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CREDIT CHANNEL AND INVESTMENT BEHAVIOR IN AUSTRIA: A MICRO-ECONOMETRIC APPROACH

MARIA VALDERRAMA

December 2001

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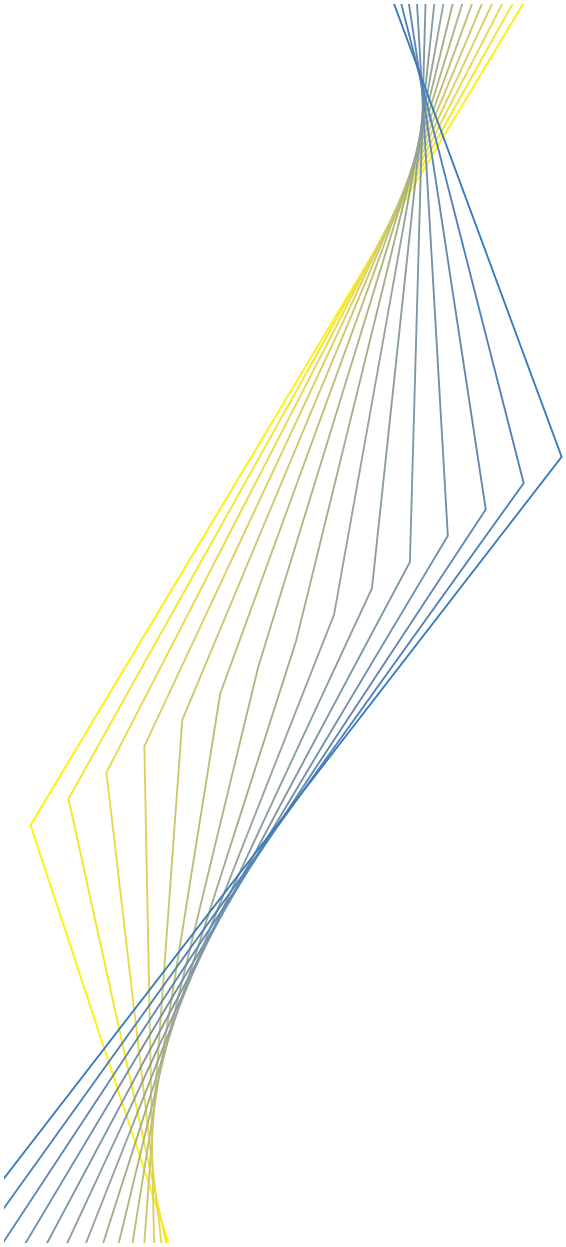

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CREDIT CHANNEL AND INVESTMENT BEHAVIOR IN AUSTRIA: A MICRO-ECONOMETRIC APPROACH*

MARIA VALDERRAMA **

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* *I am very grateful to Franz Partsch who provided the database. I would also like to thank the participants of the Monetary Transmission Network and especially my discussant Jean-Bernard Chatelain as well as Sylvia Kaufmann and Helene Schuberth.*

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The Eurosystem Monetary Transmission Network

This issue of the ECB Working Paper Series contains research presented at a conference on "Monetary Policy Transmission in the Euro Area" held at the European Central Bank on 18 and 19 December 2001. This research was conducted within the Monetary Transmission Network, a group of economists affiliated with the ECB and the National Central Banks of the Eurosystem chaired by Ignazio Angeloni. Anil Kashyap (University of Chicago) acted as external consultant and Benoît Mojon as secretary to the Network.

The papers presented at the conference examine the euro area monetary transmission process using different data and methodologies: structural and VAR macro-models for the euro area and the national economies, panel micro data analyses of the investment behaviour of non-financial firms and panel micro data analyses of the behaviour of commercial banks.

Editorial support on all papers was provided by Briony Rose and Susana Sommaggio.

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ISSN 1561-0810

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Abstract

Using individual firm data, this study analyzes the credit channel in Austria. The estimation is based on an accelerator specification of investment demand augmented by the liquidity ratio and a firm specific user cost of capital. The results show that there is a credit channel in Austria affecting all firms, while the interest rate channel is significant as long as the liquidity ratio is not included in the regression. Taking into account trade credit or lending relationships increases the significance but not necessarily the size of the interest rate channel. The interest rate channel is not significant for young firms due mainly to the fact that young firms rely more heavily on sales to increase investment. In general it is found that firms can reduce the sensitivity of investment to their liquidity position by building lending relationships with a housebank or using trade credit as a substitute for bank loans.

JEL Classification: C23, D92, E22, E52, G31, G32

Key Words: credit channel, investment demand, panel data

Non-technical Summary

The credit channel view of the transmission mechanism is based on the idea that the investment decision of the firm is not independent from its financing decision because external and internal funds are not perfect substitutes. Thus, due to capital market imperfections, the supply and the cost of external funds a firm faces will depend not only on the monetary stance but also on its financial structure and other individual characteristics that determine its access to financial markets. Under this view, the effect of a monetary tightening will be smaller for firms which are able to substitute bank lending with other types of external funds or for firms for which asymmetric information issues are of less relevance. If firms are able to circumvent a credit squeeze through other forms of financing or if banks do not reduce their supply of loans even when the monetary stance changes, then the credit channel will be weaker.

This study attempts to find evidence of a credit channel using a data set of Austrian firms. The approach followed here is to incorporate a firm specific user cost of capital that allows to directly measure the effects of monetary policy. In order to account for the financial position of the firm, the investment demand equation is augmented by the liquidity ratio, which is defined as the ratio of liquid assets to the capital stock. To test for the distributional effects of monetary policy, variables that account for the firm's access to the capital market are interacted with determinants of investment.

Since Austria has long pursued a hard currency regime the money view and the interest rate channel have not played an important role in the transmission mechanism of monetary policy. The most important determinants of investment spending have included sales and earnings expectations as well as the existing capital stock and its utilization. While the issuance of equities and bonds has played a minor role in the external financing of firms, lending from other firms or building lending relationships with a house bank have been the dominant financing strategies. Therefore, the focus of this study lies on the role of trade credit and lending relationships for the monetary transmission mechanism in Austria.

Instead of splitting the sample according to certain criteria, variables that account for the access of the firm to the capital markets are interacted with the determinants of investment. In this way, the effect of sales, the user cost of capital and the liquidity ratio on investment are made conditional on the firm's access to financial markets or its ability to substitute loans with other type of external funds.

The empirical analysis relies on data from balance sheets and income statements of Austrian firms collected by the Oesterreichische Nationalbank in the course of her refinancing activities. In addition to the balance sheet data, the OeNB collects monthly data from banks that give credit of more than ATS 5 million to firms. By using this

database, which is available only after 1994, it becomes possible to construct proxies for the existence of a house bank. Given the large number of banks per inhabitant in Austria and the rather strong competition in this sector, a high share of loans from a single bank in total banks loans is taken as an indicator of a close lending relationship. The variable used to investigate the relevance of trade credit for investment is the share of trade credit in short-term debt.

The results for the period 1994 to 1999 tend to confirm the existence of a credit channel in Austria. Financial variables are significant determinants of investment demand and considerable differences exist in the investment behavior across groups of firms.

Contrary to what has been suggested before, growth of sales contributes to explain investment behavior as long as no financial variables are taken into account. Young firms are more dependent on sales than other types of firms. This may be the result of the larger informational asymmetries that young firms face.

As in the case of sales, the effect of the user cost of capital on investment diminishes with the presence of financial variables. However, it is found that the effect and significance of the user cost of capital on investment does not necessarily decrease with size or age. As before, this is not the case when variables that should be expected to dampen the interest rate channel, such as the share of trade credit or the existence of a house bank, are included in the regression.

The liquidity ratio seems to be the most important determinant of investment demand in Austria. It is almost always significant and the size of the effect is also much larger than the effect of all other variables. However, the total effect is conditional on other characteristics of the firms. It is shown that firms may be able to diminish their dependence on internal funds by using trade credit or having close relationships with a house bank. Although these relationships seem to weaken the credit channel, they do not necessarily weaken the interest rate channel when such a channel exists. This confirms the view that trade credit and the house bank principle help overcome liquidity constraints but do not dampen the effect of the interest rate on investment.

1. Introduction

The credit channel view of the transmission mechanism is based on the idea that the investment decision of the firm is not independent from its financing decision because external and internal funds are not perfect substitutes. In this view, there is a wedge between the cost of external and internal funds, which arises due to imperfections in the capital market, such as asymmetric information, agency costs or moral hazard. Additionally, due to adverse selection firms may be rationed from credit no matter which price they are willing to pay for external funds. Thus, if capital market imperfections exist, the supply and the cost of external funds a firm faces will depend not only on the monetary stance but also on its financial structure and other individual characteristics that determine its access to financial markets, such as size, age, and an existing close relationship to another firm or to a bank.

If a credit channel exists a tightening of monetary policy will have a larger effect on financially constrained firms because their cost (quantity) of external funds will rise (fall) more compared to the cost (quantity) of internal funds and compared to firms that are not financially constrained.[1] This can happen either by affecting the supply of loans due to a fall in deposits (bank lending view) or due to a fall in the net worth of the firm (balance sheet view).[2] Under the balance sheet view, the effect of monetary policy is also exerted by a decrease on the demand for funds due to the worsening of the firm's financial position. Thus, according to the credit channel view of the transmission mechanism monetary policy will not only have stronger real effects, but also distributional effects by affecting firms' spending on investment.[3]

Finding empirical evidence of a credit channel has usually been pursued in the context of the financial accelerator framework. These studies have tested whether the investment decision of financially constrained firms depends more strongly on the monetary policy stance. Most of these studies used firm balance sheet data and split the sample by some a priori criteria which reflect the firm's access to the capital market, such as size, age, dividend payout ratio, coverage ratio, etc.[4]

This study attempts to find evidence of a credit channel using a data set of Austrian firms. Wesche (2000) used a similar data set to estimate an accelerator error correction

[1] When a firm with limited access to the capital market does not have enough internal funds to finance its desired investment, this firm is said to be financially constrained.
[2] For the bank lending channel to exist firms have to be bank dependent and monetary policy has to be capable of changing the supply of loans. For the balance sheet channel to exist, the wedge between internal and external funds has to be dependant on the net worth of the firm. See for example Bernanke et al. (1994)and Kashyap et al. (1997)
[3] The credit channel refers usually to both the balance sheet and the bank lending view. Although, they are two distinct channels, in empirical work it is hard to distinguish among them.
[4] For surveys see Hubbard (1994), and Mojon et al (2000).

model of investment to test for the existence of a credit channel in Austria; as in other studies the interest rate was included as a proxy for the user cost of capital and its cross variation was accounted for by dummies. The approach followed here is to incorporate a firm specific user cost of capital that allows measuring the effect of monetary policy directly.[5] The investment demand equation is also augmented by including variables such as the liquidity ratio[6] to account for the financial position of the firm.[7] To test for the distributional effects of monetary policy, variables that account for the firm's access to the capital market are interacted with the determinants of investment. Due to the structure of financial markets in Austria, the issuance of equities and bonds has played a minor role in the external financing of firms. Instead relationships with other firms and the house bank principle have been the dominant financing strategy. Therefore, the focus of this study lies on the role of trade credit and lending relationships for the monetary transmission mechanism in Austria.[8]

The paper is organized as follows: Section 2 contains a short description of Austrian investment spending and financing, followed by a description of the database and the indicators used in the empirical part. Section 4 introduces and motivates the specification used to find evidence for the existence of a credit channel with a firm specific user cost of capital. Section 5 focuses on the role of trade credit and the house bank principle on the transmission mechanism. Finally, some conclusions are drawn based on the empirical findings.

