Trade credit and the monetary transmission mechanism

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Abstract

This paper investigates whether firms with direct access to capital markets 'help out' firms who are reliant on credit from banks by extending more trade credit when times are hard. Taking up a theme of Meltzer (1960) it asks, whether there is a 'trade credit channel' that offsets the bank credit channel more familiar to monetary economists. Using a panel of UK firms quoted on the UK stock exchange, we find that there is. This might explain why, to date, evidence on the bank credit channel has been equivocal.

JEL classification: G32, E52, L14

Key words: trade credit, monetary transmission mechanism, credit channel

1 Introduction

This paper explores whether there is a 'trade credit channel' that offsets the 'bank credit channel' of monetary policy. In doing so it returns to a theme taken up by Alan Meltzer in 1960 when he concluded that 'When money was tightened, firms with relatively large cash balances increased the average length of time for which credit was extended. And this extension of trade credit appears to have favoured those firms against whom credit rationing is said to discriminate.' (1960: page 429) Meltzer's observation raises the possibility that we may never observe the effects of the bank credit channel by looking at aggregate data on credit, monetary policy and output alone. A tightening of monetary policy may well make conditions tighter for firms who want to borrow from banks, but firms who can access capital markets directly may step in to fill the financing gap, thereby mitigating the effect of the policy tightening on real activity.

We investigate this 'trade credit channel' by studying the dynamics of trade credit in a large panel of firms quoted on the UK stock exchange. To the best of our knowledge, such an exercise is novel. We compare flows of trade credit with measures of the business cycle and measures of the monetary stance. We find that during recessions, our quoted firms—who we take to be firms with direct access to capital markets—extend more trade credit and receive less in return, thus unambiguously 'helping' those firms without direct access to capital markets. We find that following a monetary tightening, our quoted firms extend and receive less trade credit, but the reduction in trade credit extended is more than offset by the reduction in trade credit received. So, in net terms, once again quoted firms appear to 'help out' those firms without direct access to capital markets. This evidence is at least consistent with—though we do not pretend that it is proof of—the view that the 'trade credit channel' weakens the conventional credit channel. Our findings could explain why there has, to date, been no conclusive demonstration of a credit channel effect in aggregate time series data.

2 Theory

There are a number of pieces of theory that we need to motivate the hypothesis in this paper. The first task is to explain why when there is a monetary tightening and/or a recession there is a contraction of the supply of credit to firms who borrow via financial intermediaries. The second task is to articulate a theory of why, in equilibrium, following a contraction of the supply of credit to firms who are 'buyers' of goods and services and are also reliant on bank credit, there would be an increase in the trade credit on offer from their suppliers who, it is assumed, are not reliant on bank credit, and are therefore immune to the effects of the monetary tightening.

Our first building block, the 'credit channel', has been the subject of considerable theoretical analysis during recent years. There are two sets of mechanisms that are often referred to as making up the 'credit channel'. In the *bank lending channel* an increase in the central bank interest rate increases the marginal cost to banks of making loans: if the market for loans to firms is cleared by price this will mean that a leftward shift in the supply curve of loans raises the cost of intermediated finance but, if credit is rationed (as in Stiglitz and Weiss (1981)), then the quantity of loans supplied to firms will simply shrink. This intuition has been formalised in a celebrated paper by Bernanke and Blinder (1988). The other class of 'credit channel' models has been called the *balance sheet channel*. These models explain how monetary (and other) shocks to the financial position of borrowers can affect their ability to obtain intermediated finance and thereby amplify the effect of those shocks on real activity. There are broadly two ways in which the balance sheet channel can operate. One mechanism is that an adverse shock to aggregate demand or a contractionary monetary shock may reduce current cash flows, increase the proportion of project finance which must be obtained from external (intermediary) sources, and so raise the external finance premium, which, because of the effect on expected default, depends on the degree of leverage or indebtedness. Another mechanism is that an adverse shock to aggregate demand (or, once again, a contractionary monetary shock) reduces asset prices and therefore reduces the value of collateral that firms have to offer as security to the financial intermediaries, thereby raising their external finance premium and reducing the amount of credit they can obtain. Recent examples of

theoretical accounts of the balance sheet channel include Kiyotaki and Moore (1997), Bernanke and Gertler (1995) and Bernanke, Gertler and Gilchrist (1998).

