early 20th century, banks in
20
21 industrializing countries generally played a dominant role in corporate finance
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23 (e.g. Cameron, 1967; Carosso, 1970; Rajan and Zingales, 2003; Fohlin, 2006).
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25 The most prominent of these banks in Belgium were universal banks, which
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27 offered a wide range of services to firms: they took equity stakes, provided loans,
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29 assisted firms in the issuance of securities and were often involved in the
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31 management of affiliated firms (e.g. Durviaux, 1947; Kurgan-Van Hentenryk,
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33 1991).
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41 These banks had close ties with many Belgian firms, either as a shareholder or
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43 through interlocking directorships (Van Overfelt et al., 2009). Firms with close
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45 bank ties are likely to face less credit constraints than firms without bank ties.
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47 Enhanced monitoring by the universal bank through close and continued
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49 interactions with the firm increases available credit for the firm. Delegated
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51 monitoring by a financial intermediary has lower monitoring costs than
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53 monitoring by a group of individual borrowers, and it avoids the free rider
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55 problem (Diamond, 1984). The Belgian universal banks indeed played an active
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57 role in the companies they controlled (Kurgan-Van Hentenryk, 1997).
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3 Furthermore, bank equity stakes and board positions may have provided signals of
4 credit worthiness to capital markets (see e.g. Carosso, 1970; De Long, 1991;
5 Ramirez, 1995; Franks, Mayer and Wagner, 2006). A bank with access to more
6 timely information and with incentives to produce more durable information can
7 better certify offer prices in securities issues. The findings of Deloof et al. (2007)
8 that in the period considered in this study, Belgian firms with a banker on their
9 board paid higher and more stable dividends than firms without bank relationships
10 is consistent with the “certification” role of bank directors.
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23 A number of studies find that relationships with financial institutions indeed
24 reduce credit constraints (see Ongena and Smith, 2000, for a review). Some of
25 these studies focus on the early 20th century. Ramirez (1995) finds that firms
26 affiliated with J. P. Morgan were less liquidity constrained, while the results of
27 Becht and Ramirez (2003) suggest that coal-mining firms affiliated with a
28 universal bank in Germany also faced less credit constraints. DeLong (2001)
29 shows that the presence of directors affiliated with J.P. Morgan was associated
30 with higher firm value. Van Overfelt et al. (2009) find similar results for firms
31 affiliated with universal banks in pre-World War I Belgium.
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46 In our empirical analysis we will assume a bank relationship (i) if a bank has a
47 direct equity stake in the firm, and/or (ii) if the firm has a bank director on its
48 board. Firms with a bank equity stake are likely to have a close relationship with
49 the bank. A relationship at the board level represents a continuous interaction and
50 information exchange between the firm and the bank and may facilitate access to
51 bank credit, even in the absence of a bank equity stake. We expect that firms with
52 bank relationships extended more credit to their customers.
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3 We will also consider the financing role of trade credit by using firm size and firm
4 age as proxies for access to external financing (e.g. Petersen and Rajan, 1997).
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6 Larger and older firms may grant more trade credit to customers because well-
7
8 established firms have better access to external financing. It can also be expected
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10 that firms with more internal cash are able to extend more credit to their
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12 customers (e.g. Petersen and Rajan, 1996). We therefore expect a positive
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14 relationship between cash flow and trade credit granted.
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21 Product quality explanations of trade credit on the other hand predict that larger
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23 and older firms will extend *less* trade credit to their customers than smaller and
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25 younger firms, because they have more established reputations: firms with
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27 established reputations need not use additional quality signals (e.g. Long et al.,
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29 1993; Lee and Stowe, 1993).
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34 **IV. Sample and Variables**

35 *Sample*

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38 Our sample consists of Belgian firms listed on the Brussels Stock Exchange in the
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40 period 1905-1909. We focus on four major industries: coal-mining, tramways,
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42 railways and textiles. At the time, these were the four largest Belgian industries in
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44 terms of (i) the number of firms in the industry and (ii) the number of firms
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46 affiliated with a universal bank. We hand-collected financial statement data from
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48 the appendices to the Official Gazette (“Annexes au Moniteur Belge: Recueil
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50 Spécial des Actes des Sociétés”). This is the most reliable source of Belgian
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52 financial statement data for that period. All firms constituted under Belgian
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3 corporate law were legally required to publish their balance sheets and income
4 statements in the Official Gazette (Théate, 1905).
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9 Since the discretionary power of management to design the financial statement
10 was high, there is substantial heterogeneity in the structure of the financial
11 statements. Therefore we had to reformat the financial statements in a uniform
12 structure. Fortunately, the law provided some guidelines about the depreciation of
13 assets and the distribution of profits (Resteau, 1913a and 1913b) and we were able
14 to check practitioners' guides to get a better understanding of the accounting
15 principles at the turn of the century (François, 1902 and 1907).
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27 After removing some observations with missing or outlying values for the
28 variables considered in the empirical analysis, our sample consists of 535 firm-
29 year observations for 125 different firms.
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33 34 *Variables*