2. Investment Financing and Spending in Austria

Before entering the European Monetary Union Austria's monetary policy had followed a fixed exchange rate regime since 1973: first the Schilling was fixed against a basket of currencies and since 1981 against the German mark. Due to the stability of this peg Austria was considered to form a de facto monetary union with Germany. For this reason, the money view and the interest rate channel were not so important for the transmission mechanism of monetary policy in Austria; instead, the exchange rate channel together with the cost of capital channel were considered more relevant.[9]

[5] See Chirinko et al. (1999)
[6] The liquidity ratio is defined as the ratio of liquid assets to capital stock. Liquid assets includes, securities, cash, and other liquid assets.
[7] See Bernanke et al. (1994), Bond et al. (1994), Kaplan et al. (1995), Oliner et al. (1996),Bond et al. (1997), Mairesse et al. (1999), Mojon et al. (2000), Vermeulen (2000), and Wesche (2000)
[8] See Nilsen (1999), Kohler et al. (2000) and Marotta (2000) for studies relating trade credit and the transmission mechanism and Petersen et al. (1994), Conigliani et al. (1997), Degryse et al. (1998), Elsas et al. (1998), and Dell'Ariccia et al. (2000) for the role of lending relationships.
[9] Glück (1995)

This was reinforced by the policy of subsidizing credit. As of 1991, 47% of all bank loans extended to the industry and 11% of bank credits to small firms were subsidized.[10] Thus, the existence of subsidized credit, which was used intensely up to the beginning of the 1990's, had also dampening effects on the interest rate channel.[11]

As a result, investment spending reacted very little to the interest rate and much more to changes in the exchange rate.[12] The main influences on investment activity were sales and earnings expectations as well as the existing capital stock and its utilization.[13] These facts justify the estimation of an accelerator specification of investment demand augmented by financial factors as it was done in Wesche (2000) and Gugler (1997).

Corporate finance in Austria has been characterized by the strong dependence of firms on bank lending. Capital markets are narrow and underdeveloped and have been used mostly by public authorities and financial institutions, while the issuance of debt by private non-financial institutions has been negligible. Equity ownership is one of the lowest in Europe, while the debt ratio of Austrian firms of around 75% on average is relatively high compared to other European countries.[14] According to the sample of firms from the OeNB database (see Table 1) the average debt ratio of Austrian firms in the nineties was almost 80%. Due partly to the financial system, the universal banking principle and the law which mainly protects creditors, the issuance of bond and commercial paper by non-financial institutions in Austria has been very small.[15] The share of bonds in GDP issued by non-financial corporations was only 2.8% in 1997, compared to a share of 31% issued by credit institutions and 30% issued by the government.[16] The main reasons for the low development of the capital markets are the predominance of small and medium sized firms, a relatively strong but declining presence of the state and a high concentration of ownership. This last point also reinforces the importance of bank debt, since banks are both important direct and, through holdings, indirect owners of many firms. [17]

Beside bank lending and other debt the most important item in the composition of liabilities is trade credit. In 1999 this item amounted to 11% of total liabilities while securities issuance was less than 1%. It is also worth mentioning that on the asset side trade credit also amounts to an important share of the assets of non-financial institutions. Moreover, the developments of trade credit and trade debt follow closely the evolution of

[10] Gnan (1995)
[11] Subsidized credits are still existent in Austria but their significance is very small.
[12] Gnan (1995)
[13] For more details on institutional features and empirical data on all the above points see Pech (1994).
[14] Gnan (1995), Quehenberger (1997) and IMF (1998)
[15] Delbreil et al. (2000)
[16] See Table 2, Ehrmann et al (2001).
[17] Gugler (1997)

inventories on the balance sheet of non-financial corporations. Given the importance of inventories on total investment, trade debt seems to be an important source of investment financing for Austrian firms.

At the same time, the banking sector is one of the most overbanked in Europe,[18] characterized by too many banks and a very low degree of concentration. There are 123 banks per million inhabitants in Austria, compared to 45 in Germany and 25 in France,[19] while the largest 5 banks account for less than 50% of the market.[20] Like in Germany bank relationships have been characterized by the presence of a "house-bank".[21] Although difficult to verify in empirical work, the practice of long-standing loyalty to one bank prevails in Austria and has often been held responsible for the absence of a credit channel. The foundations of this relationship lie in the specific banking practices (similar to those in Germany) that are governed by commercial law that systematically protects creditors.[22]

3. Database and indicators

The Oesterreichische Nationalbank regularly collects data on balance sheets and income statements of Austrian firms in the course of her refinancing activities. To check the solvency of non-financial enterprises involved in the collateralization of monetary policy operations, the OeNB requests annual accounts. These annual accounts are submitted to the OeNB's by the enterprises themselves or by commercial banks doing business with the enterprises in question. Consolidated financial statements are collected only in exceptional cases. [23]

The database contains annual data for the years 1979 to 1999 which provide a total of 42,870 observations. Although after 1987 the annual samples contain more than 2,000 firms, the time series dimension is comparatively small for most firms: only 88 firms are observed over the whole sample period and 3,959 firms appear in the data only once.

In addition to the balance sheet data, the OeNB collects monthly data from banks that give credit of more than ATS 5 million to firms. Using this database, which is available only after 1994, it becomes possible to construct proxies for the existence of a house bank.

The OeNB database cannot be considered a statistical sample and is biased, too. Commercial banks usually present collateral from companies which they expect will satisfy the OeNB's solvency requirements. Sound enterprises are thus over-represented in

[18] See Kaufmann (2001) for a description of the Austrian banking system.
[19] See Table 2, Ehrmann et al (2001).
[20] IMF (1998)
[21] Delbreil et al. (2000)
[22] Ibid.
[23] The individual data are strictly confidential and have to be aggregated for any publication in order to comply with data secrecy legislation.

the sample. The bias becomes more severe when only those firms for which longer time series exist are included, since these are mostly large firms.

After observations with negative values of sales, total assets, the stock of capital, total debt, number of employees as well as outliers of investment ratio, net sales, growth of net sales, user cost of capital and liquidity ratio[24] were removed, a sample of firms present in the sample during at least five consecutive years was selected; thus, only 4,158 observations remain in the sample for the period 1994 to 1999.

The variable used to investigate the relevance of trade credit for investment is the share of trade credit in short-term debt. Since trade credit is often related to the financing of inventories it is usually extended for short periods.

The existence of a house bank has usually been measured by the duration of the lending relationship.[25] However, due to the short time span of this database it was not feasible to construct such an indicator. On the other hand, given the large number of banks per inhabitant in Austria and the rather strong competition in this sector, a high share of loans from a single bank in total loans from banks could be taken as an indicator of a close lending relationship. Since lending relationships usually exist to provide short-term liquidity, the distinction according to debt maturity was made to better distinguish between the effects of lending relationships on financing investment and their effects on helping firms overcome short-term liquidity restrictions. Therefore, four different indicators are used to account for the presence of a "Hausbank": 1) the number of banks with which a firm has business relationships 2) the share of loans from the bank with the largest percentage of loans on total bank loans 3) the share of short term loans from the bank with the largest percentage on short bank loans and 4) the share of long term loans from the bank with the largest percentage on long term bank loans. Thus, the first indicator shows the largest concentration of loans from one single bank on the total of loans from banks while the other two show the same ratio according to the maturity of the loans.

Table 2 presents the statistics of the sample used in this study. These statistics are presented not only for the full sample but also for groups of firms according to size and age.[26] As seen in the table small and young firms represent each only 17% and 12% of the

[24] It was done by excluding data which exceeded 5 times the interval between quartiles from the median.
[25] Petersen et al. (1994), Conigliani et al. (1997), Degryse et al. (1998), Elsas et al. (1998), and Dell'Ariccia et al. (2000)
[26] In Valderrama (2001) it is shown that no significant differences in the elasticity of the user cost of capital are observed for small firms defined as firms with less than 55 employees or 148 employees. However, in terms of the effects of financial variables on investment, firms with more than 55 employees do not behave as financially constrained. Therefore, the definition of small firms was taken to be firms with less than 55 employees. A similar argument applies to the age criteria. Firms which have been established in the last 10 years are considered young firms.

observations, respectively. Some interesting patterns emerge from these tables. First, the average investment ratio of small firms of 7.2% is much lower than that of the full sample and of all other groups, which show an average investment ratio between 9.8% and 10.6%. The average growth in sales of small firms is also significantly smaller than that of the other groups, whereas young firms are the fastest growing group and also have the highest investment ratio.

The liquidity ratio is more or less uniform across groups except again for small firms, which in average keep 52% of their capital in the form of liquid assets. Small firms also tend to have a larger share of trade credit in short-term debt than the rest of the sample. Due to the low number of banking relationships of small firms, these firms also show the largest concentration of loans from the bank with the largest share in total debt no matter for which maturity.

Since the user cost of capital depends on the interest rate, a natural way of testing the effect of monetary policy on investment is measuring the sensitivity of investment to the user cost of capital. Past studies have used the market interest rate as a proxy for the user cost of capital and the variation across firms has been modeled with dummies. This is circumvented here by including a firm-specific user cost of capital defined as:[27]

$$UC_{it} = (\frac{p_t^I}{P_t})(\frac{1-itc_t}{1-\tau_t})(r_{it}b_{it}(1-\tau_t) + roe_{it}(1-b_{it}) - \frac{\Delta p_{t+1}^I}{p_t^I} + \delta(1-\tau_t)) \qquad (1)$$

Where, r_{it} is the apparent interest rate, which is defined as the ratio of interest and similar charges to gross debt B_{it}, and p_t^I is the economy wide price deflator for gross investment, P_t is the GDP deflator, itc is the investment tax credit, τ is the corporate tax rate, b_i is the debt ratio of the firm and roe_i is the return on equity.[28] This definition of the user cost of capital is a weighted average user cost of capital that takes into account first the financial structure of the firm[29] and thus reflects the fact that the cost of capital may increase with the leverage of the firm, and second the effect of the tax system on investment. It includes three additive elements: the opportunity cost of capital given by the apparent interest rate r_{it}, a forward-looking inflation component given by the term $\Delta p_{t+1}^I / p_t^I$ and the economic depreciation δ.[30] As seen in table 2, the variation of these measures of user cost across firms is much smaller than the variation observed in other variables. However, on average, young and small firms tend to face a slightly higher user cost of capital.