Armed with a theory of how a monetary policy or an aggregate demand shock might constrain the supply of intermediated credit, we now need a theory of why, in equilibrium, other firms, with direct access to capital markets, would find it optimal to step in and bridge the financing gap for credit-constrained firms in the event of a monetary policy or aggregate demand shock.

There are two main (complementary) theories of why firms demand and supply trade credit.[(1)] One is a transactions cost theory that posits that providing trade credit reduces the costs of paying and administering invoices between buyers and sellers undertaking regular exchanges of goods or services. Firms may simply want to cumulate obligations and pay them monthly or quarterly. Or it may be that they face strong seasonalities or uncertainties in the demand for their products, and, by extension, in the quantity of the materials they need from their suppliers. In any case, trade credit may provide a way of economising on inventories of cash. These theories are associated with Ferris (1981) and Laffer (1970).

More relevant for our purposes is the financing theory of trade credit, an early exposition of which can be found in Schwartz (1974). The theory has it that suppliers have a financing advantage over other credit providers. This advantage is threefold. First, there may be an advantage in acquiring information about the credit-worthiness of a buyer during the course of normal business, whereby the supplier becomes aware of the size and timing of buyers' orders, or the buyers' inability to take advantage of early-payment discounts. Second, there may be an advantage in enforcing repayment, especially if the supplier can credibly threaten to cut off future supply and the buyer has few other alternative sources for the good or service. Third, a supplier of goods may have an advantage in that since the supplier will presumably (providing it is not a

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[(1)] Crawford (1992a) and Petersen and Rajan (1997) provide comprehensive surveys of the literature. Meltzer (1960), Schwartz and Whitcomb (1979), Brennan, Maksimovic and Zechner (1988) have all pointed out that trade credit may also be offered as a method of price discrimination.

monopsonist selling to only one firm) have a readily available network for reselling any repossessed goods, the goods themselves are a form of collateral.

An important assumption behind the idea of the offsetting trade credit channel is that the shock that causes the external finance premium to rise for firms dependent on banks does not also raise the cost of finance for firms providing the trade credit, or at least does not raise it by as much. Provided this holds—and the case where credit rationing bites and the marginal cost of bank finance is infinite is a plausible example of where this assumption does hold—the financing advantage of providers of trade credit will become more marked and equilibrium trade credit will rise.

3 Empirics

Since the early work of Meltzer (1960) on US data there has been little or no work on the question of whether the trade credit channel offsets the conventional credit channel. Brechling and Lipsey (1963) studied trade credit for a sample of 73 UK firms and concluded that trade credit tended to rise during times of a monetary tightening. Marotta (1997) looks at trade credit flows in Italy but finds no conclusive evidence that trade credit acts to offset the credit channel. Kashyap, Stein and Wilcox (1993) *infer* (for the United States) that trade credit may be acting to weaken the credit channel but do not test for this directly.

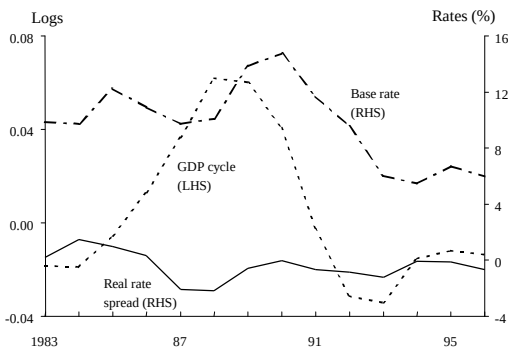
Our approach is to correlate flows of trade credit to and from the firms which have direct access to capital markets with measures of the cycle (to proxy changes in aggregate demand) and the monetary policy stance. Our measure of trade credit flows comes from a comprehensive panel of firms quoted on the UK stock exchange. Since the companies in our panel are quoted we take them to have direct access to capital markets in the sense that they can readily raise equity finance. The entire panel accounts for between 30% and 40% of total employment and between 70% and 90% of total trading profit in the UK corporate sector between the years 1983 to 1995. Once we have excluded financial companies and firms that do not report the use of trade credit at all (ie firms that neither received nor extended trade credit or, if they did, simply did not report it)

we are left with 2,000 firms, in total an average of about 6 continuous years per firm and an average of about 1,000 observations per year.[2]

We should note at the outset that flows of trade credit to and from our quoted UK companies are not simply flows relating to non-quoted firms (which is what we would like ideally) but could also reflect business with foreign companies or the government sector.