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37 Our measure of trade credit is accounts receivable scaled by total assets¹. As for
38 bank relationships, we consider relationships with six different banks: (i) the
39 Société Générale; (ii) the Crédit Général Liégeois; (iii) the Banque d'Outremer;
40 (iv) the Banque Liégeoise; (v) the Banque de Bruxelles and (vi) the Banque
41 Internationale de Bruxelles. These were the most important listed universal banks
42 both in terms of total assets and the value of the industrial portfolio (Durviaux,
43 1947; see also Van Overfelt et al., 2009). The data on the bank equity stakes were
44 collected from the "Recueil Financier", which listed the industrial portfolio of the
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59 ¹ Accounts receivable are scaled by total assets instead of sales because the financial statements
60 generally did not show sales. We do not consider accounts payable because financial statements in
pre-World War I Belgium did not distinguish between trade liabilities and bank debt.

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3 banks considered in this study. We are able to identify only 17 firms in which a
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5 bank had an equity stake².
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9 For the bank directors, we collected data on the board of directors from the
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11 “Recueil Financier”, a financial annual containing a variety of firm-specific
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13 information, including directorships³. Bank directors are based on the boards of
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15 1905. For some companies that went public after 1905, we also used the 1905
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17 board if it was available in the Recueil Financier. If it was not available, we used
18
19 the board from the year the listing started. Bank relationships were very stable
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21 anyway. Van Overfelt et al. (2009) find for a very similar sample that most firms
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23 with a bank director in 1905 already had a bank director in 1895, and most firms
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25 without a bank director in 1905 did not have a bank director in 1895. As in
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27 Germany, the boards of Belgian firms had a dual structure, consisting of an
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29 executive board (“administrateurs”) and a supervisory board (“commissaires”).
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31 While executive directors held a significant number of directorships in other
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33 firms, their supervisory peers rarely held directorships in other firms. We
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35 therefore assume that an executive director of the bank who is on the executive
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37 board of the firm is a bank director⁴.
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48 ² The limited number of bank equity stakes is remarkable, as studies on the history of Belgian
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50 universal banks tend to stress the role of these banks as equity investors (see for example Kurgan-
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52 Van Hentenryk, 1991). However, this finding is consistent with the conclusion of Fohlin (2006)
53
54 that German banks in the late 19th century owned few equity stakes in non-financial companies.
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56
57 ³ To check the accuracy of the “Recueil Financier”, we compared the information in the “Receuil
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59 Financier” with the entries in the appendices of the Official Gazette for a sub-sample of firms but
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we found no differences.

⁴ We cannot rule out the possibility that some of these directors were in fact industrialists sitting on
the board of a bank, and not bankers on the board of industrial firms. However, anecdotal evidence
suggests that these directors generally were representing the interests of the bank. For example,
Edouard Despret, who died in October 1906, held board positions in 19 different firms at the time
of his death. He was the vice-president of the Société Générale, which was by far the largest bank
in Belgium. In November 1906, he was succeeded on the board of the Société Générale by Jean
Jadot. Before becoming a director of the Société Générale, Jean Jadot held no board positions at

Table 1 about here

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Table 1 shows the number of firms interlocked with each universal bank. 43 of the 125 firms in our sample were interlocked with a universal bank. Almost half of these firms were interlocked with either the *Société Générale* or the *Crédit Général Liégeois*. The table also shows the number of equity stakes held by each universal bank. Most of these stakes were held by the *Société Générale*; the other banks had very few or no equity stakes. All the firms in which a bank had an equity stake were also interlocked with that bank.

As for the other explanatory variables, $\ln(size)$ is the natural logarithm of total assets; and $\ln(age)$ is the natural logarithm of difference between the current year and the year the firm transformed to a limited liability company. *Cash flow* is operating profit plus depreciation over the fiscal year, scaled by the book value of total assets.