[27] See Chirinko (1993 and 1999) for similar studies.
[28] This definition is labeled "WACC with taxes" in Graph 1
[29] In cases when the debt ratio was more than 100%, this was set to 100%.
[30] See Appendix for the values used.

4. Model and Estimation

In a world of perfect capital markets the investment decision of a firm would be independent of its financing decision.[31] However, in a world with asymmetric information, moral hazard, agency costs, adverse selection and other market imperfections, internal and external funds will not be perfect substitutes. Since monetary policy affects the cost and availability of funds, the analysis of the transmission mechanism at the firm level is done by testing whether monetary policy affects a firm's investment spending.

In order to find empirical evidence for the existence of a credit channel, a number of studies have tested whether the demand for investment of firms which are considered financially constrained depends more strongly on the monetary policy stance.[32] The starting point is an investment demand specification derived from the optimization problem of the firm. Assuming a Cobb-Douglas production function the desired capital stock of firm i at time t, K_{it}^{*}, will be given by the first-order conditions for profit-maximizing behavior, which states that the marginal productivity of capital should be equal to its marginal cost. The marginal cost is taken here to be the user cost of capital. Thus, rewriting:[33]

$$K_{it}^{*} = \alpha_i \frac{S_{it}}{UC_{it}} \tag{2}$$

Where S_{it} is output or net sales, UC_{it} is the user cost of capital and α_i the share of capital in the production function. For a constant elasticity of substitution production function, the computation of the marginal productivity leads to elasticities of sales and user cost with respect to capital, which are generally different from unity in absolute value. In this case, taking logs and writing the logarithms of K_{it}^{*} [34] and S_{it} [35] with small letters, using ρ for the log of the user cost of capital leads to:

$$k_{it}^{*} = \alpha_i + \beta s_{it} - \gamma \rho_{it} \tag{3}$$

The parameter γ is the constant elasticity of substitution between capital and labor.

The accelerator specification for investment demand is obtained by taking first differences and using the following expression as an approximation for investment $\Delta k_{it} \approx I_{it} / K_{i,t-1} - \delta$ (with I and δ denoting investment and depreciation, respectively). Since the adjustment to the desired capital stock is not instantaneous, this equation is

[31] That is, if the Modigliani-Miller theorem holds.
[32] For literature surveys see Hubbard (1994), Mojon et al. (2000).
[33] For detailed derivations of the profit maximizing behavior see for example Bond et al (1997) and Mairesse et al (1999).
[34] The stock of capital: was calculated using the perpetual inventory method with a depreciation rate of 10%.
[35] Output is defined as net sales.

generally expressed as an auto-regressive distributed lag specification, where η_i denotes a firm specific constant and υ_t represents the error term:

$$I_{i,t}/K_{i,t-1} = \lambda\left(I_{i,t-1}/K_{i,t-2}\right) + \sum_{j=0}^{T}\beta_j \Delta s_{i,t-j} - \sum_{h=0}^{T}\gamma_h \Delta\rho_{i,t-h} + \eta_i + \upsilon_t + \varepsilon_{it} \tag{4}$$

Due to asymmetric information and agency costs the lender will charge a higher premium to firms on which he/she has less information. This premium will be lower the larger the net worth of the firm which can be used as collateral. Due to moral hazard, if the firm is highly indebted the lender will raise the external finance premium. These imperfections and the fact that firms will cut their investment plans when an increase in the real interest rate leads to a deterioration of their financial position, give rise to the balance sheet channel. Under this view of the transmission mechanism the cost of external funds will depend on the financial structure of the firm and the demand for investment will depend on the financial position of the firm. Therefore, the empirical estimation of the credit channel has often been based on the financial accelerator theory of investment, which states that weak balance sheets can amplify adverse shocks on firm investment.

In this framework the investment demand equation in (4) is augmented by factors that account for the net worth of the firm or the availability of internal funds measured by the ratio of liquid assets to capital, which is a liquidity ratio. Thus, the augmented investment demand equation can be written as:

$$\begin{aligned} I_{i,t}/K_{i,t-1} &= \lambda\left(I_{i,t-1}/K_{i,t-2}\right) + \sum_{j=0}^{T}\beta_j \Delta s_{i,t-j} - \sum_{h=0}^{T}\gamma_h \Delta\rho_{i,t-h} \\ &+ \sum_{m=0}^{T}\omega_m \frac{LA_{i,t-m}}{p^I_{t-m}K_{t-1-m}} + \eta_i + \upsilon_t + \varepsilon_{it} \end{aligned} \tag{5}$$

Here LA_{it} represents liquid assets[36], and p^I_{it} is the economy-wide price of investment. The hypothesis is that if a credit channel exists, financial variables not only will be significant but their presence will change the total effect of the user cost of capital on investment demand.

The estimation of the investment demand was done using two-step Arellano-Bond-GMM-type estimators, which control for biases due to unobserved firm-specific effects and the lagged endogenous variables.[37] The estimations were carried out using first differences to remove the firm specific effects and time dummies were included to control for exogenous shocks in the data. Several estimations, which are not presented here, were carried out to determine the number of lags of the variables. All lagged levels of the

[36] The ratio to the capital stock is used to avoid unit problems.
[37] Arellano and Bond (1991)

investment ratio and the predetermined variables are used as instrumental variables.[38] The validity of the instruments was tested with a Sargan-test of over-identifying restrictions and tests of serial correlation in the residuals. Additionally, the sample was split according to size and age, which are usually used to take into account information asymmetries.[39]

The results of the estimation of equation (4) are shown in table 3. Three different estimations were performed: first on the full sample, second on the full sample with dummies on all right hand side variables indicating small firms and third on the full sample with dummies on all right hand side variables indicating young firms. The Sargan test does not reject all three estimations and there is no evidence of second order serial correlation.

The results of estimating equation (4) for the full sample confirm the perception that growth of sales is the most important determinant of investment while the interest rate channel is not significant. The point estimate of the long run elasticity of sales is 26.6% and is significant at the 1% level. The point estimate for the long run user cost elasticity is –13.9% but is not significant. However, when allowing different coefficient estimates for small and young firms these results change. In fact, for large, small and old firms, the user cost of capital is significant, whereas the growth of sales is not a significant determinant of investment of small firms. As expected, the long run elasticity of growth sales of 29.8% is higher for younger firms compared to the whole sample and to 19.1% for old firms. The sensitivity of investment demand to the user cost of capital is also as expected higher for small firms (-15.6%) than for the full sample (-13.9%). However, it is observed that the sensitivity of investment to the user cost of capital is much larger for large (-21.9%) and old firms (-33.3%), while there is a positive effect on the investment of young firms coming from the interest rate channel.

This puzzle could be due to a misspecified equation or omitted variables. Table 4 shows the results of estimating an equation with the liquidity ratio as in equation 5.[40] As it is often found in similar studies, growth of sales loses its significance in the presence of the liquidity ratio. In the same way, the user cost of capital is never significant except for young firms. However, for young firms the user cost of capital has a positive effect on investment demand. The largest long run elasticity of the liquidity ratio is observed for young firms (30.8%), while the lowest long run elasticity is found for small firms (12.2%).

[38] Tests not shown here were also done with different lags. The results, however, do not change significantly with different number of lags on the instrument matrix.
[39] See Wesche (2000) for the role of size and Valderrama (2001) for the role of size and age on the credit channel in Austria.
[40] Because lagged growth of sales was often not significant and negative, these variable was dropped, which did not change the results significantly.

From these results it can be concluded that the financial position of the firm and the growth of sales seem to play an important role in the determination of investment, in particular for young firms, but much less for small firms. This result can be expected since young firms will grow faster and will have more asymmetric informational problems, which makes them more dependant on their own funds and future growth expectations.

Some of these results are, however, counterintuitive. In particular, the fact that the user cost of capital is often not significant, or even positive. This could be an indication that, possibly due to the existence of capital market imperfections, the traditional neoclassical investment demand equation with or without the liquidity ratio does not adequately reflect investment behavior in Austria. A factor that may be important and that has not been investigated before is the degree of access to external funds or the ability to substitute bank loans with other type of external funds. This is usually in inverse relation to the degree of information a lender has on a borrower. Therefore, the next section concentrates on the role of trade credit and lending relationships in overcoming information asymmetries in Austria.

5. Role of Trade Credit and Lending Relationships

In the credit channel view, firms which are more bank dependent will be more affected by the monetary stance. In order to analyze the distributional effects of the transmission mechanism, it is necessary to take into account features specific to the firm, which may aggravate or dampen asymmetric information, agency costs and moral hazard. Due to the characteristics of investment spending and financing in Austria, two factors that are considered important for the transmission mechanism are analyzed: the existence of a higher share of trade credit and the existence of a house bank.

In general the effect of a monetary tightening will be smaller for firms which are able to substitute bank lending by other type of external funds or for firms for which asymmetric information issues are of less relevance. If firms are able to circumvent a credit squeeze through other forms of financing or if banks do not reduce their supply of loans even when the monetary stance changes, then the credit channel will be weaker. Cases in which this may happen include, for example, firms that are able to overcome a shortage of bank financing by increasing debt with a partner firm or firms that establish long term lending relationships with a bank which in return will not reduce credit during recession or periods of tight monetary policy. Thus, the degree at which firms can overcome informational asymmetries will determine whether a monetary tightening will leave them financially constrained or not.

Instead of splitting the sample according to certain criteria, variables that account for the access of the firm to the capital markets are interacted with the determinants of

investment. In this way, the effect of sales, the user cost of capital and the liquidity ratio on investment are made conditional on the firm's access to financial markets or its ability to substitute loans with other type of external funds. The equation that will be estimated can be written as:

$$
\begin{aligned}
&I_{i,t}/K_{i,t-1} = \lambda\left(I_{i,t-1}/K_{i,t-2}\right) + \sum_{j=0}^{T}\beta_j \Delta s_{i,t-j} - \sum_{h=0}^{T}\gamma_h \Delta\rho_{i,t-h} \\
&+ \sum_{m=0}^{T}\omega_m \frac{LA_{i,t-m}}{p^I_{t-m}K_{t-1-m}} + \varphi IT^G_{i,t} + \lambda\left(I_{i,t-1}/K_{i,t-2}\right)IT^G_{i,t} \\
&+ \sum_{j=0}^{T}\beta^G_j \Delta s_{i,t-j} IT^G_{i,t} - \sum_{h=0}^{T}\gamma^G_h \Delta\rho_{i,t-h} IT^G_{i,t} \\
&+ \sum_{m=0}^{T}\omega^G_m \frac{LA_{i,t-m}}{p^I_{t-m}K_{t-1-m}} IT^G_{i,t} + \eta_i + \upsilon_t + \varepsilon_{it}
\end{aligned}
\tag{6}
$$

Where IT^G_{it} represents an interaction term that takes into account the firm's access to the capital market. The variables studied here are: share of trade credit as a percentage of short-term liabilities and four variables that measure the existence of a "Hausbank". Under the hypothesis of a credit channel, the effect of these variables on investment should be larger for those firms which have more restricted access to external funds. Since the measures used here actually show whether firms may overcome informational asymmetries and therefore have more access to the capital, the estimated elasticities should be lower than in the case when these variables are omitted.[41]

5.1. Trade Credit

The credit channel relies on firms being dependent on bank loans to finance their investment. The issuance of commercial papers or bonds or the access to trade credit may help firms overcome bank lending shortages. Since other forms of financing in the capital markets such as shares and bonds are used very little in Austria, another alternative source of finance that could indicate a lower degree of bank dependency would be the share of trade credit as a percentage of short term debt.