To measure the cycle we de-trend GDP using a log-linear filter.[3] In order to proxy changes in monetary conditions we use official interest rates.[4] We also take a measure of the real yield spread: the spread between 2-year spot and 10-year forward real interest rates.[5] A trough in this measure of tightness indicates that long real rates are higher than short real rates and that money is 'loose', and *vice versa*. In our econometric analysis, we will also use another measure of real, monetary conditions, an *ex post* real rate, measured as the base rate minus a proxy for inflation expectations – the contemporaneous RPIX inflation rate.

Chart 1: Measures of 'tightness'



[2] It may be that firms do not accurately report trade credit for tax reasons or in order to report more favourable impressions of their company to shareholders. However we do not expect this factor (this mis-reporting) to change systematically over the cycle and so it should not affect our results.

[3] We also checked that our results are robust to using HP filters to detrend output.

[4] In common with many previous studies, for example Bernanke and Blinder (1992), Bernanke and Gertler (1995), Gertler and Gilchrist (1994), and Oliner and Rudebusch (1995).

[5] These are real rates constructed from the UK index-linked gilts curve; for example, see Deacon and Derry (1994).

Chart 1 plots the measures of monetary tightness and the GDP cycle. We can see that the GDP cycle is not perfectly in phase with the tightness of money: there have been occasions where money was tight and GDP strong, and *vice versa*. This is entirely consistent with the model in which interest rates respond positively to changes in GDP with a lag, and GDP responds negatively to changes in interest rates with a lag of the same order, while both have some exogenous shock component.

Our methodology will be as follows: we will begin by presenting some simple correlations between our measures of tightness and the cycle and aggregate trade credit flows; we will then move on to present panel econometrics exploring these correlations in more detail.

3.1 Correlation analysis

Recall that we will have uncovered an offsetting 'trade credit channel' if we find that the net trade credit extended (trade credit extended less trade credit received) increases when times are hard for those other firms (not in our data set) who do not have direct access to capital markets. Recall also that we are going to proxy 'hard times' by either tight money or weak aggregate demand, or some mixture of the two.

Chart 2: Trade credit extended (scaled by total credit extended)

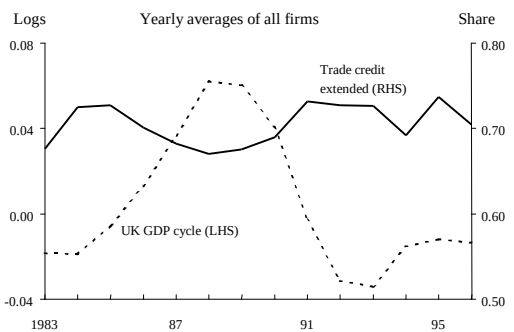
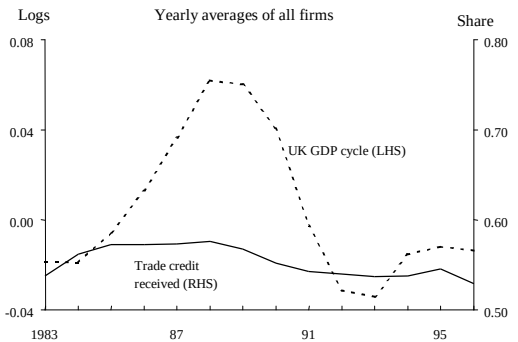


Chart 3: Trade credit received (scaled by total credit received)



Charts 2 and 3 show how trade credit extended and received have varied over time. Readers unsure about just how important trade credit flows are for the transmission mechanism of monetary policy should note that in our dataset 70% of the total short-term (ie due in less than one year) credit extended and 55% of the credit received took the form of trade credit. As we can see from Charts 2 and 3 there are no secular trends in trade credit received or extended. But there is a marked difference in the cyclicality of trade credit extended as opposed to trade credit received. It is already clear from the charts that trade credit extended increases during recessions and falls during booms. Taken together with the relatively flat profile for trade credit received, this suggests – though doesn't necessarily prove – that the net flows of trade credit act to 'help out' the unquoted firms, who we assume do not have direct access to capital markets.

Charts 4 and 5 confirm this intuition. Both show the cyclical movement in the flows of net trade credit received – whether this is scaled by total credit received or unscaled – and therefore a countercyclical profile for net trade credit extended, suggesting that the 'helper' theory may be correct.