The financial statements of the firms considered in this study distinguish between two forms of debt: “obligations” or bonds, and “créditeurs”, which is all other debt. “Créditeurs” could be bank debt but also trade liabilities. We include both *Bonds* and *Other debt*, which are scaled by the book value of total assets, as control variables in our regressions. Firms with access to bond financing and/or other debt financing may redistribute funds via trade credit to other firms. On the other hand, it is generally observed that firms try to “match maturities”: short-

all. Three years later, he was a director of 13 different firms. In most of these firms, Edouard Despret had been a director when he died (Sources: the 1906 annual report of the *Société Générale* and the 1906 and 1910 editions of the *Receuil Financier*). All the firms in which Edouard Despret held positions before his death still had one or two *Société Générale* Directors in 1909.

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3 term needs are financed with short-term debt and long-term needs are financed
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5 with long-term sources of funds (e.g. Stohs and Mauer, 1996; Deloof and Jegers,
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7 1999). Maturity matching suggests a positive relationship between accounts
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9 receivable and other debt, and a negative relationship between accounts receivable
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11 and bonds. To capture industry-specific trade credit policies, we also consider
12
13 dummies for the coal-mining, tramways, and textiles industries.
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20 Table 2 about here
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24 Table 3 about here
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28 Table 2 presents descriptive statistics. Investments in accounts receivable were
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30 substantial: on average 20.1% of total assets (median is 14.0%). However, Table 3
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32 shows that there were large differences across industries. While accounts
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34 receivable were on average more than 20% of total assets for coal-mining and
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36 textile firms, they constituted less than 10% of total assets for tramways and
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38 railways firms. Our sample reflects the importance of the coal-mining industry at
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40 the turn of the 20th century: a majority of the firm-year observations (341) in our
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42 sample are observations for the coal-mining industry.
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50 Table 4 about here
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54 **V. Regression results**

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57 Table 4 reports regression results. All regressions are estimated assuming random
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59 effects. We use clustered standard errors to assess the significance of the estimated
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3 coefficients. Standard errors clustered by firm account for the fact that standard
4 errors of regression coefficients are downward biased if residuals are correlated
5 across time for a given firm. When both fixed firm and time effects are present in
6 the data, the time effect can be addressed by including time dummies and then
7 estimating standard errors clustered on the other dimension (Petersen, 2009).
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16 In regression (1) we include a bank equity stake dummy as a measure of bank
17 relationships. The coefficient of this variable, which is statistically significant at
18 the 10% level, implies that the ratio of accounts receivable to total assets is 8.8%
19 higher for firms with a bank equity stake than for firms without a bank equity
20 stake. This result is consistent with the hypothesis that bank affiliated firms with
21 better access to credit redistributed capital via trade credit to other firms.
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32 Finance based models of trade credit predict that larger and older firms with better
33 access to credit will extend more credit than smaller and younger firms. Product
34 quality models on the other hand assume that larger and older firms extend less
35 credit, because firms with established reputations need not use trade credit as a
36 quality signal. In regression (1), the $\ln(\text{size})$ coefficient is insignificant, while the
37 $\ln(\text{age})$ coefficient is positive and significant at the 10% level, which is consistent
38 with the financing hypothesis, but inconsistent with the product quality
39 hypothesis. We also find that cash flow is positively and significantly (at the 1%
40 level) related to accounts receivable, confirming that firms with more internal
41 cash were able to grant more credit to their customers.
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56 Consistent with the maturity matching hypothesis, we find that accounts
57 receivable are positively and significantly (at the 5% level) related to “other debt”.
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60 Finally, our results suggest that coal-mining firms extended more trade credit than