The demand for trade credit has been explained by the transaction motive and the finance motive. Although both are not exclusive, the interest lies here in the finance motive. The hypothesis is that in the presence of credit market imperfections, when a bank reduces its supply of loans, firms may use trade credit to overcome liquidity shortages. The advantage of trade credit over bank credit is that the supplier will have more information about the firm and will also have an advantage in terms of the collateral.

[41] Except for the indicator number of banks, which will have the opposite effect.

Trade credit can be obtained either through an agreement with the supplier firm or just by deferring payments.[42] Thus, in this section the following hypothesis is tested:

H1: investment demand of firms with higher share of trade credit in short-term debt is less sensitive to their liquidity ratio.

To test this hypothesis, a variable that indicates the share of trade credit in short-term debt is used. As before, additional estimations are done in order to make a distinction according to size and age of the firm, since small firms will more likely be rationed by banks and therefore will have to search for alternative ways of financing. In addition it has been argued that in recessions or during credit squeezes large firms which obtain credit more easily from financial or capital markets may be more willing to extend trade credit to small firms. At the same time, large firms will be less required to use trade credit since they will very likely be able to get cheaper credit from banks. Thus, trade credit will very likely be more important for small or young firms.

As seen in table 5, the share of trade credit in short-term debt is significant for the full sample. This, however, does not contribute to increase the significance of the user cost of capital nor growth of sales on the demand equation for the whole sample. In general, interacting trade credit in the regression reduces the long run elasticity of the liquidity ratio. This effect is, as expected, especially important for young (16.7%) and small firms (4.5%).

However, as shown in table 10, (where the long run elasticities are evaluated at different values of the interaction term: the lowest possible value, the mean and the largest possible value), it can be seen that, contrary, to what would be expected, when the share of trade credit in short term debt increases the sensitivity of investment to the liquidity ratio increases for all groups of firms except for small firms. For the largest value of the interaction term, the sensitivity of investment to the liquidity ratio is still lower than in the case when this interaction term is not included.

This evidence suggests that trade credit may be important in overcoming informational asymmetries. The largest change is seen on the investment demand of small firms, which are able to be less dependent on internal funds. The long run elasticity of the liquidity ratio for small firms goes from 12.2% in equation 5 to 4.5% in equation 6. Thus, small firms which are able to have a higher share of trade credit in short term debt, seem to be less affected by changes in their liquidity position. This supports the hypothesis that small firms are able to overcome liquidity constraints by using trade credit.

Trade credit and the liquidity ratio contribute slightly to reduce the sensitivity of investment of large and old firms to the user cost of capital. This could be due to the

[42] Elliehausen et al. (1993)

market power that large or old firms may have on their suppliers, from which they are able to obtain less expensive external funds. The effect on young firms is mixed: while the long run elasticities are lower than in the previous specification, the user cost of capital continues exerting a positive effect on investment.

5.2. Lending Relationships

Although the existence of a house bank has been difficult to quantify, the practice of long-standing loyalty to a bank prevails in Austria and has often been held responsible for the absence of a credit channel in Austria.[43] The hypothesis is that firms which are able to rely on a „house bank" will suffer less from liquidity shortages because the problem of asymmetric information is overcome through a long-standing relationship.[44] However, it is not yet settled whether the presence of a house bank will increase or decrease the effect of the user cost of capital on investment.

Although it has been argued that the existence of a "house bank" may curtail the existence of a credit channel because the house bank will not restrict credit in difficult times, the effect on the elasticity of the user cost of capital is ambiguous. The existence of long term lending relationships will guarantee that banks do not reduce the quantity of loans to its clients during times of monetary tightening or recessions, but they may change the price of loans, since banks will have a monopolistic power over their clients.[45] Thus, the hypothesis tested here is:

H2: investment demand of firms which have a „house-bank" is more sensitive to the user cost of capital and less sensitive to the liquidity ratio.

Due to the difficulty to pin down the existence of a "house bank", the four indicators outlined in section 3 are used to investigate the effect of lending relationships on investment demand. As in the last section estimations are done not only for the full sample but also for a split according to size and age.

1) The number of banks with which a firm has business relationships (table 6):

This interaction term as well as growth of sales are significant only for old and young firms (long run elasticity of growth of sales is 6.8% and 10.2%, respectively). The user cost of capital is significant for both small (-6.3%) and young firms (+7.1%), but for young firms the effect is still positive. As in the last two specifications the liquidity ratio is always positive and significant. The effect of the financial position of the firms on investment is, as expected, lower for all groups except for small firms (12.2% in table 4 and 13.9% in table 6).

[43] Quehenberger (1997), Delbreil et al. (2000).
[44] Petersen et al. (1994).
[45] Quehenberger (1997), Elsas et al. (1998) and Dell'Ariccia et al. (2000)

As seen in table 10 the sensitivity of investment to the user cost of capital of small firms decreases slightly when the number of banks becomes larger (6.5% for at the lowest value and 6.1% at the highest value). This seems to suggest that by having multiple lending relationships, small firms are able to "shop" for the best price. However, the difference is very small and it is not validated for the other groups of firms. Thus, evidence that having a house bank increases the sensitivity of investment to user cost of capital based on this indicator of a house bank is not conclusive.

As a result of a larger number of banks the long run elasticity of the liquidity ratio increases. This is in line with the idea that an exclusive lending relationship isolates firms from restrictions stemming from a worsening financial position. However, there is no evidence that banks use this exclusive lending relationship to increase the price of loans.

2) The share of loans from the bank with the largest share in total loans from banks (table 7):

Introducing this variable as an interaction term makes all variables in the investment demand of small firms become significant. Growth of sales becomes also significant for old (7.7%) firms, but is no longer significant for young firms.

The liquidity ratio is always significant and positive, except for the full sample. Compared to the specification without an interaction term that proxy the influence of a house bank relationship, the sensitivity to the liquidity ratio is much lower. For small firms the interaction term is significant and positive (8.8%) and the size of the effect is as large as the effect of the liquidity ratio on investment (8.4%). Taken together the effect on investment is even larger than in the case when interaction term is not included in the regression. For large firms, the effect of the liquidity ratio on the investment demand is not affected by the inclusion of the share of loans coming from their main bank.

From table 10 it can be seen that the effect of the user cost of capital decreases for small firms with the existence of a house bank and increases for all other groups. For all groups of firms a high share of one bank in total bank loans reduces the sensitivity to the availability of internal funds. This confirms the results obtained before.

3) The share of long-term loans from the bank with the largest percentage in long-term loans from banks (table 8):

All variables except the interaction term are significant and show the expected sign in the regressions for large, old and small firms. On the other hand, the user cost of capital and growth of sales lose their significance for young firms.

The effect of the user cost of capital on investment demand is much larger and significant for small firms (-10.4%) compared to the one obtained (-7%) in the specification without an interaction term (table 4). Surprisingly, compared to large firms (-11.5%), this sensitivity is smaller. This suggests that when a higher concentration of long

term debt comes from a house bank the size of the firm does not help dampen the interest rate channel.

The effect of the liquidity ratio is very similar for large (7.9%) and old firms (7.9%), higher for small firms (13.1%) and very low for young firms (4.8%). Compared to the estimation shown before, the sensitivity of investment demand to the liquidity ratio decreases considerably by including this interaction term. This is the only specification in which small firms are more sensitive to the availability of internal funds than large firms.

As seen in table 10, the effect of the liquidity ratio on investment becomes smaller with a larger share of long-term loans from a single bank in the total of long-term bank loans. The opposite effect can be observed with respect to the user cost of capital: the presence of a house bank tends to increase the sensitivity of investment to the user cost of capital. Thus, as in the former case, this provides evidence that banks use the monopoly power over their clients to increase the price of loans.

4) *The share of short-term loans from the bank with the largest percentage in short-term loans from banks (table 9):*

Including this indicator term does not change the significance of the determinants of investment for the full sample, but the growth of sales becomes significant for small firms (2.5%). As in the last part, the user cost of capital becomes significant for large (-10%) and old firms (-13.3%), while the positive significant effect of this variable on the investment of young firms (-0.2%) disappears. Compared to the last interaction term used, the effect of the user cost of capital on investment decreases slightly for large firms and increases for old firms. However, in both cases it increases as the share of loans from one bank in total short-term loans increases (see table 10).

As before, the liquidity ratio remains positive and significant for all groups of firms. However, the effect on investment is as large as it was when no interaction term was included. The exception is the group of young firms. There are also rather large differences in-between size and age groups. Compared to large firms (28.1%) the effect of the liquidity ratio is much smaller for small firms (17.8%) and for young firms (12.4%) compared to old firms (19.4%). Moreover, for all groups except old firms the size of the effect becomes smaller as the interaction variable becomes larger (see table 10).

In summary, it is found here that the intensity and significance of both the interest rate channel and the credit channel are conditional on whether the firm has a close lending relationship with a bank or not. It can be concluded that an exclusive relationship with a bank seems to help firms to be less dependant on their financial position but does not isolate them from changes in the interest rate channel. The largest exception seems to be the case of small firms for which a larger concentration of loans from one single bank on bank loans decreases the effect of the interest rate channel on investment. The change on

the intensity of the interest rate channel is, however, very small. It is also found that these results are very similar no matter which variable is used to account for a house bank.

6. Summary and conclusions

Due to Austria's monetary policy and financial structure it is widely believed that the effects of monetary policy through the credit channel are much more important than the those predicted under the traditional monetary view. The investigation of the credit channel with a sample of Austrian firms for the period 1994 to 1999 tends to confirm the existence of a credit channel in Austria. Financial variables are significant determinants of investment demand and considerable differences exist in the investment behavior across groups of firms.

Contrary to what has been suggested before, growth of sales contributes to explain investment behavior as long as no financial variables are taken into account. In general not only the significance but also the long run elasticity of sales growth diminishes when financial variables or an interaction term are included in the regression. There are also considerable differences across groups of firms: young firms are more dependent on sales than other groups of firms. This may be due to the larger informational asymmetries that young firms face.

