Financing of SME's: An Asset Side Story

Jan Bartholdy
Aarhus School of Business
Department of Finance
Aarhus, Denmark
jby@asb.dk

and

Cesario Mateus
University of Greenwich Business School
Department of Accounting and Finance
London, United Kingdom
c.mateus@greenwich.ac.uk

ABSTRACT

The main sources of financing for small and medium sized enterprises (SMEs) are equity (internally generated cash), trade credit paid on time, long and short term bank credits, delayed payment on trade credit and other debt. The marginal costs of each financing instrument are driven by asymmetric information (cost of gathering and analysing information) and transactions costs associated with non-payment (costs of collecting and selling collateral). According to the Pecking Order Theory, firms will choose the cheapest source in terms of cost. In the case of the static trade-off theory, firms choose finance so that the marginal costs across financing sources are all equal, thus an additional Euro of financing is obtained from all the sources whereas under the Pecking Order Theory the source is determined by how far down the Pecking Order the firm is presently located. In this paper, we argue that both of these theories miss the point that the marginal costs are dependent of the use of the funds, and the asset side of the balance sheet primarily determines the financing source for an additional Euro. An empirical analysis on a unique dataset of Portuguese SME's confirms that the composition of the asset side of the balance sheet has an impact of the type of financing used and the Pecking Order Theory and the traditional Static Trade-off theory are rejected.

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JEL classification codes: G3, G32

Introduction

What determines the capital structure of a firm? The academic literature has presently two theories: the Pecking Order Theory and the Static Trade-off theory. In the Pecking Order Theory, firms choose the cheapest funding source first and when exhausted move to the second one etc until they end up with external equity. The difference in costs between the funding sources, besides risk, is due to asymmetric information and adverse selection. The second theory is the static trade-off theory, which, in most cases, is used to explain the choice between debt and equity, but it also applies to the composition of debt. In this theory, firms choose financing such that marginal costs of the funding sources are equal and in equilibrium, an additional Euro of activity (investment, increase in working capital etc) is financed by an equal amount (at least for very small increments in activity) of each financing source. In the Pecking Order Theory it is irrelevant what an additional Euro of financing is being used for all that matters is the adverse selection costs associated with each funding source. In the Static Trade off theory an additional Euro of required financing is raised from all the financing sources independently of its use. In this paper, we argue that due to asymmetric information and the solution to this problem for different providers of funding (primarily banks and other firms in the form of Trade credits) the marginal costs of each funding source **are** a function of the use of the funds. Thus, the composition of the asset side or the intended use of funds determines the source of the funds and more generally the capital structure; in particular purchases of Goods and Services is financed by Trade Credits, investments in fixed assets by Long Term Bank Loans and Debtors and other parts of Working Capital by Short Term Bank Loans. The theory is tested using (unbalanced) panel data set of Portuguese firms. Why Portuguese firms? The first reason is that the Portuguese financial system is not as developed as in for example the US and we would therefore ceteris paribus expect that problems

associated with asymmetric information are acerbated in the Portuguese system. The second reason is that we have access to a unique and detailed panel dataset of Portuguese SME's.

We find that the composition of the asset side is an important determinant of the type of financing used by SME's, or to put in another way the marginal costs of the financing source is a function of the use of funds. The Pecking Order Theory is therefore, rejected. It is a question of interpretation whether the Static trade off theory is rejected or not. What is rejected is that in equilibrium an additional Euro of spending is financed by all the different types of debt independently of it's use, i.e. the marginal costs of funding depends on the use of the additional funds. This dependence is referred to as the Asset Side Theory, and is in contrast to the traditional Static Trade-off theory which holds that the marginal costs are equal and all funds used to finance an additional Euro of spending. The main difference between the two is the shape of the marginal costs curves, as to whether this qualifies as a new theory or is it part of the Static Trade-off Theory is a question of preference, below we have used the term Asset Side Theory to distinguish the two views for the purpose of clarification.

For SME's the main sources of financing are equity (internally generated cash), trade credit, bank credit and other debt. The choice of financing is driven by the costs of the source**s** which **is** primarily determined by costs of solving the asymmetric information problem and the expected costs associated with non-payment of debt. Asymmetric information costs arise from collecting and analysing information to support the decision of extending credit, and the non-payment costs are from collecting the collateral and selling it to recover the debt. Since SMEs' management and shareholders are often the same person, equity and internally generated funds have no asymmetric information costs and equity is therefore the cheapest source.

From ongoing business transactions and knowledge of the industry providers of trade credit had good information about the firm and the costs of solving the asymmetric information problem is relatively low. In case of non-payment, providers of trade credit are able to collect and sell the "collateral" (i.e. goods sold by them) depending on the type of goods at relatively low costs. Since the comparative advantage of providers of trade credits is in terms of gathering information and selling the goods (collateral) *provided by them* the amount of trade credit is also limited to the amount of goods and services delivered. The length of the credit period is a function of the nature of the goods and services sold. We expect very short periods for services and perishable goods since they have virtually no values as collateral, whereas raw materials may retain their value as collateral for longer periods and the suppliers are therefore willing to extend trade credit over longer periods as well. The primary determinant of the amount of trade credits is therefore the financial health of the firm and value of the types of goods and services sold as collateral. Although trade credits *paid on time* may be the cheapest source of external funds the firm is not able, in general, to finance all their activities using trade credits since the amount of available credit is restricted by the amount of goods and services delivered.

Banks have less information than the providers of trade credit and the cost of gathering information is higher than for providers of trade credit. In addition, the costs to banks of solving the asymmetric information problem may be higher for high growth firms etc. Providers of trade credit have an advantage over banks in selling the collateral they have themselves have manufactured and delivered, but due to their size and number of transactions, banks have an advantage in selling "general collateral" such as buildings, machinery etc. Thus banks have an advantage over providers of trade credits in issuing loans secured by "general collateral" such as long term bank loans. In the case of long-term bank loans, we expect the

value of loans is limited by the value of tangible assets as well as the variables representing the financial health of the firm.

Short-term bank credit is related to Working Capital. In particular, banks have comparative advantages in evaluating and to a certain extent collection of accounts receivables. Banks have to access the credit worthiness of the firm applying for the loans as well as the creditworthiness of the firms in the accounts receivables portfolio. Cash and cash equivalents, ie, the firm's liquidity, can also be used as collateral for Short Term Bank Loans**,** but the bank has no advantages in evaluating or using inventories as collateral. Thus, the key variable in explaining Short Term Bank Loans is Debtors (accounts receivables).

In the discussion, so far agency costs have not been mentioned. As discussed in Bartholdy and Mateus [2007] bank financing is a good way of solving these problems: Bank Loans may have a long maturity but the rates can be renegotiated e.g. every quarter and banks also can call in the loan. If a firm attempts to exploit the debt holders then banks have the possibility of imposing the "penalty" right away, which discourages these attempts. In an empirical analysis of the capital structure then the agency variables will no**t** be significant for bank-financed firms.

Other categories of debt credit card debt, car loans etc. that are dearer than bank loans. Once again, the variables determining this type of debt are financial health and performance. In the present study we have no idea what is included in this category and we suspect that it includes different types of debt for different firms.

The last financing source is trade credit where payments if payment is delayed the firm will forego the discount and if the time is long enough penalty payment making this type financing rather expensive.

Asymmetric information therefore gives rise to costs associated with the provision of funds. It appears that equity has the lowest asymmetric financing costs, followed by bank credit, overdrawn trade credits and other debt. Although there are cost differences generated by asymmetric information, we do not have a Pecking Order financing structure since firms cannot choose between financing sources independently of the asset side of the balance sheet.