Chart 4: Net trade credit received (unscaled)

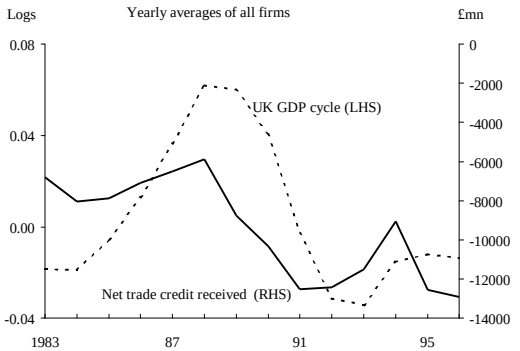
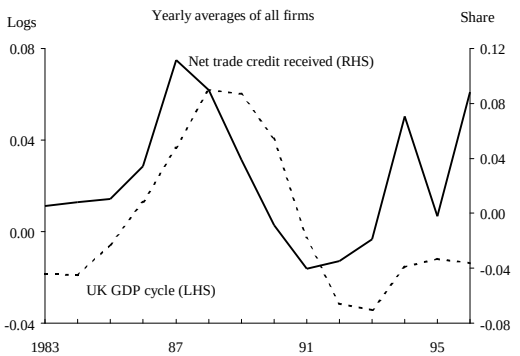


Chart 5: Net trade credit received (scaled by total credit received)



Our inspection of the charts is, in part, confirmed by looking at correlation coefficients at different leads and lags between the trade credit series and our measures of the cycle and monetary conditions. These are shown in Table A. The table shows that, as a proportion of total short-term credit extended, trade credit rises during recessions, and trade credit received (as a proportion of total short term debt) falls: which is what the helper theory would predict. The correlations with the measures of monetary conditions are less supportive of the helper theory. The correlations with the real spread (*SR*) are mostly insignificant. The correlations with the base rate are wrongly signed: when the base rate rises, trade credit as a proportion of total credit extended falls. However,

note that these correlations cannot rule in or rule out the helper theory by themselves. If, for example, flows of total credit are falling when the base rate rises it is still possible that actual flows of trade credit extended are rising.

Table A: Correlations between tightness measures and trade credit shares (total averages)

	CYC_{t-2}	CYC_{t-1}	$\boldsymbol{CYC_t}$	CYC_{t+1}	CYC_{t+2}
Trade credit extended/total debit	0.08	-0.40	**-0.80**	-0.90	-0.66
Trade credit received/total credit	0.01	0.37	**0.62**	0.78	0.75
	BR_{t-2}	BR_{t-1}	$\boldsymbol{BR_t}$	BR_{t+1}	BR_{t+2}
Trade credit extended/total debit	0.17	-0.07	**-0.49**	-0.82	-0.92
Trade credit received/total credit	0.08	0.35	**0.63**	0.80	0.86
	SR_{t-2}	SR_{t-1}	$\boldsymbol{SR_t}$	SR_{t+1}	SR_{t+2}
Trade credit extended/total debit	-0.21	0.11	**0.07**	0.07	0.21
Trade credit received/total credit	0.47	0.25	**0.02**	-0.12	-0.38

3.2 Panel econometrics

We turn now to exploring the correlations between flows of trade credit and cycle and monetary conditions with some econometrics. The equation systems we estimate are given by (**1**) and (**2**) below.

$$\begin{aligned} TC_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + d \cdot CYC_t + e_{it} \\ TD_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + d \cdot CYC_t + e_{it} \\ NETTC_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + d \cdot CYC_t + e_{it} \end{aligned} \qquad \textbf{(1)}$$

$$\begin{aligned} TC_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + g \cdot MC_t + e_{it} \\ TD_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + g \cdot MC_t + e_{it} \\ NETTC_t &= a_i + b_1 SAL_t + b_2 \cdot L_t + g \cdot MC_t + e_{it} \end{aligned} \qquad \textbf{(2)}$$