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3 firms in other industries: the coefficient of the coal-mining dummy is positive and
4 significant at the 5% level.
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9 In regression (2) we consider our second measure of bank relationships: a dummy
10 which equals one if a firm had a bank director on its board, and zero otherwise.
11
12 However, the coefficient of this variable is insignificant.
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16
17 Firms in trouble may extend trade credit to attempt to maintain their sales
18 (Petersen and Rajan, 1997; Marotta, 2005). We test this conjecture by separating
19 cash flow into cash flow if positive and cash flow if negative: firms with a
20 negative cash flow are more likely to be in trouble than firms with a positive cash
21 flow. In regression (3), the coefficient of former remains positive and significant
22 at the 1% level, while the coefficient of the latter is insignificant. The conjecture
23 that firms in trouble extended more trade credit is therefore not confirmed.
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35 Most of the sample firms in which a bank has an equity stake are coal-mining
36 firms. It is therefore possible that the effect of bank equity stakes we found in
37 regression (1) is in fact a proxy for a “coal-mining effect”: maybe it was not firms
38 with a bank equity stake but firms in the coal-mining industry which extended
39 more trade credit. In regression (4) we re-estimated our base model for coal-
40 mining firms only (341 firm-year observations). The bank equity coefficient is
41 again economically large (0.147), and statistically significant at the 5% level. This
42 result suggests that even *within* the coal mining industry firms with a bank equity
43 stake extended more trade credit. The findings for the other independent variables
44 are also confirmed: $\ln(\text{age})$, cash flow and other debt are all significant when we
45 consider coal-mining firms only.
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VI. Conclusions

This study investigates the factors correlated with accounts receivable in an environment characterized by high information asymmetries and poorly protected investors, focusing on the role of bank relationships. The results are generally consistent with the financing role of trade credit, but inconsistent with product quality explanations for trade credit. The results also confirm that firms with close bank ties redistributed capital via trade credit to other firms. However, only firms with a bank equity stake extended more trade credit. Firms with a banker on their board which did not have a bank equity stake did not provide more credit to their customers.

Most of the sample firms with a bank equity stake were coal-mining firms, in which the Société Générale held a stake. The Société Générale was the dominant universal bank in Belgium, not only before World War I but for most of the 19th and 20th centuries. Historical evidence confirms that the Société Générale had a close relationship with the coal mining firms in which it held a stake. For example, Kurgan-Van Hentenryk, (1997) notes that in 1881 the Société Générale established the “Inspection des charbonnages” (collieries inspectorate), in order to monitor the costs of collieries under its control. De Beelde (1992) provides evidence that the Société Générale imposed cost accounting rules on affiliated coal mining firms.

This raises the question *which customers* were granted more credit by bank affiliated firms. It cannot be ruled out that affiliated firms extended more credit only to firms controlled by the same bank. As a matter of fact, Deloof and Jegers (1996) find evidence that Belgian firms belonging to a group in the 1990s used

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3 trade credit as a tool to finance other group members. The available data for the
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5 period considered in this study do not allow us to investigate trade payables
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7 policies. However, our finding that firms with a bank director, which were likely
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9 to have easier access to credit than firms without a bank director, did not extend
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11 more trade credit could be interpreted as an indication that it was not the
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13 availability of credit *per se* which led firms with a bank equity stake to provide
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15 more trade credit.
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For Peer Review

References

Antov, D.S. and Atanasova, C.V. (2007) Trade credit financing: how expensive is it really?, Working Paper, University of York.

Bastos, R. and Pindado, J. (2007) An agency model to explain trade credit policy and empirical evidence, *Applied Economics*, **39**, 2631–2642.

Becht, M. and Ramirez, C.D. (2003) Does bank affiliation mitigate liquidity constraints? Evidence from Germany universal banks in the pre-World War I period, *Southern Economic Journal*, **70**, 254-272.

Biais, B. and Gollier, C. (1997) Trade credit and credit rationing, *Review of Financial Studies*, **10**, 903-937.

Brennan, M., Maksiovic, V. and Zechner, J. (1988) Vendor financing, *Journal of Finance*, **43**, 1127-1141.

Burkart, M. and Ellingsen, T. (2004) In-kind financing: a theory of trade credit, *American Economic Review*, **94**, 569-590.

Cameron, R. E. (1967) *Banking in the Early Stages of Industrialization: A Study in Comparative Economic History*, Oxford University Press, Oxford.

Carosso V.P. (1970) *Investment Banking in America: A History*, Harvard University Press, Cambridge.

Cull, R., Xu, L.C. and Zhu, T. (2007) Formal finance and trade credit during Chinas transition, Working Paper, World Bank.

1
2
3 Cuñat, V., Trade credit: suppliers as debt collectors and insurance providers,
4
5
6 *Review of Financial Studies*, **20**, 2007, 491-527.

7
8
9 De Beelde, I. (1992) Accounting information and its use in a number of Belgian
10
11 coalmines during the first half of the twentieth century, Working Paper, Ghent
12
13 University.