The rest of this paper is organized as follows. Section 1 discusses the data for the study and Section 2 develops a theory of Pecking Order theory for SME's. Section 3 tests the theory and Section 4 concludes the study.

1. Financing of SME's in Portugal and data description

The primary data source for this study is the Bank of Portugal Statistical Departments database. This database contains balance sheet and income statement data on 1,811 non-listed firms with 11,359 non-continuous firm year observations. Several selection criteria were impose for inclusion in the sample: Only manufacturing firms for the period 1990-1999 with more than 100 employees with data for at least one year were included. Firms with negative net worth and less than three years continuous data are not included in the sample. Firms with observations lying at the tails of the distribution are deleted from the sample, that is, if the firm has observations in either tail (0,5%) of the distribution. The final sample consists of 1416 firms and 7546 firm year observations. 271 firms have data for the entire sample and

about 200 firms have data for 1 or two years only. Around 100 firms have data from 4 to 9 years. Thus the dataset is an unbalanced panel sample data with an overweighted with firms which have only a few years of observations and firms with data for the entire period.

[PLEASE insert Table 1 here]

[PLEASE insert Table 2 here]

From Table 2 the number of observations is well distributed among the years with between 700 and 800 observations for each year. Surprisingly, the years with fewer observations are 1991**,** 1993 and 2000. Looking at the distribution of observations across the industries "Textiles and clothes" industry contributes most with a third of the total observations. The "Heavy industry" and "Wood and paper paste" are the smallest with about 15% each of the observations. The sample is in general representative for the Portuguese economy as a whole.

[PLEASE insert Table 3 here]

Looking at the average size balance sheet in Table 3 Portuguese firms have close to 50% equity whereas Rajan and Zingales [1995] report that large listed firms in the G7 countries have equity ranging from 28% (Germany) to 42% (UK). However, Berger and Udell [1998] reports equity levels at around 50% for a sample of US SME's. Thus it appears that Portuguese firms are financed in the same manner with respect to the choice of debt and equity as the smaller and medium sized US firms even though the Portuguese economy is significantly less developed than the US as represented by the importance of the "Textile and clothes" industry to the Portuguese economy.

The amount of current liabilities in Portugal ranges from 33% to 40%, whereas for the G7 countries it ranges from 23% for Canada to 43.2% for Italy and 43%.4 (66%) for France. Thus Portugal has slightly more current liabilities than the average G7 country (treating France as an outlier). The composition of the current liabilities is dominated by bank loans (between 8% and 13%) and trade credits (between 8% and 14%) and other liabilities around 10%. Banks also dominates the long term debt where they account for between 9 and 13%. Thus overall banks or financial institutions accounts for around 20 to 25% of the financing in terms of loans. This is in line with US SME's where banks account for around 25% of the financing (Berger and Udell [1998], Table1). The use of trade credits in the US is around 15% thus slightly higher than in Portugal. This is surprising since a priori one would expect that in countries with well developed financial institutions firms make less use of trade credits, i.e. firms leave the intermediary business to the financial institutions instead of acting as banks themselves. However, there is a category called "Other Current Liabilities" accounting for 10% of the financing in Portugal and it may be that this type of financing is classified as "Trade credits" in Berger and Udell [1998]. Thus it is not possible on the current data to explore if this difference is a significant difference representing economic fundamentals or just a difference in classification. UK data for trade credits of SME's is also in line with Portugal and the US at around 11% (Poutziouris et al. [2005]). It therefore appears as if SME's in Portugal are financed in more or less the same way as in the US, but differently to large listed firms in the G7.

Finally on the liability side there is also an item called "Accrued Expenses" this item contains items that should be recognized this year but they are expenses and will only occur next year, these include (vacation subsidies, social expenses, rent, etc.).

The difference in financing structure between SME's in general and large listed firms in the G7 may be driven by differences in asymmetric information. Small firms are in general more informational opaque than larger firms and larger firms therefore have easier access to financial markets and therefore rely less on banks and trade credits for financing.

Estimating trade credits

From Table 3 it is clear that the main source of financing are trade credits, bank financing and "other financing". But the definition of trade credits is not clear. To the borrower the price of trade-credit depends on the terms of the "loan". A standard textbook trade-credit contract is typically quoted as 2-10 net 30. This means, that the contract has a discount rate of 2% if the customer pays the bill within 10 days. Otherwise the full amount is due in 30 days. The contracts in Portugal differ from the standard textbook contract by not having the initial ten days thus a Portuguese contract is quoted as e.g. net 30 and the customer will receive the discount if the bill is paid within the 30 days[1]. Often the contract also contains a penalty rate if the payment is made after 30 days. According to Eurofactor [2006] the average payment terms for Portugal were 53 days in 2003, and the average late payment was 45 days. 88% of the companies in Portugal starts the debt recovery process after on average 42 days thus it appears that the threat of starting debt recovery has an impact since the average late payments is just below the average start of the debt recovery process[2].

Portugal has three types of trade credit, the first is trade credit with a discount, and all firms will take this one, since financing is free[3]. The second type of trade credit is financing during the "second period" from the end of the discount period to the date where the firm

[1] Evidence from a "non-scientific" phone survey to randomly selected firms in each industry.
[2] It is not possible to obtain survey evidence for the sample period 1990-2000, thus we have to rely on later periods for "validation" of the method used.
[3] It is possible that some firms obtain a cheaper price by foregoing the discount and pay at the delivery of the goods. Approximately 1% of the firms in the sample does not have any trade credits and may be affected by this.

starts legal proceedings to recover the payment. The financing during this period is expensive since the company foregoes the discount and there may be a penalty attached as well. Again from Eurofactor [2006] in 2005 22% of Portuguese companies imposed late payment charges and out of these 93% of the firms collects them. The last type of trade credit is during the third period when the supplier starts legal proceedings and trade-credit financing at this stage becomes very expensive both in terms of direct costs such as forgone discounts, late payment charges and lawyers fees, but also in terms of lost reputation and the lack of ability to obtain future trade-credit financing. In this paper the last two periods has been collapsed into one since it is not possible to obtain an estimate of when the companies proceed with legal proceedings.

The definitions of cheap and expensive trade credits are straight forward, if the number of credit days is larger than specified in the contract then the trade credits are expensive and if the number of credit days is below then they are classified as cheap trade credits. Unfortunately, it is not possible from the balance sheet to ascertain what type of trade credits the firms use nor do we have any information on the Trade Credit Terms. Thus we need to obtain two estimates, one for the number of credit days and one for the number of days specified in the contract to classify firm's trade credits as either cheap or expensive.

An estimate of the number of credit days can be obtained from the balance sheet and income statement as:

$$\text{Credit days} = \frac{\text{Amount of Trade - Credits (balance sheet)}}{\text{Cost of Goods Sold (income statement)} / 365}$$

Notice that the amount of trade credits comes from the balance sheet and is therefore measured at a point in time, i.e. the end of the fiscal year whereas cost of goods sold is a flow measure representing the costs over the previous time period, usually one year. The number of credit days is therefore a point estimate based on the amount of trade credits at the end of the fiscal year, and this number may, or may not, be a good estimate of the average amount of trade credits throughout the year. If there is seasonality in the purchase of goods and services then the estimate will be a function of the precise time of measurement. Consider an extreme example of a toy store that always pay at the due date of say 90 days and stock for the Christmas trade in November. If the fiscal year date is end of November then the amount of trade-credits is very large and the estimate of credit days will be correspondingly large whereas if the fiscal year end is the end of February then the estimate of trade credits will be very small. Even in a sample where all firms pay at the due date the point estimate will show significant variation due to random or seasonal variation in the amount of trade credits measured at the point in time.