The dependent variable is the level of trade credit received (*TC*) or extended (*TD*) or net trade credit extended (*TC-TD* or *NETTC*). A key explanatory variable is sales (*SAL*) which, since trade credit (by definition) is always tied to the sale of goods, we would expect, regardless of the theory most important for motivating trade credit, would be an

important determinant.[6] We control for the effects of a variable that proxies firm liquidity, the 'quick ratio' (*L*, defined as total current assets minus stock and work in progress, all divided by total current liabilities). This variable measures the funds available for trade credit lending and is a variable commonly found in empirical studies of the determinants of trade credit. (Though, it turns out, that the liquidity ratio is often not significant in our regressions.) Finally, we include our measures of the GDP cycle (*CYC*) or one of our measures for monetary conditions (*MC*). We aim to estimate three equations, for trade credit extended and trade credit received separately, and for net trade credit. Since we have strong priors that the errors in these three equations would be correlated with one another, a seemingly unrelated regression is the most appropriate framework to use. To make this feasible we have to proxy sales (*SAL*) with total credit received (*TOTR*) and total credit extended (*TOTE*), otherwise the SUR collapses to a single-equation estimation.[7]

Table B below shows what coefficient signs we would expect if the helper theory is correct and there is indeed a trade credit channel that offsets the conventional bank credit channel.

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[6] As was found in many micro studies: see, for example, Elliehausen and Wolken (1993) and Petersen and Rajan (1994).

[7] Note that *TOTR* and *TOTE* are highly correlated with sales (0.97 and 0.99 respectively for the aggregate figures, and 0.94 in each case for the firm level data). The estimation method is also discussed in the Appendix.

Table B: Expected signs of coefficients

	TC	*TD*	*NETTC*	Explanation
b_1	+	+	?	More sales/purchases increase trade credit used; sales proxy input purchases with standard production functions
b_2	--	+	--	More liquid firms can extend more trade credit/need less trade credit
If large (quoted) firms **help out** small firms when bank loans dry up we expect:				
g	--	+	--	Quoted companies extend more *TD* and receive less *TC* from small companies when monetary conditions tighten (ie measure increases)
d	+	--	+	Quoted companies extend more *TD*/receive less *TC* when the economy goes into recession
If large (quoted) firms **squeeze** liquidity from small firms when bank loans dry up we expect:				
g	+	--	+	
d	--	+	--	

To recap, we expect sales to increase both trade credit received and extended (since sales would proxy the quantity of inputs purchased when firms have standard production functions); we expect trade credit extended to increase during times of recession or monetary tightening and, following the same logic, trade credit received to decrease.

Table C below summarises the results of a system estimation of the equations in (**1**) and (**2**) using a SUR-GLS estimator.[8] The more detailed regression results are contained in Table D. In our estimates we allow for firm-level fixed effects. Hausman's tests indicate that we should model trade credit using fixed, rather than random effects. As suggested by Baltagi (1995), the fixed-effects estimator is obtained by estimating SUR-GLS on the demeaned variables. For each system of equations, where we experiment with a different measure of the cycle or of monetary conditions, we estimate with either a contemporaneous measure of the cycle or of monetary conditions, or a one-period lag. The typically small number of consecutive observations that we have for individual firms makes a more inclusive lag structure impractical.

[8] A Breusch-Pagan test clearly rejected that our three equations were independent, implying that we will get more efficient estimates using a system estimator.

Table C: Results of the fixed-effects estimation, SUR-GLS

	CYC: d			*BR: g*			*SL: g*			*RB: g*		
	TC	*TD*	*NT*	*TC*	*TD*	*NT*	*TC*	*TD*	*NT*	*TC*	*TD*	*NT*
Contemp.	.	–	+	–	–	–	–	–	–	–	–	–
Lag	+	.	+	–	–	–	–	–	–	–	–	.

As we can see from Table C, our fixed-effect results suggest that the helper theory may be correct. The left-hand panel shows that trade credit received (*TC*) rises in booms and falls during recessions (hence the positive coefficient on the first lag). Trade credit extended (*TD*) seems to fall during booms and rise during recessions. Unsurprisingly, net trade credit received rises during booms and falls during recessions. This is evidence that our quoted firms 'help out' the unquoted firms during recessions. The results for the measures of monetary conditions are intriguing. What they show – whether we use the *ex post* real rate (*RB*), the base rate (*BR*) or the real spread (*SL*) – is the following. Trade credit received falls when monetary conditions tighten. Once again this is in line with the helper theory. But trade credit extended (*TD*) also falls when monetary conditions tighten. Nevertheless, this fall in trade credit extended is smaller than the fall in trade credit received, so the effect is that net trade credit received falls when monetary conditions tighten. These firm-level panel regressions appear to resolve some of the ambiguities we saw in the table of correlations earlier, providing clearer evidence that there is a trade credit channel that offsets the conventional bank credit channel.