14
15
16
17 De Long, B. J. (1991) Did J. P. Morgans Men Add Value? An Economists
18
19 Perspective on Financial Capitalism., in *Inside Business Enterprise: Historical*
20
21 *Perspectives on the Use of Information* (Ed.) P. Temin, University of Chicago
22
23 Press, Chicago.

24
25
26
27 Deloof, M. and Jegers, M. (1996) Trade credit, product quality, and intragroup
28
29 trade: some European evidence, *Financial Management*, **25**, 33-43.

30
31
32
33 Deloof, M. and Jegers, M. (1999) Trade Credit, Corporate Groups, and the
34
35 Financing of Belgian Firms, *Journal of Business Finance and Accounting*, **26**,
36
37 945-966.

38
39
40
41 Deloof, M., Roggeman, A. and Van Overfelt, W. (2007) Who's Afraid of
42
43 Universal Banks? Universal Bank Affiliations and Corporate Dividend Policy in
44
45 Pre-World War I Belgium, Working Paper, University of Antwerp.

46
47
48
49 Demirgüç-Kunt, A. and Maksimovic, V. (2001) Firms as financial intermediaries:
50
51 evidence from trade credit data, Working Paper, World Bank.

52
53
54
55 Diamond, D.W. (1984) Financial Intermediation and Delegated Monitoring,
56
57 *Review of Economic Studies*, **51**, 393-414.

1
2
3 Durviaux, R. (1947) *La Banque Mixte: Origine et Soutien de l'Expansion*
4
5
6 *Economique de la Belgique*, Etablissements Emile Bruylant, Brussels.

7
8
9 Emery, G.W. (1984) A pure financial explanation for trade credit, *Journal of*
10
11 *Financial and Quantitative Analysis*, **19**, 271-285

12
13
14
15 Emery G.W. (1987) An optimal financial response to variable demand, *Journal of*
16
17 *Financial and Quantitative Analysis*, **22**, 209-225.

18
19
20 Ferris, J.S. (1981) A transactions theory of trade credit use, *Quarterly Journal of*
21
22 *Economics*, **94**, 243-270.

23
24
25
26 Fisman, R. and Love, I. (2003) Trade credit, financial intermediary development,
27
28 and industry growth, *Journal of Finance*, **58**, 353-374.

29
30
31
32 Fohlin, C. (2006) *Finance Capitalism and Germanys Rise to Industrial Power:*
33
34 *Corporate Finance, Governance, and Performance from the 1840s to the Present*,
35
36 Cambridge University Press, Cambridge.

37
38
39 François, A. (1901) *Principes de Comptabilité des Sociétés par Actions à l'Usage*
40
41 *des Administrateurs, Commissaires, Directeurs et Actionnaires de Sociétés*,
42
43
44 Vandeweghe, Ghent.

45
46
47 François, A. (1907) *Inventaires et Bilans dans les Sociétés par Actions*,
48
49
50 Vandeweghe, Ghent.

51
52
53 Franks, J., C. Mayer and H.F. Wagner (2006), The Origins of the German
54
55 Corporation – Finance, Ownership and Control, *Review of Finance*, **10**, 537-585.
56
57
58
59
60

1
2
3 Kurgan-Van Hentenryk, G. (1991) Finance and Financiers in Belgium, 1880-1914
4 in *Finance and Financiers in European History, 1880-1960* (Ed.) Y. Cassis,
5
6 Cambridge University Press, Cambridge.
7
8

9
10
11 Kurgan-Van Hentenryk, G., The Société Générale, 1850-1934 (1997), in *The*
12
13 *Generale Bank* (Ed.) H. Van der Wee, Lannoo, Tielt.
14
15

16
17 Lee, Y.W. and Stowe, J.D. (1993) Product risk, asymmetric information, and
18
19 trade credit, *Journal of Financial and Quantitative Analysis*, **28**, 285-300.
20
21

22
23 Long, M.S., Malitz, I.B. and Ravid, S.A. (1993) Trade credit, quality guarantees,
24
25 and product marketability, *Financial Management*, **22**, 117-127.
26
27

28
29 Love, I., Preve, L.A. and Sarria-Allende, V. (2007) Trade credit and bank credit:
30
31 evidence from recent financial crises, *Journal of Financial Economics*, **83**, 453-
32
33 469.
34
35

36
37 McMillan, J. and Woodruff, C. (1999) Interfirm Relationships and Informal
38
39 Credit in Vietnam, *Quarterly Journal of Economics*, **114**, 1285-1320.
40
41