The second estimate we need is of the standard contract terms in the industry. At our disposal is a point estimate of the actual credit days at the end of the fiscal year for each company. There are two factors influencing the number of actual credit days. The first is seasonality as discussed above. If the firm pays on time then our point estimate will fluctuate randomly around the number of days specified in the contract (a normal or symmetric distribution). This suggests using the average number of actual credit days for each industry as an estimate of the normal contract for the industry. However, the sample also includes firms that delay payments on the trade credit. The existence of firms with late payments influences that right hand side of the distribution and makes the distribution look like a log-normal distribution. The mean and median number of days in the sample is therefore

influenced by the number of firms in the sample that delays payment and cannot be used as an estimate of the terms of the contract[4]. Instead we assume that most firms choose to pay on time, i.e. at the end of the contract and claim the discount, thus we use the most common number of actual credit days as an estimate of the number of credit days written into the contract for a given industry. The next problem relates to the seasonality and randomness of the estimate of actual credit days. As shown in the Toy store example above, the number of credit days estimated from the balance sheet may be above the number of days specified in the contract even though the firm pays on time. Thus the influence of seasonality and randomness needs to be removed to isolate the firms with late trade credit payments. Since the right hand of the distribution is influenced by the number of firms with late payment it is not possible to use the entire distribution to estimate the variance of the number of actual credit days **for** firms that pay on time. But it is possible to use the left hand side since the late payment firms will not be found here. Thus the semi-variance is estimated using the left hand side and converted to the variance for the distribution by multiplying by 2:

$$s = \sqrt{\frac{2}{T^{-}}\left(\sum_{t}^{T^{-}} Min(0; actual\ credit\ days\text{-}contract\ days)^2\right)}$$

It is now possible to estimate cheap and expensive trade credit for each firm in the sample:

$$if\ \ actual\ credit\ days > contract\ credit\ days + 1.96\,s \ \ \Rightarrow Trade\ credit = expensive\ credit$$
$$if\ \ actual\ credit\ days < contract\ credit\ days + 1.96\,s \ \ \Rightarrow Trade\ credit = cheap\ credit$$

The average number of actual credit days for each industry is displayed in Figures 1 to 7. In Figure 1 the distribution of the number of credit days is shown for the entire sample. The

[4] If one is willing to assume a log-normal distribution then it is possible to obtain an estimate of the first moment of the distribution from the average. However, here we choose to use a simpler method that does not rely on the properties of the distribuition.

median number of days is 92. The average number of days is 106 and is larger than the median reflecting that the distribution is skewed to the right due to late payments. Eurofactor [2006] reports an average number of credit days of 83 days for 2005, thus the number of credit days has declined over time. A priori we would expect most firms to exploit the discount and pay on time, thus an estimate of the due date can be obtained by looking at the most common number of credit days (the tallest column in the figure). For the entire sample this is between 75 and 85 days. In 2005, Eurofactor [2006] reports an average number of credit days from contracts of 53, thus there has been a decrease in actual and contract credit days over time.

[PLEASE insert Table 4 here]

Figure 1 covers the entire sample and may therefore mask differences across industries. Figure 2-7 shows the distribution for the six industries. As expected the distribution of actual credit days is skewed to the right driven by the number of late paying firms. The estimate for the contract days for each industry is based on the most common number (largest column in the figures) rounded to an even number (30,40,..)[5]. The standard deviation ranges from 13 to 52 days. The cut-off days for cheap credit, i.e. if the number of credit days is larger than this number of days then the trade credit are defined as being expensive credits, is estimated as 1.96 times the estimate for the standard deviation plus the estimated value of the contract values (most common value). In table 4 the values ranges from 66 days to 212 days.

[PLEASE insert Table 5 here]

[5] NG, Smith and Smith [1999] reports that the normal contract issued by listed firms (Compustat firms) in the US is 2/10 net 30, that is a 2% discount is received if paid within 10 days otherwise payment has to be made within 30 days.

An estimate of the amount of cheap trade-credit is then obtained by comparing the actual credit days with the estimated days for the industry. If the actual number of credit days is below the estimated days for the industry then all of the trade-credits is classified as cheap-trade credit, i.e. the firm pays on or before the due date and claims the discount. If the actual number of days is above the estimated industry norm then all the trade-credits are classified as expensive, i.e. the firm pays after the due date and may have to pay a penalty and does not obtain the discount. From Table 5 there is a large variation in the use of expensive trade credits across industries. In the Machinery and equipment industry only 8% of the firms makes use of expensive credits whereas for Food and Drink and Heavy Machinery about 47% of the firms makes use of expensive credits. Howorth and Reber [2003] report results from a survey that for the UK 57% of SME's occasionally pay their creditors late, thus it appears that the estimates for Portugal in Table 5 are below those for the UK but more importantly our estimation procedure does not produce numbers out of line with survey evidence[6].

2. Asset side theory of SME financing

In the previous section we have suggested that SME's in Portugal are financed using internal generated cash, cheap trade credits, long and short-term bank loans and expensive trade credits and other loans. In this section the motives behind the different types of financing are discussed.

[6] NG, Smith and Smith [1999] reports that about 30% of US firms do not claim the discount offered by listed firms (Compustat firms).

2.1. Cheap Trade credits

The first external financing source we will discuss is trade-credits. Trade credits are interesting since they represent financial services provided by non-financial firms in competition with financial intermediaries. The early research within this area focused on the role of trade credits in relation to the credit channel or the so called "Meltzer" effect and in relation to the efficiency of monetary policy. The basic idea is that firms with direct access to financial markets, in general large well known firms, issue trade credits to small financially constrained firms (Bernanke and Blinder [1988]). The more recent research breaks the role of trade credits into a strategic motive and financial motive for issuing and using these credits[7].

Strategic motives

The first theory centers on asymmetric information regarding the firm's products. Trade credits are offered to the buyers so that the buyer can verify the quantity and quality before submitting payments. By offering trade finance the supplier signals to the buyers that they offer products of good quality. Since small firms, in general, have no reputation then these firms are forced to use trade credits to signal the quality of their products. The use of trade credits is therefore driven by asymmetric information of the products and is therefore more likely to be used by small firms, if the buyer has little information about the supplier, or the products are complicated and it is difficult to asses their quality.

The second strategic motive is pricing. Offering trade finance on favorable terms is the same as a price reduction for the goods. Thus firms can use trade credits to promote sales without officially reducing prices or use them as a tool for price discrimination between different buyers. Trade credits are most advantageous to risky borrowers since their costs of

[7] For a more general and broader discussion of trade credits see Smith [1987] and Petersen and Rajan [1997].

alternative financing are higher than for borrowers with good credit ratings. Thus trade credits can be used as tool for direct price discrimination but also as an indirect tool (if all buyers are offered the same terms) in favor of borrowers with a low credit standing.

Trade credits are also used to develop long term relationships between the supplier and the buyers. This often manifests itself by the supplier extending the credit period in case the buyer has temporary financial difficulties. Compared to financial institutions suppliers have better knowledge of the industry and are therefore better able to judge whether the firm has temporary problems or the problems are of a more permanent nature.