Table D: Fixed effects, SUR estimations

LHS	*RHS*[a]										*Test-stat*	*Obs:*12416		*Single eqn*[e]	
	$TOTR_t$ / $TOTE_t$	L_t	CYC_t	CYC_{t-1}	BR_t	BR_{t-1}	SL_t	SL_{t-1}	RB_t	RB_{t-1}	R^2 [b]	$c^{2(c)}$	$c^2_{(3)}$ [d]	*F*	c^2
TC_t	0.18	*n.s.*	*n.s.*								0.40	6291.2		6.3	541
	(79.3)											(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*	-24671*								0.41	6584.7		7.3	905
	(81.0)		(-2.3)									(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*	21568*								0.08	1966.5	7668.7	17.0	12
	(-44.2)		(2.2)									(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*		25152							0.40	6304.6		6.3	541
	(79.3)			(3.185)								(0.0)		(0.0)	(0.0)
TD_t	0.3	*n.s.*		*n.s.*							0.41	6579.8		7.3	905
	(81.1)											(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*		21433.3							0.08	1969.4	7670.2	17.0	12
	(-44.3)			(2.7)								(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*			-669.3						0.40	6320.5		6.3	540
	(78.7)				(-5.7)							(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*			-622.2						0.41	6605.5		7.3	905
	(80.6)				(-4.1)							(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*			-211.8						0.08	1963.2	7675.0	17.0	11
	(-44.3)				(-1.8)							(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*				-904.5					0.40	6340.1		6.3	553
	(78.5)					(-7.5)						(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*				-815.9					0.42	6617.2		7.3	911
	(80.6)					(-5.3)						(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*				-278.7*					0.08	1966.1	7683.2	17.0	12
	(-44.3)					(-2.4)						(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*					-1427				0.40	6308.7		6.3	543
	(79.0)						(-4.7)					(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*					-680**				0.41	6586.5		7.3	903
	(81.0)						(-1.7)					(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*					-984.2				0.08	1973.3	7674.2	17.0	12
	(-44.4)						(-3.3)					(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*						-2672			0.40	6357.4		6.3	549
	(78.3)							(-8.8)				(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*						-1480			0.41	6608.7		7.3	903
	(80.6)							(-3.8)				(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*						-1668			0.08	1992.1	7689.1	17.0	11
	(-44.6)							(-5.6)				(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*							-1783		0.40	6346.5		6.3	539
	(78.2)								(-7.8)			(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*							-1622		0.41	6627.8		7.3	918
	(80.2)								(-5.5)			(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*							-545.5*		0.08	1962.9	7680.1	17.0	11
	(-44.2)								(-2.4)			(0.0)	(0.0)	(0.0)	(0.0)
TC_t	0.18	*n.s.*								-953	0.40	6309.1		6.3	544
	(78.9)									(-4.4)		(0.0)		(0.0)	(0.0)
TD_t	0.31	*n.s.*								-1193	0.42	6601.6		7.3	906
	(80.8)									(-5.0)		(0.0)		(0.0)	(0.0)
NT_t	-0.15	*n.s.*								n.s.	0.08	1940.5	7672.7	17.0	12
	(-44.3)											(0.0)	(0.0)	(0.0)	(0.0)

(a) The coefficients are significant at a 99% level if not otherwise noted, * (**) denotes significance at the 95% (90%) level, *n.s.* is 'not significant'). The numbers below the coefficients in brackets denote the corresponding z-statistics.
(b) Note that the R^2 is only of descriptive use since it is not a well-defined concept when GLS is used. The R^2 reported is the percent of variance explained by the predictors (similar to the R^2 of the corresponding single equation OLS estimation).
(c) F-statistic (with the probability in brackets) that all coefficients are jointly zero.
(d) The χ^2 test reported in this column is the Breusch-Pagan test of independence of the equations. The H_0 is that the correlation between the equations is zero; the probability that the H_0 is true is reported below the test statistic in brackets.
(e) Tests from corresponding single equation estimation. The F-test is the Chow test for fixed-effects vs pooled model (H_0 is that data is poolable, ie individual fixed effects are zero). The χ^2 test is the Haussman specification test for random effects vs fixed effects (H_0 is that the random effects model is valid, ie differences between coefficients are not systematic).