The interest rate channel is weak, but it does exist for some groups of firms. The size and significance of the effect of the user cost of capital on investment depends not only on the type of firm, but also on other variables included in the regression, which capture informational asymmetries, access to capital and financial markets, etc. The direction of the change, however, is not unique. As in the case of sales, the effect of the user cost of capital on investment diminishes with the presence of financial variables. However, it is found that the effect and significance of the user cost of capital on investment does not necessarily decrease with size or age. This is not the case either when variables that should be expected to dampen the interest rate channel, such as the share of trade credit or the existence of a house bank, are included in the regression.

The liquidity ratio seems to be the most important determinant of investment demand in Austria. It is almost always significant and the size of the effect is also much larger than the effect of the other variables. However, the total effect is conditional on other characteristics of the firms studied here. It is shown that firms may be able to diminish their dependence on internal funds by using trade credit or having close relationships to a house bank. Although these relationships seem to weaken the credit channel, they do not necessarily weaken the interest rate channel when such a channel exists. This confirms the view, that trade credit and the house bank principle help overcome liquidity constraints but do not dampen the effect of the interest rate on investment.

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APPENDIX

Data Definitions

Investment: was defined as the reported increases by acquisition of tangible (fixed) assets.

The stock of capital: was calculated using the perpetual inventory method with a depreciation rate of 10%.

Investment Ratio: Investment in year t divided by capital stock in year t-1.

Output: net sales

Gross Debt was defined as total liabilities – equity – capital like liabilities – social capital – long term reserves.

Liquidity ratio: is defined as liquid assets in year t to capital stock in year t-1

Trade Credit: trade debt + partner liabilities + deferred payments.

Corporate tax rate: the corporate tax rate is 34% since 1994

Investment tax credit:

Year	Rate according to Law	Rate used
1994	until March 31, 1994, the limit of the tax credit was 30%, afterwards the maximum rate was 15% for machinery and equipment and 10% for vehicles.	15%
1995	between May 1, 1995 and May 31, 1996 the maximum rate was set at 9% for machinery and equipment and 6% for vehicles.	9%
1996	between June 1, 1996 and December 31, 1997 the rate was set at 12% for new equipment and machinery, 9% for used equipment and machinery and 6% for vehicles.	9%
1997		10%
1998	between January 1, 1998 and December 31, 2000 the maximum rate was set at 9% for machinery and equipment and 6% for vehicles.	8%
1999		8%

Table 1. Financial Structure of Austrian Firms

	1989	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Asset structure (as % of total assets)											
Total real fixed assets	34.56	34.87	33.18	32.59	34.96	32.24	32.08	37.89	42.28	42.89	36.60
Total financial fixed assets	1.40	1.51	2.90	3.54	3.81	4.54	6.03	8.29	7.40	7.48	8.76
Total inventories	25.33	24.91	23.01	25.30	22.50	22.67	25.65	19.82	17.11	15.17	18.08
Total trade credit	23.11	22.39	22.00	20.98	19.34	19.71	17.01	13.89	12.49	11.94	14.81
Total all other assets	15.60	16.32	18.91	17.59	19.40	20.85	19.23	20.12	20.73	22.52	21.75
Liability structure (as % of total liabilities)											
Loans from credit institutions	40.90	41.44	28.05	36.18	38.05	34.75	30.48	23.41	23.04	23.59	23.96
Loans with maturity less than one year	25.53	25.43	18.71	26.29	22.10	19.87	20.05	14.87	15.54	14.82	16.32
Loans with maturity more than one year	15.37	16.01	9.33	9.89	15.95	14.88	10.43	8.54	7.51	8.77	7.64
Debt securities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85	1.10	1.11	0.88
Trade debt	20.34	18.84	16.88	14.53	14.08	14.53	12.73	10.50	9.69	9.33	11.13
All other debt	22.43	22.18	32.24	23.08	14.00	20.83	24.39	20.58	21.54	21.18	19.43
Equity and reserves	12.09	12.54	16.55	17.26	16.46	18.65	18.96	27.59	28.76	30.67	28.98
All other liabilities	4.24	5.00	6.29	8.95	17.41	11.23	13.45	16.07	15.87	14.13	15.62
Flow indicators (as % of total assets)											
Gross investment	2.87	3.86	4.31	4.34	10.59	9.71	9.02	9.52	7.09	8.24	10.04
Cash flow	12.75	12.91	11.69	10.60	12.04	11.47	10.78	9.44	9.31	10.18	11.27
Net operating profit	6.41	6.52	6.25	5.11	5.55	5.57	5.34	3.93	4.02	4.70	5.78
Interest and similar charges	3.84	4.37	4.07	3.80	4.16	3.37	2.87	2.09	1.89	1.77	1.52

Note**:** everything in percentages.
Source: Oesterreichische Nationalbank

Graph 1. User cost of capital with taxes and financial structure (WACC with taxes) and interest rates

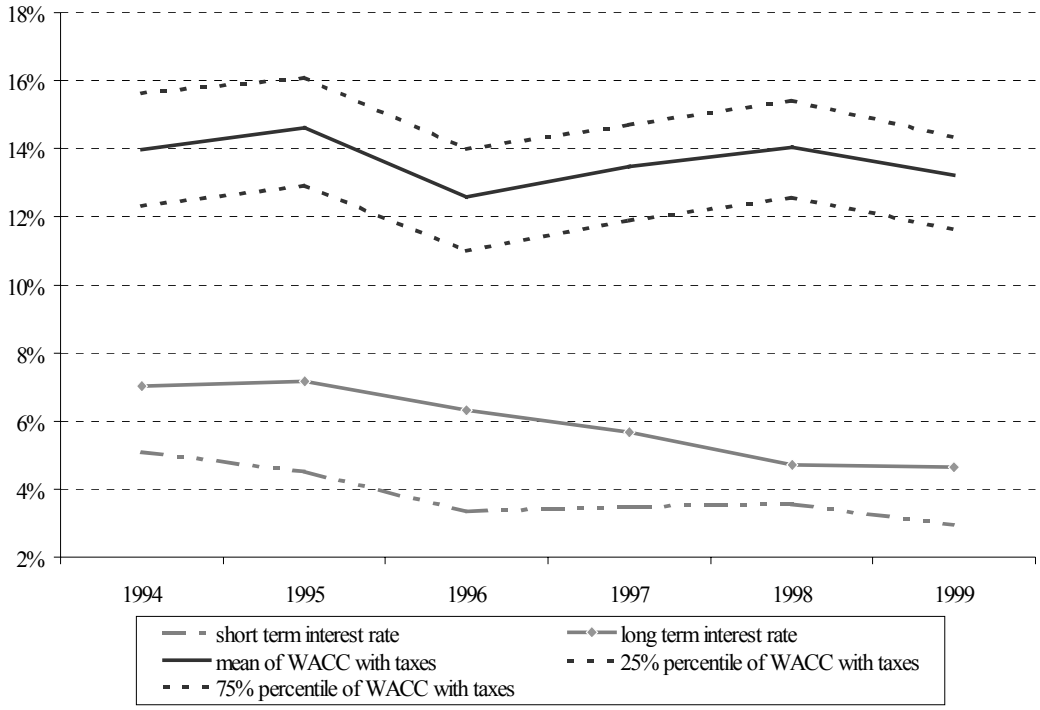

Table 2. Statistics

Group	*Obs.*	*Mean*	*Std.Dev.*	*Min*	*Max*
Number of employees (size)					
all	4,158	320	517	1	4,948
small	701	31	15	1	54
large	3,457	379	549	55	4,948
young	496	337	443	3	2,913
old	3,662	318	526	1	4,948
Years since foundation (age)					
all	4,158	28	22	2	136
small	701	25	20	2	94
large	3,457	28	22	2	136
young	496	6	2	2	8
old	3,662	31	21	9	136
Investment Ratio (in percentage)					
all	4,158	9.93	9.06	0.00	58.13
small	701	7.23	8.91	0.02	58.13
large	3,457	10.48	9.00	0.00	58.06
young	496	10.61	9.94	0.01	55.39
old	3,662	9.84	8.93	0.00	58.13
Logarithm of net sales					
all	4,158	12.80	1.27	9.18	17.62
small	701	11.44	0.81	9.18	14.82
large	3,457	13.08	1.17	10.47	17.62
young	496	13.06	1.18	10.05	15.74
old	3,662	12.77	1.28	9.18	17.62
Growth of net sales (in percentage)					
all	4,158	3.22	14.49	-71.55	72.80
small	701	1.49	15.17	-67.89	63.61
large	3,457	3.57	14.32	-71.55	72.80
young	496	5.56	15.01	-54.15	72.80
old	3,662	2.91	14.39	-71.55	66.20
Debt ratio (in percentage)					
all	4,158	70.76	20.83	8.44	184.35
small	701	74.02	24.89	9.87	179.30
large	3,457	70.10	19.84	8.44	184.35
young	496	71.74	19.97	15.15	143.89
old	3,662	70.63	20.94	8.44	184.35
Liquidity Ratio (in percentage)					
all	4,158	48.40	32.95	0.15	215.63
small	701	52.02	33.95	0.15	200.94
large	3,457	47.67	32.70	0.74	215.63
young	496	45.34	30.30	2.46	203.11
old	3,662	48.82	33.28	0.15	215.63

Table 2. Statistics (continuation)

Group	*Obs.*	*Mean*	*Std.Dev.*	*Min*	*Max*
User cost of capital with taxes (in percentage)					
all	4,158	12.33	2.25	5.97	28.09
small	701	12.48	2.56	6.92	22.47
large	3,457	12.30	2.18	5.97	28.09
young	496	12.45	2.48	7.32	28.09
old	3,662	12.31	2.21	5.97	25.53
Trade credit share in short term debt (in percentage)					
all	4,154	37.43	21.04	0.24	98.59
small	698	44.18	23.18	0.24	98.59
large	3,456	36.07	20.31	0.38	95.67
young	496	35.37	20.08	2.41	94.04
old	3,658	37.71	21.15	0.24	98.59
Number of Banks					
all	3,758	4	4	1	79
small	545	2	1	1	7
large	3,213	4	4	1	79
young	460	4	3	1	23
old	3,298	4	4	1	79
Largest share of loans from one bank in total loans from banks (in percentage)					
all	3,797	69.90	24.72	10.09	100.00
small	529	84.08	20.62	25.97	100.00
large	3,268	67.61	24.57	10.09	100.00
young	466	65.93	25.79	16.82	100.00
old	3,331	70.46	24.52	10.09	100.00
Largest share of long term loans from one bank in long term loans from banks (in %)					
all	3,578	72.63	24.80	7.54	100.00
small	485	88.28	18.56	26.37	100.00
large	3,093	70.18	24.76	7.54	100.00
young	444	68.29	25.25	17.36	100.00
old	3,134	73.25	24.68	7.54	100.00
Largest share of short term loans from one bank in short term loans from banks (in %)					
all	3,170	82.05	20.86	15.67	100.00
small	438	88.67	17.33	38.32	100.00
large	2,732	80.99	21.18	15.67	100.00
young	408	79.49	20.93	23.91	100.00
old	2,762	82.43	20.83	15.67	100.00