The last motive in not strictly a strategic motive but is based on transactions costs. Trade credits are an efficient way of performing the transactions since it is possible to separate between delivery and payment. In basic terms the truck driver delivering the goods does not have to run around to find the person responsible for paying the bills. The buyer also saves transactions costs by reducing the amount of cash required on "hand".

Financing motives

The basis for this view is that firms compete with financial institutions in offering credit to other firms. The traditional view of financial institutions is that they extend credit to firms where asymmetric information is a major problem. Financial institutions have advantages in collecting and analyzing information from, in particular, smaller and medium sized firms that suffer from problems of asymmetric information. The key to this advantage over financial markets lies in the close relationship between the bank and the firm and in the payment function. The financial institution is able to monitor the cash inflow and outflows of the firm by monitoring the accounts of the firm.

But with trade credits non-financial firms are competing with financial institutions in solving these problems and extending credit. How can non-financial institutions compete in this market? Petersen and Rajan [1997] briefly discusses several ways that suppliers may have advantages over financial institutions. The supplier has a close working association with the borrower and more frequently visits the premises than a financial institution does. The size and timing of the lenders orders with the supplier provides information about the conditions of the borrowers business. Notice that this information is available to the supplier before it is available to the financial institution since the financial institution has to wait for the cash flow associated with the orders. The use of early payment discounts provides the supplier with an indication of problems with creditworthiness in the firm. Again the supplier obtains the information before the financial institution does. Thus the supplier may be able to obtain information about the creditworthiness faster and cheaper than the financial institution.

The supplier may also have advantages in collecting payments. If the supplier has at least a local monopoly for the goods then the ability to withhold future deliveries is a powerful incentive for the firm to pay. This is a particular powerful threat if the borrower only accounts for a small fraction of the suppliers business. In case of defaults the supplier can seize the goods and in general has a better use for them than a financial intermediary sizing the same goods. Through its sales network the supplier can sell the reclaimed goods faster and at a higher price than what is available to a financial intermediary. These advantages, of course, depend on the durability of the goods and how much the borrower has transformed them.

If asymmetric information is one of the driving forces the explanation of trade credits then firms can use the fact that their suppliers have issued them credits in order to obtain additional

credit from the banks. The banks are aware that the supplier has better information thus the bank can use trade credits as signal of the credit worthiness of the firm.

That trade credits are in general secured by the goods delivered also puts a limit on the amount of trade credits the firm can obtain, thus the firm cannot use trade credits to finance the entire operations of the firm.

In summary the prediction is that the level of asymmetric information is relatively low between the providers of trade credit and the borrowers due to the issuer's general knowledge of the firm and the industry. In the empirical work below the variables explaining the use of trade credit are credit risk factors and Cost of Goods Sold. Since these trade credits are secured by the materials delivered to the firm**,** firms cannot "borrow" for more than the delivery value of the goods and services.

2.2 Bank loans

Banks have less information than providers of trade credit and the costs of gathering information are also higher for banks than for providers of trade credit. Providers of trade credits also have an advantage over banks in selling the collateral they have themselves delivered, but due to their size and number of transactions banks have an advantage in selling general collateral such as buildings, machinery etc. Banks therefore prefer to issue loans using tangible assets as collateral, also due to asymmetric information, they are less likely to issue loans to more opaque firms such as small and high growth firms. Banks are therefore willing to lend long term provided that tangible assets are available for collateral. In the empirical work below tangible assets and credit risk/bankruptcy variables are expected to explain the

use of long-term bank loans and the amount of long-term bank loans are limited by the value of tangible assets.

The basis for issuing Short Term Bank Loans is the comparative advantages banks have in evaluating and collecting on accounts receivables, i.e. Debtors. It is also possible to use Cash and Cash equivalents as collateral but banks do not have any comparative advantages over other providers of credit in terms of evaluating and collecting these since they consist of cash and marketable securities. In terms of inventories, again banks do not have any comparative advantages in evaluating these. Thus, we expect the amounts of debtors to be the key variable in explaining the behaviour of Short Term Bank Loans.

2.3. Expensive trade credit and other loans

After other sources of finance have been exhausted firms can delay payment on their trade credits. However, this is expensive since it involves giving up the discount and maybe incurs penalty payments. Also the use of this type of credit can have reputational costs and it may be difficult to obtain trade credit in the future. The nature of the costs, of course, depends on the number of suppliers, if there is only one supplier then these costs can be rather high whereas if the firm can obtain the same goods and services from other suppliers then these costs are not particularly high.

Other debt is composed of credit card debt, car loans etc. that are dearer than bank loans. Again, the variables determining this type of debt are financial health and performance. Below, however, we do not have any good information regarding these types of loans and what they consists of thus we pay little attention to them in the empirical work[8].

[8] This, of cause, is not desirable but we have been unable to obtain additional information from the data provider. We have also contacted several accountants labelled them a “catch all term”.

3. Empirical evidence

The key components of the asset side theory of SME financing presented above are whether the costs of asymmetric information and costs of collecting and selling collateral are important factors in the use of the different types of debt. The first set of tests below is therefore to establish whether the variables identified above (Cost of Goods Sold for Trade Credits, Tangible assets for Long Term bank Loans and Accounts Receivables for Short Term Bank Loans) are able to explain the choice of financing. As argued above each of these financing choices has different costs, as is the case for the Pecking Order Theory, but the Asset Side Theory does not lead to Pecking Order financing since firms cannot choose the financing independently of the asset side of the balance sheet. Thus, the next test is to test the theory against Pecking Order financing behavior. A modified version of the tests used by Shyam-Sunder and Meyers [1999] is used to test the two theories against each other. Finally, a simple test is used to test the asset side financing theory against the Static Tradeoff Theory. The Static Tradeoff Theory predicts that firms use different financing sources such that the marginal costs of obtaining an additional dollar in financing is equal for the different financing sources, or an additional dollar of financing is obtained in equals amount from each financing source.

3.1. Testing the Asset side financing theory

It was argued above that the value of supplies bought was the key determinant of the use of trade-credits and firms will use these instead of short term bank financing since trade-credits are cheaper due to the informational advantages held by the supplier of trade-credits over banks. The proxy used to capture this is the Cost of Goods Sold (COGS) divided by total assets:

$$\left(\frac{D^{Cheap\ Trade\ credit}}{TA}\right)_{it} = a + b_1 Intan_{it} + b_2 Profit_{it} + b_3 Size_{it} + b_4 Business\ risk_{it} + b_5 Growth_{it} +$$

$$b_6 Age_{it} + b_7 Marginaltax_{it} + b_8 Cogs_{it} + b_9 Interest_{it} + g\left(\frac{D^{Cheap\ Trade\ credit}}{TA}\right)_{it-1} + e_{it} \quad (1)$$

TA is total assets and INTAN is the amount of intangible assets, both obtained from the balance sheet of the firm. Age is the logarithm of the number of years since the start of the firm and size is the logarithm of total assets. GROWTH is measured as an average of the growth in total assets and growth in sales. PROFIT is earnings before interest and taxes divided by total assets and TAX is the marginal tax rate as developed by Graham ([1998], [2000])[9]. Finally, *BUSINESS RISK* is the standard deviation of return on assets and INTEREST is rate of interest.

Growth, Age, Intangible assets and Size are often interpreted as representing proxies for asymmetric information. Young, small and growing firms are often viewed as the most opaque firms. Profit and Business risk are proxies for bankruptcy risk.

As discussed below there is an equation for each type of debt, since it is likely that errors are correlated across equations, i.e. shocks are common to all types of financing we use a Seemingly Unrelated Regression framework. Also, since the lagged dependent variable will be correlated with the error term in case of auto-correlation an Instrumental Variable approach is used, thus the estimation procedure is equivalent to Three Stage Least Squares.