42
43 Miwa, Y. and Ramseyer, J.M. (2006) Japanese industrial finance at the close of
44
45 the 19th century: trade credit and financial intermediation, *Explorations in*
46
47 *Economic History*, **43**, 94-118.
48
49

50
51 Marotta, G. (1997) Does trade credit redistribution thwart monetary policy?
52
53 Evidence from Italy, *Applied Economics*, **29**, 1619-1629.
54
55

56
57 Marotta, G. (2005) When do trade credit discounts matter? Evidence from Italian
58
59 firm-level data, *Applied Economics*, **37**, 403-416.
60

1
2
3 Musacchio, A. (2006) Can Civil Law Countries Get Good Institutions? Creditor
4 Rights and Bond Markets in Brazil (and the World), 1850-2003, Working Paper,
5 Harvard Business School.
6
7
8

9
10
11 Nilsen, J.H. (2002) Trade credit and the bank lending channel, *Journal of Money,*
12 *Credit and Banking*, **34**, 226-253.
13
14
15

16
17 Ongena, S. and Smith, D.C. (2000) Bank relationships: a review, in *Performance*
18 *of Financial Institutions* (Eds.) S.A. Zenios, S. A. P. Harker, P., Cambridge
19 University Press, Cambridge.
20
21
22

23
24
25 Petersen, M.A. (2009) Estimating Standard Errors in Finance Panel Data Sets:
26 Comparing Approaches, *Review of Financial Studies*, **22**, 435-480.
27
28
29

30
31 Petersen, M.A. and Rajan, R.G. (1997) Trade credit: theories and evidence,
32 *Review of Financial Studies*, **10**, 661-691.
33
34
35

36
37 Rajan, R.G. and Zingales, L. (2003) The Great Reversals: The Politics of
38 Financial Development in the 20th Century, *Journal of Financial Economics*, **69**,
39 2003, 5-50.
40
41
42

43
44 Ramirez, C. D. (1995) Did J. P. Morgans men add liquidity? Corporate
45 investment, cash flow and financial structure at the turn of the Twentieth Century,
46 *Journal of Finance*, **50**, 661-678.
47
48
49

50
51
52 Resteau, C. (1913a) *Commentaire Législatif de la Loi du 25 mai 1913 Portant*
53 *Modifications aux Lois sur les Sociétés Anonymes*, Imprimerie Veuve Ferdinand
54 Larcier, Brussels.
55
56
57
58
59
60

1
2
3 Resteau, C (1913b) *Les Sociétés Anonymes devant les Lois Belges*, Imprimerie
4
5
6 Veuve Ferdinand Larcier, Brussels.

7
8
9 Schwartz, R.A. (1974) An economic model of trade credit, *Journal of Financial*
10
11 *and Quantitative Analysis*, **9**, 643-657.

12
13
14
15 Smith, J. (1987) Trade credit and informational asymmetry, *Journal of Finance*,
16
17 **42**, 863-869.

18
19
20
21 Stohs, M. H. and Mauer, D.C. (1996) The determinants of corporate debt maturity
22
23 structure, *Journal of Business*, **69**, 279-312.

24
25
26 Théate, T. (1905) *Les Sociétés Anonymes: Abus et Remèdes*, Mish & Thron, Paris.

27
28
29
30 Tsuruta, D. (2008) Bank information monopoly and trade credit: do only banks
31
32 have information about small business, *Applied Economics*, **40**, 981-996.

33
34
35
36 Van Overfelt, W., J. Annaert, M. De Ceuster and M. Deloof (2009) Do Universal
37
38 Banks Create Value? Universal Bank Affiliation and Company Performance in
39
40 Belgium, 1905-1909, *Explorations in Economic History*, forthcoming.

41
42
43 Wilner, B.S. (2000) The exploitation of relationships in financial distress: the case
44
45 of trade credit, *Journal of Finance*, **55**, 153-178.

Table 1. Company Interlocks and Equity Stakes for each Universal Bank

This table reports the firm interlocks and equity stakes for each universal bank. The sample consists of 535 firm-year observations in the coal-mining, trams railways and textiles industries. A firm is interlocked with a universal bank if an executive director of the bank is also a member of the executive board of the company. All the firms in which a bank had an equity stake were also interlocked with that bank.