Table 3
Neoclassical Investment Demand without the Liquidity Ratio (Equation 4)
GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***large***		***old***	
I_{t-1}/K_{t-2}	0.130	0.034	0.183	0.043	0.121	0.033
Growth of $Sales_t$	0.192	0.089	0.161	0.070	0.124	0.082
Growth of $Sales_{t-1}$	0.039	0.016	0.041	0.014	0.043	0.016
Change in UCC_t	-0.102	0.114	-0.141	0.073	-0.234	0.082
Change in UCC_{t-1}	-0.018	0.032	-0.038	0.023	-0.058	0.025
Long run elasticity:[1)]						
Growth of Sales	0.266	(0.017)	0.247	(0.010)	0.191	(0.066)
Change in User Cost	-0.139	(0.394)	-0.219	(0.050)	-0.333	(0.004)
			small		***young***	
I_{t-1}/K_{t-2}			-0.291	0.149	-0.001	0.116
Growth of $Sales_t$			-0.111	0.115	0.170	0.128
Growth of $Sales_{t-1}$			-0.016	0.028	-0.076	0.036
Change in UCC_t			-0.003	0.036	0.215	0.054
Change in UCC_{t-1}			0.009	0.023	0.119	0.031
Long run elasticity:[1)]						
Growth of Sales			0.068	(0.467)	0.298	(0.007)
Change in User Cost			-0.156	(0.096)	0.047	(0.689)
Long run differential coefficient						
Growth of Sales			-0.18		0.11	
Change in User Cost			0.06		0.38	
Number of obs.	2,652		2,652		2,652	
Wald test	30.96		40.44		61.85	
Sargan test	24.32		37.64		49.81	
p-value	0.500		0.901		0.481	
m1:	-9.98		-9.66		-9.87	
p-value	0.000		0.000		0.000	
m2:	1.78		1.66		1.35	
p-value	0.075		0.097		0.176	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 4
Neoclassical Investment Demand with the Liquidity Ratio (Equation 5)
GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***large***		***old***	
I_{t-1}/K_{t-2}	0.057	0.041	0.101	0.044	0.076	0.042
Growth of $Sales_t$	0.014	0.070	0.018	0.056	0.038	0.054
Change in UCC_t	-0.018	0.096	-0.050	0.065	-0.016	0.063
Change in UCC_{t-1}	-0.023	0.028	-0.035	0.022	-0.021	0.020
Liquidity $Ratio_t$	0.202	0.097	0.202	0.065	0.146	0.053
Liquidity $Ratio_{t-1}$	0.067	0.057	0.026	0.046	0.060	0.036
Long run elasticity:[1)]						
Growth of Sales	0.015	(0.837)	0.020	(0.750)	0.041	(0.484)
Change in User Cost	-0.044	(0.724)	-0.094	(0.289)	-0.040	(0.627)
Liquidity Ratio	0.285	(0.000)	0.254	(0.000)	0.224	(0.000)
			small		***young***	
I_{t-1}/K_{t-2}			-0.220	0.133	-0.303	0.122
Growth of $Sales_t$			-0.003	0.074	0.232	0.097
Change in UCC_t			-0.012	0.030	0.112	0.045
Change in UCC_{t-1}			0.019	0.019	0.073	0.027
Liquidity $Ratio_t$			-0.144	0.069	0.001	0.060
Liquidity $Ratio_{t-1}$			0.053	0.045	0.170	0.057
Long run elasticity:[1)]						
Growth of Sales			0.013	(0.789)	0.219	(0.001)
Change in User Cost			-0.070	(0.368)	0.122	(0.043)
Liquidity Ratio			0.122	(0.001)	0.308	(0.000)
Long run differential coefficient						
Growth of Sales			-0.01		0.18	
Change in User Cost			0.02		0.16	
Liquidity Ratio			-0.13		0.08	
Number of obs.	2,652		2,652		2,652	
Wald test	39.62		57.68		105.14	
Sargan test	39.74		70.00		70.34	
p-value	0.229		0.410		0.399	
m1:	-8.03		-8.90		-8.39	
p-value	0.000		0.000		0.000	
m2:	1.35		1.39		0.96	
p-value	0.176		0.165		0.337	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 5
Investment Demand with Liquidity Ratio (Equation 6)
Interaction term: share of trade credit in short term debt
GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***Large***		***old***	
I_{t-1}/K_{t-2}	-0.068	0.100	0.011	0.079	-0.034	0.077
Growth of $Sales_t$	0.076	0.068	-0.010	0.048	0.042	0.051
Change in UCC_t	0.031	0.077	-0.097	0.048	-0.142	0.044
Change in UCC_{t-1}	0.000	0.023	-0.034	0.021	-0.051	0.021
Liquidity $Ratio_t$	0.097	0.067	-0.013	0.045	-0.005	0.025
Liquidity $Ratio_{t-1}$	0.037	0.041	-0.002	0.039	0.047	0.025
Interaction Term (IT)	0.171	0.096	-0.043	0.058	-0.011	0.039
I_{t-1}/K_{t-2}*(IT)	0.219	0.256	0.168	0.186	0.237	0.181
Growth of $Sales_t$*(IT)	-0.062	0.176	0.155	0.126	-0.052	0.127
Change in UCC_t*(IT)	0.083	0.072	0.072	0.076	0.218	0.062
Change in UCC_{t-1}*(IT)	0.048	0.039	0.035	0.043	0.064	0.039
Liquidity $Ratio_t$*(IT)	-0.072	0.129	0.239	0.107	0.101	0.053
Liquidity $Ratio_{t-1}$*(IT)	0.124	0.048	0.204	0.058	0.136	0.036
Long run elasticity:[1)]						
Growth of Sales	0.053	(0.249)	0.052	(0.159)	0.024	(0.435)
Change in User Cost	0.081	(0.311)	-0.098	(0.032)	-0.093	(0.052)
Liquidity Ratio	0.156	(0.001)	0.163	(0.000)	0.138	(0.000)
Interaction Term (IT)	0.160	(0.099)	-0.044	(0.452)	-0.011	(0.776)
			Small		***young***	
I_{t-1}/K_{t-2}			-0.446	0.122	-0.413	0.137
Growth of $Sales_t$			0.040	0.073	0.301	0.076
Change in UCC_t			0.094	0.056	0.242	0.068
Change in UCC_{t-1}			0.011	0.034	0.110	0.037
Liquidity $Ratio_t$			0.073	0.044	0.065	0.035
Liquidity $Ratio_{t-1}$			0.051	0.039	0.051	0.020
Interaction Term (IT)			0.073	0.051	0.008	0.032
I_{t-1}/K_{t-2}*(IT)			0.478	0.285	0.185	0.357
Growth of $Sales_t$*(IT)			-0.236	0.168	-0.346	0.150
Change in UCC_t*(IT)			-0.174	0.120	-0.388	0.145
Change in UCC_{t-1}*(IT)			-0.002	0.069	-0.053	0.080
Liquidity $Ratio_t$*(IT)			-0.320	0.107	-0.085	0.060
Liquidity $Ratio_{t-1}$*(IT)			-0.184	0.058	0.002	0.045
Long run elasticity:[1)]						
Growth of Sales			-0.014	(0.501)	0.156	(0.000)
Change in User Cost			-0.055	(0.158)	0.084	(0.011)
Liquidity Ratio			0.045	(0.032)	0.167	(0.000)
Interaction Term (IT)			0.021	(0.477)	-0.002	(0.943)
Long run differential coefficient						
Growth of Sales			-0.066		0.132	
Change in User Cost			0.043		0.177	
Liquidity Ratio			-0.118		0.030	
Interaction Term (IT)			0.064		0.008	
mean of (IT)	37.42%		44.18%		35.37%	
Number of obs.	2,645		2,645		2,645	
Wald test	65.64		288.36		608.24	
Sargan test	69.92		131.43		149.49	
p-value	0.704		0.906		0.588	
m1:	-8.68		-8.57		-8.64	
p-value	0.000		0.000		0.000	
m2:	0.81		0.78		0.63	
p-value	0.420		0.434		0.531	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 6
Investment Demand with Liquidity Ratio (Equation 6)
Interaction term: log. of the number of banks with which a firm has business deals
GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***Large***		***old***	
I_{t-1}/K_{t-2}	0.190	0.123	0.222	0.099	0.195	0.084
Growth of $Sales_t$	0.031	0.070	-0.063	0.056	0.022	0.046
Change in UCC_t	0.078	0.065	-0.057	0.039	-0.033	0.037
Change in UCC_{t-1}	0.008	0.023	-0.028	0.021	-0.001	0.018
Liquidity $Ratio_t$	0.113	0.089	0.109	0.042	-0.038	0.036
Liquidity $Ratio_{t-1}$	0.023	0.049	0.001	0.049	0.083	0.031
Interaction Term (IT)	-0.021	0.040	-0.014	0.019	-0.046	0.019
I_{t-1}/K_{t-2}*(IT)	-0.155	0.104	-0.148	0.080	-0.147	0.071
Growth of $Sales_t$*(IT)	0.014	0.051	0.065	0.046	0.041	0.037
Change in UCC_t*(IT)	0.009	0.018	0.012	0.019	0.000	0.016
Change in UCC_{t-1}*(IT)	0.003	0.013	0.005	0.014	-0.006	0.012
Liquidity $Ratio_t$*(IT)	0.001	0.050	0.020	0.032	0.059	0.029
Liquidity $Ratio_{t-1}$*(IT)	0.023	0.026	0.047	0.027	0.017	0.019
Long run elasticity:[1)]						
Growth of Sales	0.048	(0.313)	0.006	(0.864)	0.068	(0.017)
Change in User Cost	0.101	(0.197)	-0.072	(0.107)	-0.042	(0.348)
Liquidity Ratio	0.165	(0.005)	0.192	(0.000)	0.130	(0.000)
Interaction Term (IT)	-0.026	(0.593)	-0.018	(0.448)	-0.057	(0.010)
			Small		***young***	
I_{t-1}/K_{t-2}			-0.474	0.129	-0.711	0.143
Growth of $Sales_t$			0.098	0.063	0.283	0.085
Change in UCC_t			-0.014	0.035	0.042	0.055
Change in UCC_{t-1}			-0.005	0.023	0.060	0.037
Liquidity $Ratio_t$			-0.097	0.042	0.031	0.041
Liquidity $Ratio_{t-1}$			0.112	0.047	0.086	0.032
Interaction Term (IT)			0.003	0.023	0.019	0.014
I_{t-1}/K_{t-2}*(IT)			0.261	0.113	0.278	0.103
Growth of $Sales_t$*(IT)			-0.153	0.054	-0.173	0.058
Change in UCC_t*(IT)			0.010	0.035	0.023	0.042
Change in UCC_{t-1}*(IT)			0.000	0.023	0.005	0.026
Liquidity $Ratio_t$*(IT)			0.032	0.043	0.028	0.032
Liquidity $Ratio_{t-1}$*(IT)			-0.068	0.028	-0.052	0.018
Long run elasticity:[1)]						
Growth of Sales			0.027	(0.310)	0.102	(0.003)
Change in User Cost			-0.063	(0.058)	0.071	(0.080)
Liquidity Ratio			0.139	(0.000)	0.159	(0.000)
Interaction Term (IT)			-0.008	(0.551)	-0.018	(0.096)
Long run differential coefficient						
Growth of Sales			0.022		0.034	
Change in User Cost			0.009		0.114	
Liquidity Ratio			-0.054		0.029	
Interaction Term (IT)			0.010		0.040	
mean of (IT)	1.055		0.444		1.225	
Number of obs.	2,287		2,287		2,287	
Wald test	27.11		268.43		187.74	
Sargan test	70.29		141.24		136.99	
p-value	0.693		0.761		0.834	
m1:	-7.58		-7.60		-7.11	
p-value	0.000		0.000		0.000	
m2:	0.90		0.55		0.57	
p-value	0.368		0.581		0.566	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 7
Investment Demand with Liquidity Ratio (Equation 6)
Interaction term: share of loans from bank with the largest percentage in total loans from banks. GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***Large***		***old***	
I_{t-1}/K_{t-2}	-0.250	0.198	-0.326	0.149	-0.463	0.149
Growth of $Sales_t$	0.251	0.146	0.254	0.111	0.446	0.094
Change in UCC_t	0.101	0.078	-0.016	0.063	-0.019	0.056
Change in UCC_{t-1}	-0.003	0.038	-0.003	0.035	-0.034	0.035
Liquidity $Ratio_t$	0.131	0.120	0.192	0.079	0.130	0.073
Liquidity $Ratio_{t-1}$	0.019	0.052	0.090	0.037	0.066	0.035
Interaction Term (IT)	0.033	0.098	0.047	0.054	-0.053	0.060
I_{t-1}/K_{t-2}*(IT)	0.468	0.293	0.635	0.231	0.775	0.214
Growth of $Sales_t$*(IT)	-0.302	0.184	-0.395	0.151	-0.537	0.125
Change in UCC_t*(IT)	-0.056	0.064	-0.009	0.065	-0.027	0.060
Change in UCC_{t-1}*(IT)	0.012	0.041	-0.025	0.043	0.029	0.041
Liquidity $Ratio_t$*(IT)	-0.159	0.134	-0.123	0.090	-0.142	0.089
Liquidity $Ratio_{t-1}$*(IT)	0.024	0.044	-0.015	0.039	0.003	0.036
Long run elasticity:[1)]						
Growth of Sales	0.043	(0.320)	-0.025	(0.460)	0.077	(0.014)
Change in User Cost	0.072	(0.365)	-0.048	(0.399)	-0.056	(0.291)
Liquidity Ratio	0.061	(0.327)	0.209	(0.000)	0.107	(0.001)
Interaction Term (IT)	0.026	(0.746)	0.036	(0.406)	-0.036	(0.361)
			Small		***young***	
I_{t-1}/K_{t-2}			0.185	0.196	0.281	0.189
Growth of $Sales_t$			-0.382	0.124	-0.777	0.146
Change in UCC_t			-0.039	0.066	-0.010	0.094
Change in UCC_{t-1}			-0.075	0.046	0.058	0.061
Liquidity $Ratio_t$			0.015	0.072	0.046	0.057
Liquidity $Ratio_{t-1}$			-0.135	0.046	-0.069	0.036
Interaction Term (IT)			0.053	0.030	0.048	0.028
I_{t-1}/K_{t-2}*(IT)			-0.949	0.278	-0.928	0.291
Growth of $Sales_t$*(IT)			0.536	0.164	1.132	0.192
Change in UCC_t*(IT)			-0.006	0.090	0.184	0.121
Change in UCC_{t-1}*(IT)			0.091	0.060	0.019	0.088
Liquidity $Ratio_t$*(IT)			-0.076	0.083	-0.017	0.077
Liquidity $Ratio_{t-1}$*(IT)			0.148	0.056	0.076	0.048
Long run elasticity:[1)]						
Growth of Sales			0.032	(0.069)	0.032	(0.320)
Change in User Cost			-0.056	(0.094)	0.105	(0.025)
Liquidity Ratio			0.084	(0.000)	0.092	(0.003)
Interaction Term (IT)			0.088	(0.069)	-0.004	(0.934)
Long run differential coefficient						
Growth of Sales			0.056		-0.045	
Change in User Cost			-0.008		0.161	
Liquidity Ratio			-0.125		-0.015	
Interaction Term (IT)			0.052		0.032	
mean of (IT)	69.90%		84.08%		65.93%	
Number of obs.	2,327		2,327		2,327	
Wald test	33.54		654.12		335.74	
Sargan test	76.35		138.26		140.45	
p-value	0.499		0.814		0.776	
m1:	-8.25		-7.49		-7.75	
p-value	0.000		0.000		0.000	
m2:	0.97		0.53		0.72	
p-value	0.331		0.598		0.469	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 8
Investment Demand with Liquidity Ratio (Equation 6)
Interaction term: share of long term loans from bank with the largest percentage in long term loans from banks. GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***Large***		***old***	
I_{t-1}/K_{t-2}	-0.150	0.173	0.017	0.129	-0.225	0.122
Growth of $Sales_t$	0.119	0.163	0.278	0.099	0.068	0.090
Change in UCC_t	0.054	0.092	-0.061	0.061	0.022	0.055
Change in UCC_{t-1}	-0.004	0.045	0.006	0.038	-0.020	0.037
Liquidity $Ratio_t$	0.094	0.124	0.145	0.083	0.076	0.054
Liquidity $Ratio_{t-1}$	0.015	0.057	0.048	0.039	0.075	0.033
Interaction Term (IT)	0.005	0.084	0.035	0.038	0.023	0.044
I_{t-1}/K_{t-2}*(IT)	0.318	0.251	0.099	0.195	0.450	0.171
Growth of $Sales_t$*(IT)	-0.084	0.200	-0.296	0.134	-0.031	0.109
Change in UCC_t*(IT)	-0.065	0.062	-0.014	0.065	-0.099	0.061
Change in UCC_{t-1}*(IT)	-0.009	0.047	-0.055	0.046	-0.007	0.042
Liquidity $Ratio_t$*(IT)	-0.118	0.138	-0.203	0.086	-0.054	0.068
Liquidity $Ratio_{t-1}$*(IT)	0.013	0.055	0.036	0.041	-0.055	0.034
Long run elasticity:[1)]						
Growth of Sales	0.063	(0.172)	0.069	(0.023)	0.050	(0.096)
Change in User Cost	-0.004	(0.971)	-0.115	(0.026)	-0.084	(0.070)
Liquidity Ratio	0.035	(0.564)	0.079	(0.074)	0.079	(0.002)
Interaction Term (IT)	0.005	(0.951)	0.036	(0.375)	0.019	(0.604)
			Small		***young***	
I_{t-1}/K_{t-2}			0.022	0.193	0.009	0.190
Growth of $Sales_t$			-0.416	0.125	-0.092	0.144
Change in UCC_t			0.152	0.086	-0.185	0.101
Change in UCC_{t-1}			-0.056	0.068	-0.033	0.057
Liquidity $Ratio_t$			0.128	0.096	0.159	0.053
Liquidity $Ratio_{t-1}$			-0.141	0.057	-0.038	0.024
Interaction Term (IT)			-0.017	0.025	0.082	0.025
I_{t-1}/K_{t-2}*(IT)			-0.344	0.264	-0.583	0.275
Growth of $Sales_t$*(IT)			0.463	0.158	0.140	0.183
Change in UCC_t*(IT)			-0.200	0.105	0.347	0.126
Change in UCC_{t-1}*(IT)			0.070	0.076	0.124	0.070
Liquidity $Ratio_t$*(IT)			0.004	0.104	-0.253	0.069
Liquidity $Ratio_{t-1}$*(IT)			0.106	0.064	0.061	0.040
Long run elasticity:[1)]						
Growth of Sales			0.047	(0.099)	0.037	(0.240)
Change in User Cost			-0.104	(0.009)	0.022	(0.555)
Liquidity Ratio			0.131	(0.000)	0.048	(0.088)
Interaction Term (IT)			0.019	(0.500)	0.086	(0.027)
Long run differential coefficient						
Growth of Sales			-0.023		-0.013	
Change in User Cost			0.011		0.106	
Liquidity Ratio			0.052		-0.031	
Interaction Term (IT)			-0.017		0.067	
mean of (IT)	72.63%		88.18%		68.19%	
Number of obs.	2,146		2,146		2,146	
Wald test	21.01		565.44		192.78	
Sargan test	74.73		135.19		144.4	
p-value	0.552		0.860		0.699	
m1:	-7.93		-7.86		-7.53	
p-value	0.000		0.000		0.000	
m2:	1.02		0.65		0.78	
p-value	0.307		0.514		0.433	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 9
Investment Demand with Liquidity Ratio (Equation 6)
Interaction term: share of short term loans from bank with the largest percentage in short term loans from banks. GMM-two step estimators in first differences