Table 6 presents the results from estimating (1). For cheap trade credits the only significant variable, beside the lagged dependent variable, is Cost of Goods Sold. This

[9] See Bartholdy and Mateus [2007] for a discussion of the calculation of the marginal tax rate applicable for this sample.

supports the discussion above that there **is** very little asymmetric information associated with trade credits. The Age of the firm is significant at the six percent level thus there is weak support that younger firms uses slightly more trade credits compared with older firms. The results for Cheap trade Credits therefore supports The Asset Side Theory.

In the case of Long Term Bank Loans we argued above that the key variable is Tangible assets since the firm could pledge these as collateral for Long Term Bank Loans. The model is therefore given by:

$$\left(\frac{D^{Long\ Term\ Bank\ Loans}}{TA}\right)_{it} = a + b_1 Intan_{it} + b_2 Profit_{it} + b_3 Size_{it} + b_4 Business\ risk_{it} + b_5 Growth_{it} +$$
$$b_6 Age_{it} + b_7 Marginaltax_{it} + b_8 Tan_{it} + b_9 Interest_{it} + g\left(\frac{D^{Long\ Term\ Bank\ Loans}}{TA}\right)_{it-1} + e_{it} \quad (2)$$

Tan is Tangible assets divided by total assets. From Table 6 Tan is positive and significant thus supporting the Asset side theory. Intangible assets and size of the firms are also positive and significant; that size is positive significant and age negative and (nearly) significant is not surprising. Banks has comparative advantages in solving the asymmetric information problem and providing funding to existing customers, that is, older and larger firms. Young, small firms and high growth firms are often associated with asymmetric information thus banks are less willing to lend long term to these firms. But Intangible assets are also positive which is a surprise since the common belief is Intangible assets is a proxy for asymmetric information and should therefore have a negative coefficient. To the extend that Goodwill from Acquisitions dominates this term a positive coefficient may imply that Long Term Bank Loans are one of the financing sources for these transactions. Finally, Business risk is

negative and significant which fits with our intuition that banks are not willing to lend long term to more risky customers.

Above we argued that short term debt is supported by (accounts receivables) and the profitability of the firm. The model is therefore given by:

$$\left(\frac{D^{Short\ Term\ Bank\ Loans}}{TA}\right)_{it} = a + b_1 Intan_{it} + b_2 Profit_{it} + b_3 Size_{it} + b_4 Business\ risk_{it} + b_5 Growth_{it} +$$
$$b_6 Age_{it} + b_7 Marginaltax_{it} + b_8 Debtors_{it} + b_9 Interest_{it} + g\left(\frac{D^{Short\ Term\ Bank\ Loans}}{TA}\right)_{it-1} + e_{it} \quad (3)$$

Debtors are account receivables divided by total assets. Again from Table 6, Debtors is positive and significant supporting the discussion above. However, profitability is negative and (strongly) significant which does not support our theory. One possible explanation for this is that Short Term Bank Loans are provided to help firms with liquidity problems associated with a poor profitability in one year. Tax is positive thus it appears that firms increase Short Term Debt to take advantage of the tax shield associated with debt. Profitability is only significant for Short Term Bank Loans and this casts doubt on the conventional interpretation of the variable in empirical studies, namely a variable supporting the Pecking Order Theory and therefore a proxy for asymmetric information. If this was the case then it would have been significantly negative for all types of financing.

As discussed in the data section we have no idea what Other Debt consists of and we therefore include all the variables in an explorative attempt at finding some significant factors:

$$\left(\frac{D^{Other\ Debt}}{TA}\right)_{it} = a + b_1 Intan_{it} + b_2 Profit_{it} + b_3 Size_{it} + b_4 Business\ risk_{it} + b_5 Growth_{it} +$$
$$b_6 Age_{it} + b_7 Marginaltax_{it} + b_8 Cogs_{it} + b_9 Tan_{it} + b_{10} Debtors_{it} + b_9 Interest_{it}$$
$$+g\left(\frac{D^{Other\ Debt}}{TA}\right)_{it-1} + e_{it} \quad (4)$$

As seen from Table 6 we none of the variables are significant and we have not explanation for this.

Expensive trade credits are probably the funding of last resort (perhaps together with other debt); they are relatively easy to obtain by lack of payment at the due date of the trade credits. However, the amount is limited by the availability of trade credits. The model used is the same as for Other Loans. From Table 6 we can see that Debtors is strongly significant indicating that firms will use expensive trade credits to finance their own, probably overdue, debtors to the extent that they cannot obtain short term financing from the bank. It also appears that large and young firms makes use of expensive trade credits; young firms probably because they have exhausted the other types of financing and they are often dependents of a few customers and if one of these customers due do not pay on time they are forced to use expensive trade credits. The motivation behind larger firms is different; here it is more likely that they are using their market power towards smaller suppliers. A small firm supplying a large firm cannot do much if a larger firm does not pay on time since they have the credible treat of using other suppliers, thus it is not likely that the smaller firm is going to impose penalties etc if a large firm does not pay on time. Thus expensive trade credits may not be that expensive for larger firms!

Overall Table 6 supports the theory that asymmetric information and the asset side of the balance sheet is one of the drivers of the financing choice of SMEs.

Since the different financing sources may have different funding costs due differences in solving the asymmetric information problem it would be optimal for the firm to use the cheapest source first and then so forth, i.e. a Pecking Order Financing driven by the relative costs. However, the asset side theory puts restrictions on the choice of financing by the assets used as collateral for the debt, i.e. the firm is not free to choose the type of financing; the choice of asset determines the financing source. In the next section we use the framework developed by Shyam-Sunder and Myers (1999) to test the Pecking Order Theory and to test whether firms follow a pecking order in financing choice or the whether the financing source is determined by the asset side of the balance sheet.

3.2. Test of Pecking Order behavior

The test used below is an adaptation of the test used by Shyam-Sunder and Myers [1999] and is given by:

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it} \qquad (5)$$

where, Shyam-Sunder and Myers [1999] define DEF:

$$DEF_t = DIV_t + X_t + \Delta W_t + R_t - C_t \qquad (6)$$

Where, C_t is operating cash flows after interest and taxes, DIV_t is dividend payments, X_t is capital expenditures, ΔW_t is the net increase in working capital, and R_t is the current proportion of long term debt at start of period. ΔD_{it} is the amount of debt issued (or retired). The pecking order hypothesis predicts that $\beta_{PO} = 1$ and $\alpha = 0$, that is internal generated funds are used first and if additional financing is required it is obtained using debt. Shyam-Sunder

and Myers [1999] find that the coefficient on deficit is statistically close to one. They do not include equity in equation (6) because the pecking order model will issue or retire equity only as a last resort which is a rare occurrence, a claim disputed by Frank and Goyal [2003] and Fama and French [2005]. However, Chirinko and Singha [2000] question the interpretation of this test. In particular they show that if firms issue external equity then the test performed by Shyam-Sunder and Myers [1999].

Chirinko and Singha [2000] point out that equation (5) is only correctly specified if the firms indeed do not issue external equity, if they do then this will bias both the slope coefficient and the intercept term. The argument is clear from Figure 1. The first 80% of the firm issue one dollar debt for each dollar of deficit financing represented by the 45 degree line from O to A. The last 20% of the firms, having exhausted their ability to raise more debt, issue external equity represented by A to B on the horizontal line. If we estimate equation (5) on a dataset where e.g. 20% use external equity without accounting the for the kink then the slope of the estimated line becomes "an average" of a line with a slope of 1 and a line with a slope of zero and the estimated slope coefficient will therefore be below 1.