Universal Bank	Number of interlocked firms	Number of equity stakes	Average percentage of shares held
Société Générale	17	12	20%
Crédit Général Liégeois	18	3	26%
Banque d'Outremer	10		
Banque de Bruxelles	5	1	4%
Banque Liégeoise	4	1	4%
Banque Internationale de Bruxelles	3		

Table 2. Descriptive Statistics

This table reports descriptive statistics for a sample of 535 firm-year observations for 125 listed Belgian firms in the coal-mining, trams, railways and textile industries in the period 1905-1909. Accounts Receivable, Cash Flow, Bonds and Other Debt are scaled by the book value of total assets. Cash Flow is operating profit plus depreciation over the fiscal year. Size is total assets at the beginning of the fiscal year (expressed in Belgian Francs). Age is the difference between the current year and the year the firm transformed to a limited liability company.

	Mean	Median	Standard Deviation	Minimum	Maximum
Accounts Receivable	0.201	0.140	0.196	0.000	0.926
Cash Flow	0.140	0.113	0.121	-0.255	0.871
Size	9,077,236	4,544,958	15,932,929	291,502	135,587,143
Age	28.250	23.000	19.328	1.000	81.000
Bonds	0.127	0.000	0.187	0.000	0.843
Other Debt	0.147	0.099	0.139	0.000	0.747

Table 3 Average accounts receivable / total assets for each industry

This table reports the average accounts receivable over total assets ratio for a sample of 535 firm-year observations for 125 listed Belgian firms in the coal-mining, trams, railways and textile industries in the period 1905-1909. The number of observations for each industry-year are given in parentheses.

	Coal-mining	Tramways	Railways	Textile
1905	0.233 (66 obs.)	0.097 (13 obs.)	0.081 (6 obs.)	0.233 (12 obs.)
1906	0.256 (69 obs.)	0.066 (16 obs.)	0.082 (6 obs.)	0.249 (12 obs.)
1907	0.248 (70 obs.)	0.081 (17 obs.)	0.097 (5 obs.)	0.203 (20 obs.)
1908	0.230 (69 obs.)	0.068 (17 obs.)	0.095 (5 obs.)	0.202 (20 obs.)
1909	0.226 (67 obs.)	0.061 (18 obs.)	0.092 (5 obs.)	0.196 (22 obs.)
1905-1909	0.239	0.074	0.089	0.210

Table 4. Regression Results

Random effects regressions are based on a sample of 535 firm-year observations for 125 listed Belgian firms in the coal-mining, trams, railways and textile industries in the period 1905-1909. Accounts Receivable (the dependent variable), Cash Flow, Bonds and Other Debt are scaled by the book value of total assets. Cash Flow is operating profit plus depreciation over the fiscal year. Ln(size) is the natural logarithm of total assets. Ln(age) is the natural logarithm of difference between the current year and the year the firm transformed to a limited liability company. All regressions include year dummies. P-values (robust for heteroscedasticity) are in parentheses below each coefficient. P-values for random effects estimations are based on clustered standard errors. ***: denotes significance at the 1% level; **: denotes significance at the 5% level; *: denotes significance at the 10% level.

	(1)	(2)	(3)	(4)
Sample:	All Companies	All Companies	All Companies	Coal-Mining Companies
Bank Equity Stake	0.088* (0.076)	-	0.088* (0.077)	0.147** (0.019)
Bank Director	-	0.042 (0.240)	-	-
Ln (Size)	-0.003 (0.866)	0.001 (0.949)	-0.003 (0.877)	-0.021 (0.431)
Ln (Age)	0.021* (0.059)	0.019 (0.118)	0.021* (0.059)	0.026* (0.056)
Cash Flow	0.341*** (0.000)	0.336*** (0.000)	-	0.393*** (0.000)
Positive Cash Flow	-	-	0.344*** (0.000)	-
Negative Cash Flow	-	-	0.241 (0.293)	-
Bonds	0.052 (0.610)	0.048 (0.642)	0.046 (0.687)	0.133 (0.230)
Other Debt	0.164** (0.011)	0.162** (0.013)	0.162** (0.014)	0.233** (0.020)
Coal-Mining	0.152** (0.036)	0.154** (0.034)	0.150** (0.045)	-
Tramways	0.032 (0.645)	0.016 (0.811)	0.032 (0.648)	-
Textiles	0.110 (0.111)	0.109 (0.107)	0.109 (0.119)	-
Overall R ²	0.314	0.230	0.316	0.328
No. of observations	535	535	535	341