	Coeff.	*Std. Err.*	*Coeff.*	*Std. Err.*	*Coeff.*	*Std. Err.*
	all		***Large***		***old***	
I_{t-1}/K_{t-2}	0.003	0.265	0.070	0.153	-0.214	0.156
Growth of $Sales_t$	0.152	0.205	0.273	0.140	0.167	0.126
Change in UCC_t	0.019	0.094	-0.013	0.071	0.035	0.068
Change in UCC_{t-1}	0.104	0.069	0.118	0.053	0.078	0.056
Liquidity $Ratio_t$	0.002	0.100	0.065	0.055	0.059	0.050
Liquidity $Ratio_{t-1}$	0.234	0.050	0.249	0.037	0.165	0.034
Interaction Term (IT)	0.047	0.101	0.030	0.039	-0.057	0.048
I_{t-1}/K_{t-2}*(IT)	-0.022	0.334	-0.091	0.200	0.326	0.192
Growth of $Sales_t$*(IT)	-0.140	0.237	-0.305	0.157	-0.189	0.147
Change in UCC_t*(IT)	-0.081	0.091	-0.092	0.087	-0.186	0.074
Change in UCC_{t-1}*(IT)	-0.114	0.070	-0.157	0.059	-0.104	0.059
Liquidity $Ratio_t$*(IT)	0.077	0.106	0.039	0.061	-0.020	0.057
Liquidity $Ratio_{t-1}$*(IT)	-0.074	0.037	-0.077	0.033	-0.029	0.029
Long run elasticity:[1)]						
Growth of Sales	0.037	(0.328)	0.023	(0.403)	0.013	(0.603)
Change in User Cost	-0.037	(0.629)	-0.100	(0.007)	-0.133	(0.003)
Liquidity Ratio	0.235	(0.000)	0.281	(0.000)	0.194	(0.000)
Interaction Term (IT)	0.048	(0.666)	0.032	(0.471)	-0.047	(0.195)
			Small		***young***	
I_{t-1}/K_{t-2}			-0.252	0.138	0.641	0.197
Growth of $Sales_t$			-0.215	0.153	0.059	0.161
Change in UCC_t			-0.127	0.098	-0.115	0.152
Change in UCC_{t-1}			-0.234	0.068	0.069	0.075
Liquidity $Ratio_t$			0.076	0.045	-0.186	0.069
Liquidity $Ratio_{t-1}$			-0.132	0.037	0.149	0.035
Interaction Term (IT)			0.031	0.022	0.056	0.023
I_{t-1}/K_{t-2}*(IT)			0.028	0.179	-1.217	0.263
Growth of $Sales_t$*(IT)			0.182	0.174	0.114	0.188
Change in UCC_t*(IT)			0.181	0.117	0.238	0.178
Change in UCC_{t-1}*(IT)			0.294	0.076	-0.027	0.089
Liquidity $Ratio_t$*(IT)			-0.070	0.052	0.171	0.077
Liquidity $Ratio_{t-1}$*(IT)			0.061	0.037	-0.157	0.046
Long run elasticity:[1)]						
Growth of Sales			-0.025	(0.050)	0.127	(0.000)
Change in User Cost			-0.032	(0.118)	-0.002	(0.962)
Liquidity Ratio			0.178	(0.000)	0.124	(0.000)
Interaction Term (IT)			0.052	(0.107)	-0.002	(0.978)
Long run differential coefficient						
Growth of Sales			-0.048		0.114	
Change in User Cost			0.068		0.130	
Liquidity Ratio			-0.104		-0.070	
Interaction Term (IT)			0.020		0.045	
mean of (IT)	82.05%		88.67%		79.49%	
Number of obs. observations	1,705		1,705		1,705	
Wald test	39.51		10,176		516.96	
Sargan test	78.57		145.47		148.72	
p-value	0.429		0.676		0.605	
m1:	-7.23		-7.08		-7.41	
p-value	0.000		0.000		0.000	
m2:	-0.45		-0.49		0.06	
p-value	0.650		0.627		0.950	