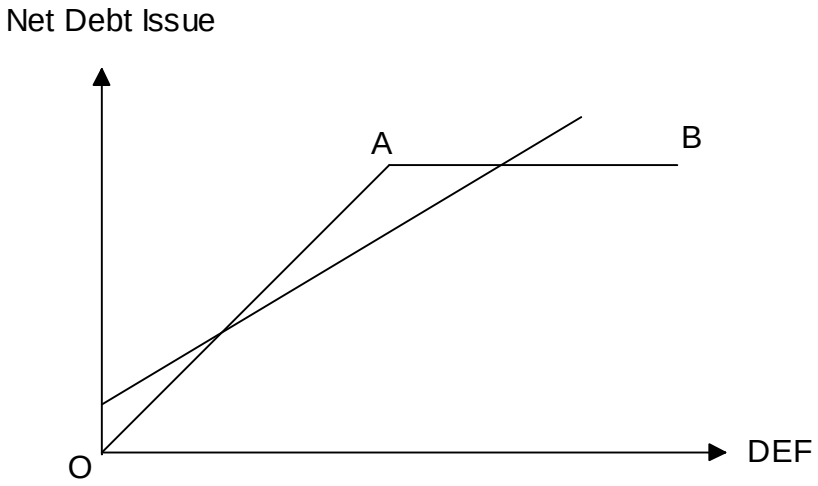

Figure 1

From an econometric point of view the main problem is the location of the breakpoint since this has to be estimated.

The testing procedure below utilizes the idea derived from figure 1. Consider the case where the firm has three external funding sources L_1, L_2 and L_3 and under the Pecking Order Hypothesis the financing pecking order is assumed to be L_1, L_2 and L_3. For each of the funding sources there is a dollar for dollar relationship between the funding deficit and the funding source provided that the funding source is below the capacity for this type of funding, thus figure 1 holds for each funding source, i.e. there is a breakpoint and the slope coefficient is equal to one.

The data is sorted by the funding deficit and the following regression is estimated:

$$L_{1,it} = a + b \times Def_{i,t}^{1} + e_{it} \quad (7)$$

where, Def^1 is the funding deficit in relation to funding source 1 and defined as internal generated cash flows – investments –changes in working capital – changes in equity, where changes in working capital is defined as changes in (Debtors + Inventories + Cash and Cash Equivalents + Prepaid Expenses - Accrued Income).

Equation (7) is then tested for a breakpoint and if a breakpoint is found it is imposed on the regression as a dummy variable with a value of zero if the observation is below the breakpoint and one otherwise. The following regression is then estimated:

$$L_{1,it} = a_b + b_b \times Def_{i,t}^{1} + a_a \times D_{it} + b_a \times D_{it} \times Def_{i,t}^{1} + e_{it} \quad (8)$$

The prediction of the Pecking Order Theory is then given by:

- There exists a breakpoint and
- $b_b = 1$, $b_a = 0$ and $a_b = 0$

The Asset Side Theory also predicts breaks since the assets used as collateral for loans restrict the amount of the financing available. The coefficients on DEF, therefore depends on how DEF is made up and the type of financing investigated. For example, if the major source of the funding deficit comes from an increase in investments, then we expect the coefficient on DEF in the equation for Cheap Trade Credits, Short Term Bank Loans to be zero and significant for the Long Term Bank financing equation. This feature of the asset side theory is further explored below, but first Pecking Order behaviour is tested.

For L_2 the following regression is estimated:

$$L_{2,it} = a + b \times Def_{i,t}^{2} + e_{it} \quad (9)$$

Where, Def^2 is defined as: $Def^1 - L_1$ and so forth for any subsequent funding sources. The equation is then tested for a breakpoint and if one is found the following is estimated:

$$L_{2,it} = a_b + b_b \times Def_{i,t}^{2} + a_a \times D_{it} + b_a \times D_{it} \times Def_{i,t}^{2} + e_{it} \quad (10)$$

Andrews [1993] and Andrews and Ploberger [1994] are used to test for and estimate the break points for each equation. The assumed Pecking Order is: Cheap Trade Credits, Long Term Bank Loans, Short Term Bank Loans, Expensive Trade Credits and Other Loans. However, as we do not know what Other Loans consists of, it is not clear if the last two terms should be

changed around in the pecking order. Table 7 provides results from the break tests of each funding source, and these tests confirm the prediction by Pecking Order Financing that breaks exists. The next step is to test the predictions:

- § $b_b = 1$ and $b_a = 0$

The following system estimated by SUR is used to test the predictions:

$$L_{it}^{Cheap\ Trade\ Credits} = a_b^{CTC} + b_b^{CTC} \times Def_{i,t}^{CTC} + a_a^{CTC} \times D_{it\ \ it}^{CTC} + b_a^{CTC} \times D_{it\ \ it}^{CTC} \times Def_{i,t}^{CTC} + e_{it}$$
$$L_{it}^{Long\ Term\ Bank\ Loans} = a_b^{LTBL} + b_b^{LTBL} \times Def_{i,t}^{LTBL} + a_a^{LTBL} \times D_{it}^{LTBL} + b_a^{LTBL} \times D_{it}^{LTBL} \times Def_{i,t}^{LTBL} + e_{it}$$
$$L_{it}^{Short\ Term\ Bank\ Loans} = a_b^{STBL} + b_b^{STBL} \times Def_{i,t}^{STBL} + a_a^{STBL} \times D_{it}^{STBL} + b_a^{STBL} \times D_{it}^{STBL} \times Def_{i,t}^{STBL} + e_{it}$$
$$L_{it}^{Expensive\ Trade\ Credits} = a_b^{ETC} + b_b^{ETC} \times Def_{i,t}^{ETC} + a_a^{ETC} \times D_{it\ \ it}^{ETC} + b_a^{ETC} \times D_{it\ \ it}^{ETC} \times Def_{i,t}^{ETC} + e_{it}$$

D is a dummy variable indentifying the estimated break in the sample from the tests in Table 7. The null hypothesis is given by:

$$b_b^{CTC} = b_b^{LTBL} = b_b^{STBL} = b_b^{ETC} = 1$$
$$b_a^{CTC} = b_a^{LTBL} = b_a^{STBL} = b_a^{ETC} = 0$$
$$a_b^{CTC} = a_b^{LTBL} = a_b^{STBL} = a_b^{ETC} = 0$$

As seen from Table 8 the predictions by the Pecking Order Theory are soundly rejected, but the predictions by the Asset Side Theory that the function should contain a break since the firm does not have unlimited funds of each category available is not rejected.