Of course we would not want to claim too much for our results. The econometric equations are far from perfect. The net trade credit received equation does not explain a great deal of the variation in the data (although this is not unusual in panel econometric studies). It is possible that there is some other explanation of these results—aside from the helper theory—although we do not have any likely candidates. We should also remember that some of the flows of trade credit received and extended are between our panel of UK quoted firms and overseas firms (or even the Government sector), and not just between UK quoted and UK unquoted firms. Nevertheless, our results are at least consistent with an offsetting trade credit channel, and therefore provide one possible reason for why, to date, there have been no conclusive studies showing that there is evidence of a conventional bank credit channel.

4 Conclusion

In this paper we find that firms with direct access to capital markets – firms that are quoted on the UK stock exchange – both extend more and receive less trade credit during a recession. They therefore unambiguously provide unquoted firms with more net trade credit. When monetary conditions tighten (however measured) our quoted firms both extend and receive less trade credit, though it seems that trade credit received falls by more than trade credit extended, and so net trade credit received falls when monetary conditions are tighter. This evidence is also consistent with an offsetting trade credit channel.

Our results are suggestive of (though we would not claim proof of) Meltzer's (1960) conjecture that flows of borrowing between firms were important in ameliorating the effects of imperfections in the intermediated credit market. The data and results described in this paper could therefore explain why in studies like that by Dale and Haldane (1995) there seems to be no conclusive evidence of a credit channel (in the corporate sector). Perhaps, in reality, there is a credit channel, but one that is offset by a trade credit channel.

Appendix: data and variables

The data set

We use the company accounts of UK quoted companies provided by Datastream. Data prior to 1983 were not included since only few companies reported the use of trade credit separately. We excluded all companies that did not report trade credit separately, companies that reported zero trade credit over the whole observation period, and financial companies. The remaining unbalanced panel has 12,400 observations from 1983 to 1996, 2,000 non-financial quoted firms (manufacturing and services) and an average continuous time interval of six years per firm.

The variables

The variables used in the regressions have the following Datastream codes:

TC variable 276, trade creditors

TD variable 287, trade debtors

TOTR variable 385, total creditors & equivalent (current liability)

TOTE variable 370, total debtors & equivalent (current asset)

L quick ratio, defined as (total current assets (376) minus total stock and work in progress (364))/total current liabilities (389)

MC a) base rate (annual average)

b) spread between 2-year and 10-year forward real rates (extracted from yield curves, annual averages)

c) *ex post* real rate: base rate minus RPIX

CYC GDP cycle, log linearly detrended from UK GDP (constant prices)

TOTR, TOTE

Sales explain most of the variation in trade credit since trade credit is linked to the flow of goods.[9] Sales will also reflect trends in the value of trade credit which are due to inflation.

Two proxies for sales were used: total short-term credit received related to trading activities in the equations for trade credit received (*TC*), and total short-term debtors in the equations for trade credit extended (*TD*) and for net trade credit received (*NETTC*). The two proxies are highly correlated with sales (the correlation coefficient is 0.94 for both on the firm-level, and 0.97 (0.99 for total debtors) on the aggregate level. The different proxies allow us to improve the efficiency of the estimates by accounting for the dependency of the equations for trade credit, debit and net trade credit (the Zellner SUR estimation collapses to a single-equation OLS estimation if the same RHS variables are used). Also, the fit of the estimation improves with the proxies.

L represents the liquidity position of firms measuring the availability of funds to finance trade credit. This 'quick ratio' equals total current assets minus total stock and work in progress divided by total current liabilities. It captures the idea that more liquid firms should require less finance in the form of trade credit.

Table F: Correlations between tightness/cycle measures

	$BR._{t-1}$	$BR._t$	BR_{t+1}	SL_{t-1}	SL_t	SL_{t+1}		$BR._{t-1}$	$BR._t$	BR_{t+1}
CYC_{t-1}	0.59	**0.79**	0.68	**-0.41**	-0.33	-0.20	SL_{t-1}	**0.18**	0.07	-0.21
CYC_t	0.24	0.61	**0.80**	-0.39	**-0.40**	-0.24	SL_t	-0.09	**0.15**	0.04
CYC_{t+1}	-0.01	0.29	0.64	-0.11	**-0.37**	-0.31	SL_{t+1}	-0.34	-0.05	**0.20**

[9] The related flow of goods for trade credit received are purchases of inputs rather than sales. But under fairly general assumptions for the production function, changes of input purchases can be proxied by changes in output (sales).

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