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years. Time dummies and a constant were included but not reported. Instrumental variables: all lagged levels of endogenous and of all predetermined variables

[1)] evaluated at the mean of the interaction term, number in parenthesis are p-values of χ^2 test.

Table 10
Summary Table
Long run elasticities evaluated at different values of interaction term

	MIN	*MEAN*	*MAX*	*MIN*	*MEAN*	*MAX*	*MIN*	*MEAN*	*MAX*
Trade credit	***all***	***all***	***all***	***large***	***Large***	***large***	***old***	***old***	***old***
Growth of Sales	0.058	0.053	0.048	0.035	0.052	0.070	0.029	0.024	0.019
Change in User Cost	0.066	0.081	0.097	-0.107	-0.098	-0.088	-0.120	-0.093	-0.065
Liquidity Ratio	0.147	0.156	0.164	0.113	0.163	0.215	0.110	0.138	0.167
				small	***Small***	***small***	***young***	***young***	***young***
Growth of Sales				-0.007	-0.014	-0.022	0.180	0.156	0.129
Change in User Cost				-0.046	-0.055	-0.065	0.093	0.084	0.074
Liquidity Ratio				0.048	0.045	0.043	0.151	0.167	0.185
value of (IT)	27.42%	37.42%	47.42%	34.18%	44.18%	54.18%	25.37%	35.37%	45.37%
Number of banks	***all***	***all***	***all***	***large***	***Large***	***large***	***old***	***old***	***old***
Growth of Sales	0.047	0.048	0.048	-0.001	0.006	0.013	0.064	0.068	0.071
Change in User Cost	0.101	0.101	0.100	-0.075	-0.072	-0.069	-0.042	-0.042	-0.042
Liquidity Ratio	0.165	0.165	0.165	0.188	0.192	0.196	0.124	0.130	0.136
				small	***small***	***small***	***young***	***young***	***young***
Growth of Sales				0.034	0.027	0.021	0.111	0.102	0.093
Change in User Cost				-0.065	-0.063	-0.061	0.069	0.071	0.074
Liquidity Ratio				0.135	0.139	0.142	0.154	0.159	0.165
value of (IT)	0.955	1.055	1.155	0.344	0.444	0.544	1.125	1.225	1.325
share on total bank loans	***all***	***all***	***all***	***large***	***large***	***large***	***old***	***old***	***old***
Growth of Sales	0.072	0.043	0.011	0.019	-0.025	-0.075	0.125	0.077	0.021
Change in User Cost	0.074	0.072	0.071	-0.041	-0.048	-0.056	-0.052	-0.056	-0.061
Liquidity Ratio	0.072	0.061	0.049	0.209	0.209	0.208	0.113	0.107	0.100
				small	***small***	***small***	***young***	***young***	***young***
Growth of Sales				0.023	0.032	0.040	-0.016	0.032	0.079
Change in User Cost				-0.061	-0.056	-0.052	0.089	0.105	0.119
Liquidity Ratio				0.090	0.084	0.078	0.099	0.092	0.084
value of (IT)	59.90%	69.90%	79.90%	74.08%	84.08%	94.08%	55.93%	65.93%	75.93%
share on long term bank loans	***all***	***all***	***all***	***large***	***large***	***large***	***old***	***old***	***old***
Growth of Sales	0.070	0.063	0.056	0.101	0.069	0.037	0.051	0.050	0.049
Change in User Cost	0.004	-0.004	-0.012	-0.107	-0.115	-0.124	-0.069	-0.084	-0.101
Liquidity Ratio	0.045	0.035	0.025	0.096	0.079	0.061	0.087	0.079	0.071
				small	***small***	***small***	***young***	***young***	***young***
Growth of Sales				0.033	0.046	0.059	0.029	0.037	0.045
Change in User Cost				-0.089	-0.104	-0.119	-0.006	0.022	0.050
Liquidity Ratio				0.138	0.131	0.124	0.072	0.048	0.024
value of (IT)	62.63%	72.63%	82.63%	78.18%	88.18%	98.18%	58.19%	68.19%	78.19%
share on short term bank loans	***all***	***all***	***all***	***large***	***large***	***large***	***old***	***old***	***old***
Growth of Sales	0.051	0.037	0.023	0.054	0.023	-0.008	0.032	0.013	-0.007
Change in User Cost	-0.017	-0.037	-0.056	-0.076	-0.100	-0.124	-0.099	-0.133	-0.169
Liquidity Ratio	0.235	0.235	0.235	0.288	0.281	0.275	0.192	0.194	0.195
				small	***small***	***small***	***young***	***young***	***young***
Growth of Sales				-0.015	-0.025	-0.035	0.143	0.127	0.113
Change in User Cost				-0.051	-0.032	-0.014	0.004	-0.002	-0.008
Liquidity Ratio				0.182	0.178	0.173	0.136	0.124	0.113
value of (IT)	72.05%	82.05%	92.05%	78.67%	88.67%	98.67%	69.49%	79.49%	89.49%

NOTE:
Small firms: firms with less than employees 55, young firms: firms established in the last 10 years

Table 11
Summary Table
Long run elasticities evaluated at mean of interaction term

	no interaction term			trade credit					
	all	***large***	***old***	***all***	***large***	***old***	***all***	***large***	***old***
Growth of Sales	0.266 **	0.247 **	0.191 *	0.015	0.020	0.041	0.053	0.052	0.024
Change in User Cost	-0.139	-0.219 *	-0.333 **	-0.044	-0.094	-0.040	0.081	-0.098 **	-0.093 *
Liquidity Ratio				0.285 **	0.254 **	0.224 **	0.156 **	0.163 **	0.138 **
Interaction Term (IT)							0.160 *	-0.044	-0.011
		small	***young***		***small***	***young***		***small***	***young***
Growth of Sales		0.068	0.298 **		0.013	0.219 **		-0.014	0.156 **
Change in User Cost		-0.156 *	0.047		-0.070	0.122 **		-0.055	0.084 **
Liquidity Ratio					0.122 **	0.308 **		0.045 **	0.167 **
Interaction Term (IT)								0.021	-0.002
Long run differential coefficient									
Growth of Sales		-0.18	0.11	-0.02	-0.01	0.18		-0.066	0.132
Change in User Cost		0.06	0.38	0.04	0.02	0.16		0.043	0.177
Liquidity Ratio				-0.29	-0.13	0.08		-0.118	0.030
Interaction Term (IT)								0.064	0.008

	number of banks			share on total bank loans			share on long term bank loans			share on short term bank loans		
	all	***large***	***old***	***all***	***large***	***old***	***all***	***large***	***old***	***all***	***large***	***old***
Growth of Sales	0.048	0.006	0.068 **	0.043	-0.025	0.077 **	0.063	0.069 **	0.050 *	0.037	0.023	0.013
Change in User Cost	0.101	-0.072	-0.042	0.072	-0.048	-0.056	-0.004	-0.115 **	-0.084 *	-0.037	-0.100 **	-0.133 **
Liquidity Ratio	0.165 **	0.192 **	0.130 **	0.061	0.209 **	0.107 **	0.035	0.079 *	0.079 **	0.235 **	0.281 **	0.194 **
Interaction Term (IT)	-0.026	-0.018	-0.057 **	0.026	0.036	-0.036	0.005	0.036	0.019	0.048	0.032	-0.047
		small	***young***		***small***	***young***		***small***	***young***		***small***	***young***
Growth of Sales		0.027	0.102 **		0.032 *	0.032		0.047 *	0.037		-0.025 *	0.127 **
Change in User Cost		-0.063 *	0.071 *		-0.056 *	0.105 **		-0.104 **	0.022		-0.032	-0.002
Liquidity Ratio		0.139 **	0.159 **		0.084 **	0.092 **		0.131 **	0.048 *		0.178 **	0.124 **
Interaction Term (IT)		-0.008	-0.018 *		0.088 *	-0.004		0.019	0.086 **		0.052	-0.002
Long run differential coefficient												
Growth of Sales		0.022	0.034		0.056	-0.045		-0.023	-0.013		-0.048	0.114
Change in User Cost		0.009	0.114		-0.008	0.161		0.011	0.106		0.068	0.130
Liquidity Ratio		-0.054	0.029		-0.125	-0.015		0.052	-0.031		-0.104	-0.070
Interaction Term (IT)		0.010	0.040		0.052	0.032		-0.017	0.067		0.020	0.045

NOTE: Small firms: firms with less than employees 55, young firms: firms established in the last 10 years

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