The predictions of the Asset Side Theory are that the financing instrument is a function of the underlying factor determining the funding deficit. Recall that the prediction for Cheap Trade Credits is that changes in these are generated by changes in the amount of goods and services delivered to the firm. Unfortunately, we do not have explicit data on this but it is

likely to be correlated with changes in Working Capital. We are more fortunate when it comes to changes in Long Term Bank Loans since the prediction is that these changes are driven by investments in fixed assets and we do have data for investments. Also, changes in Short Term Bank Loans are driven by changes in debtors and possibly other components of Working Capital. The definition of changes in Working Capital is therefore redefined to be net of changes in Debtors, below labeled by the superscript "n". Finally, expensive credits are used when everything else fails. Thus we can use the following model:

$$L_{it}^{Cheap\ Trade\ Credits} = a^{CTC} + b_1^{CTC} Investments_{it} + b_2^{CTC} \Delta Working\ capital_{it}^{n} + b_3^{CTC} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Long\ Term\ Bank\ Loans} = a^{LTBL} + b_1^{LTB} Investments_{it} + b_2^{LTBL} \Delta Working\ capital_{it}^{n} + b_3^{LTBL} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Short\ Term\ Bank\ Loans} = a^{STBL} + b_1^{STB} Investments_{it} + b_2^{STBL} \Delta Working\ capital_{it}^{n} + b_3^{STBL} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Expensive\ Trade\ Credits} = a^{ETC} + b_1^{ETC} Investments_{it} + b_2^{ETC} \Delta Working\ capital_{it}^{n} + b_3^{ETC} \Delta Debtors_{it} + e_{it}$$

Recall that L is the change in the financing source and the predictions from the Asset Side Theory in it most extreme form are:

- Changes in Cheap Trade Credits are driven by changes in the components of Working Capital: $b_1^{CTC} = 0, b_2^{CTC} > 0, b_3^{CTC} = 0$
- Changes in Long Term Bank financing are driven by investments: $b_1^{LTBL} > 0, b_2^{LTBL} = 0, b_3^{LTBL} = 0$
- Short Term Bank Loans are driven by changes in Debtors and possible also in changes in Working Capital: $b_1^{STBL} = 0, b_2^{STBL} > 0, b_3^{STBL} > 0$

We do not have explicit predictions for Expensive Trade Credits since these are presumably the last resort. Table 9 presents the results. As predicted investments in the equation for Cheap Trade Credits is not significant; firms do not use Cheap Trade Credits to finance fixed assets. Changes in Working Capital are significant as predicted, but changes in Debtors are

also significant which is not supported by the theory. There are at least three possible interpretations of this result. The first is that firms use the cheapest source first to finance an increase in debtors, a type of Pecking Order Financing. However this theory is rejected above. The second explanation is that growth will increase both Cheap Trade Credits and Debtors, generating a correlation but no causation between these two variables. Finally, all providers of credits may be satisfied by the collateral value of Accounts Receivables and therefore willing the lend to a firm with many Debtors, rejecting the above argument that banks have comparative advantages in evaluating Accounts Receivables.

In the case of Long Term Bank Loans investments is strongly significant and changes in Working Capital insignificant which supports the Asset Side Theory. It is also the case that changes in Debtors is significant suggesting that firms use Long Term Bank Loans to finance Accounts Receivables/debtors. Since changes is Debtors represents Trade Credits granted by the company which are short term in nature and it does not appear likely that Long Term Bank Loans are being used for their financing. We therefore revert to the same argument as for the Cheap Trade Credits that growth leads to an increase in Debtors as well as in investments and change in Debtors is therefore correlated with Changes in Long Term Bank Loans.

In the case of Short Term Bank Loans, the significance of investments rejects the Asset Side Theory, although the significance of changes in Working Capital and changes in Debtors supports the theory. Since Expensive Trade Credits is a last resort we expect all coefficients to be significant which is indeed the case.

Thus there is supporting and contradictory evidence for the Asset Side Theory. First the supporting evidence, there appears to be amble evidence that the composition of the asset side of the balance sheet has implications for the choice of financing, that firms cannot choose

financing independently of the asset side. The contradictory evidence from Cheap Trade Credits and Short Term Bank Loans, although it appears that the asset side of the balance sheet is again important, the theory as presented above does not provide an entirely adequate job of explaining the behavior of these loans.

3.3. Static Trade-of Theory

An alternative explanation is that firms use the Static Trade-off Theory. In this theory firms finance each additional Euro in funding deficit by increasing all the funding sources until the marginal costs are equal, thus and additional Euro required in funding will, in equilibrium, increase all funding sources by an equal amount. In terms of the above equation system, this corresponds to the following restrictions:

$$b_1^{CTC} = b_2^{CTC} = b_3^{CTC} = b_1^{LTB} = b_2^{LTBL} = b_3^{LTBL} = b_1^{STB} = b_2^{STBL} = b_3^{STBL}$$

These restrictions are strongly rejected. If there are transactions costs and firms therefore obtain one type of loan at a time then the cross equation restrictions would be rejected. But in the Static trade-off theory it does not matter what the source of the funding deficit is, and we therefore have the following set of restrictions under transactions costs (dropping the cross equation restrictions):

$b_1^{CTC} = b_2^{CTC} = b_3^{CTC}$, $c^2(2)$ = 2.3895 with Significance Level 0.3028
$b_1^{LTB} = b_2^{LTBL} = b_3^{LTBL}$, $c^2(2)$ = 1331.03 with Significance Level 0.00000000
$b_1^{STB} = b_2^{STBL} = b_3^{STBL}$, $c^2(2) = 57.0300$ with Significance Level 0.00000000

We do not reject the restictions for Cheap Trade Credits, however the Static Trade off theory is rejected for both Long- and Short-Term Bank Loans.

The overall picture from Tables 6 to 9 it is not entirely clear-cut, although it does appear that the Pecking Order Theory does not hold. There is some support for the Asset Side Theory, in particular that Long Term Bank Loans are driven by investments in fixed assets. There is also some support for the notion that Cheap Trade Credits are driven by goods and services delivered. Short Terms Bank loans, on the other hand, seems to be driven by all three factors namely, changes in working capital, changes in debtors and by investments. So it appears that the *composition* of the asset side of the balancesheet is an important determinant for Cheap Trade Credits and Long Term Bank Loans, and less so for Short Term Bank Loans and Expensive Trade Credits. In particular the evidence for Short Term Bank loans is mixed, changes in working capital and debtors are significant as expcted but investments also seems to be financed by Short Term Bank Loans and profitabilty has a negative influence on the amounts of Short Term Bank Loans. One possible interpretation of these results is the following. Firms financing fixed investments cannot borrow the full amount, since the collateral value of the asset is less than the purchase price and thus firms with low cash flows (low profitability) cannot cover the funding deficit from own funds and is therefore forced to use Short Term Bank Loans or Expensive Trade Credits to cover the gap.

As is common in the literature when faced with results that are not clear cut we conclude that there is definitely room for additional research in this area.

Conclusions

Currently there exist two theories of capital structure The Pecking Order Theory where firms first exhaust all funding of the cheapest source first, then the second cheapest source and so on. The differences in funding costs are due to adverse selection costs from asymmetric

information. The second theory is the Tradeoff Theory where firms increase the amount of debt as long as the benefits are greater than the costs from doing so. The benefits of debt are tax-shields and "positive agency costs" and the costs of debt are the expected bankruptcy costs and the "negative agency costs". In terms of the choice of financing, firms equate the marginal costs of each financing source and in equilibrium the marginal costs of each source are equal and therefore one additional Euro will be raised from all the financing types. In both of these theories, the composition of the asset side of the balance sheet is not important and in this paper, that proposition is strongly rejected. So the main conclusion is that the composition of the asset side of the balance sheet influences the composition of the liability side of the balance sheet in terms of the different types of debt used to finance the firm, or that the use of the funds is important in deciding the type of financing available.

We further argue that it is asymmetric information and collateral that determines the relationship between the asset side and liability side of the balance sheet. The theory works reasonable well for Cheap Trade Credits and Long Term Bank Loans but the tests for Short Term Bank Loans are disappointing.

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Table 1: Number of firms with consecutive data

The sample is unbalanced since companies may have data for less than 10 years. The table shows the number of firms and the number of years for which they have consequitive data

Years of data	Number of firms
1	196
2	200
3	149
4	123
5	108
6	100
7	90
8	90
9	89
10	271
Total	1416

Table 2: Number of firm year observations across years and industries

	Industry						
Year	Food and drinks	Textiles and clothes	Wood and paper paste	Chemical products	Heavy industry	Machinery and equipment	Total
1991	102	236	56	125	53	127	699
1992	114	278	61	119	49	139	760
1993	107	272	63	121	48	128	739
1994	105	274	59	120	50	133	741
1995	109	274	67	130	51	137	768
1996	108	270	71	130	51	134	764
1997	106	272	70	132	56	128	764
1998	113	282	67	133	63	140	798
1999	111	277	70	133	61	138	790
2000	97	232	59	133	65	137	723
Total	1072	2667	643	1276	547	1341	7546

Table 3: Balance sheet

Average Balance Sheets items as a Fraction of Total Assets

	1990	1992	1994	1996	1998	2000
Assets						
Fixed Assets	**0.52**	**0.53**	**0.54**	**0.50**	**0.51**	**0.47**
Intangible Assets	0.01	0.01	0.04	0.04	0.03	0.02
Tangible Assets	0.43	0.42	0.40	0.37	0.39	0.34
Investments	0.08	0.10	0.10	0.09	0.09	0.11
Current Assets	**0,48**	**0.47**	**0.46**	**0.50**	**0.49**	**0.52**
Stocks (Liquidity)	0.02	0.01	0.01	0.02	0.01	0.01
Debtors	0.24	0.24	0.26	0.29	0.26	0.30
Inventories	0.19	0.17	0.15	0.14	0.15	0.16
Cash and cash Equivalents	0.02	0.03	0.03	0.04	0.06	0.04
Prepaid Expenses	0.01	0.02	0.01	0.01	0.01	0.01

	1990	1992	1994	1996	1998	2000
Shareholders's Funds and Liabilities						
Shareholders's Funds	**0.49**	**0.47**	**0.46**	**0.48**	**0.49**	**0.46**
Capital	0.22	0.21	0.25	0.25	0.24	0.20
Reserves	0.23	0.25	0.19	0.21	0.22	0.21
Net Income of the Year	0.04	0.01	0.02	0.02	0.03	0.05
Provisions	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Liabilities	**0.49**	**0.52**	**0.53**	**0.51**	**0.50**	**0.53**
Non-Current Liabilities	0.16	0.15	0.14	0.15	0.13	0.13
Long-Term Debt	0.13	0.12	0.09	0.11	0.09	0.10
Bank Loans	0.10	0.10	0.07	0.09	0.08	0.09
Other	0.03	0.02	0.02	0.02	0.01	0.01
Other Non-Current Liabilities	0.03	0.03	0.05	0.04	0.04	0.03
Current Liabilities	0.33	0.37	0.39	0.36	0.37	0.40
Loans	0.10	0.13	0.12	0.08	0.08	0.09
Bank Loans	0.10	0.13	0.12	0.08	0.08	0.09
Others	<0.01	<0.01	<0.01	<0.01	<0.01	<0.00
Creditors	0.10	0.10	0.12	0.12	0.12	0.14
Other Current Liabilities (Incl. Shareholder's)	0.09	0.09	0.09	0.09	0.10	0.10
Accrued Expenses	0.04	0.05	0.06	0.07	0.07	0.07

Table 4: Summary of evidence for estimating Credit Days

Industry	Sample data		Estimate used in calculations	Estimate of standard deviation of credit days	Number of credit days with cheap credit
	Median number of days	Most common number of days			
Food and drinks	60	35-45	40	13.6098	66.6752
Textiles and clothes	86	66-75	70	28.5422	125.9427
Wood and paper paste	95	85-95	90	34.5357	157.69
Chemical products	116	85-95	90	28.8522	146.5503
Heavy machinery	108	75-85	80	18.6593	116.5722
Machinery production and equipment	106	105-115	110	52.1976	212.3073

Table 5: Distribution of expensive trade credits

Industry	Number of firms	Percentage of firms with expensive credit	Expensive credits as percentage of total credit
Food and drinks	818	47.066	63.576
Textiles and clothes	1913	27.757	38.889
Wood and paper paste	481	16.008	19.143
Chemical products	956	33.682	32.869
Heavy machinery	383	47.258	41.446
Machinery production and equipment	954	8.071	5.965

Table 6: Tests of the factors determining the use of different types of debt

The dependent variable is cheap trade credits, long and short term bank loans, other debt and expensive trade credits divided by total assets. Trade credits are defined as cheap if the number of credit days (creditors/cost of gods sold/360) is less than the norm for the industry and as expensive if the number of credits days is greater than the norm. Intangible and tangible assets are obtained from the balance sheet and scaled by total assets. Profitability is earnings before interest and taxes divided by total assets. Size is the logarithm of total assets, growth is the average of the growth in total assets and sales. Business risk is the standard deviation of the return on assets, Age is the age of the company and Interest is the three month risk free rate of interest and the marginal tax rate (see Bartholdy and Mateuse [2007]). The regression is estimated using Instrumental variables in a Seemingly Unrelated Regression (3SLS). Industry dummy variables are also included but not reported. T-statistics are reported below the coefficient.

	Dependent variable				
Variable	Cheap trade credit	Long term bankloans	Short term bankloans	Other credits	Expensive trade credits
Constant	-0.0273	-0.0065	0.0054	0.0038	-0.0458
	(-1.4036)	-0.3762	0.2920	0.2780	-1.2290
Lagged dependent variable	0.7238	0.82909	0.8592	1.0606	0.8277
	(35.736)	61.8506	68.5762	7.5596	41.8729
Intangible	-0.0196	0.0646	-0.0025	0.0082	0.1031
	(-0.7258)	2.4502	-0.0888	0.7424	2.1644
Profitability	0.0056	-0.0062	-0.0191	0.0001	0.0040
	(1.2327)	-1.4218	-4.0749	0.0307	0.5205
Size	-0.0017	0.0073	0.0024	-0.0007	0.0118
	(-0.5597)	2.8375	0.8362	-0.2956	2.2042
Business risk	-0.0026	-0.1234	-0.0433	0.0023	-0.0401
	(-0.0870)	-3.9809	-1.3065	0.1984	-0.7833
Growth	0.0761	-0.0992	-0.0833	-0.0028	-0.3300
	(1.3858)	-2.5864	-1.9342	-0.1318	-3.5073
Interest	-0.0164	-0.0162	-0.0269	-0.0100	0.0301
	(-0.6710)	-0.6665	-1.0174	-0.7707	0.7171
Age	0.0072	-0.0071	-0.0015	-0.0012	-0.0162
	(1.8984)	-1.9394	-0.3742	-0.8592	-2.5207
Marginal tax rate	0.0139	-0.0206	0.0391	-0.0001	-0.0048
	(0.8556)	-1.2250	2.1773	-0.0022	-0.1717
Cost of goods sold	0.0327			0.0003	0.0021
	(7.7389)			0.2492	0.4335
Tangible assets		0.0137		0.0011	0.0182
		2.3015		0.4034	1.8140
Debtors			0.0239	-0.0007	0.0784
			3.0023	-0.2175	6.2603

Table 7: Tests for unknown breakpoints.

Andrews [1993] and Andrews and Ploberger [1994] tests for unknown breakpoints are applied to the following model:

$$L_{j,it} = a + b \times Def_{i,t}^{j} + e_{it}$$

Where $L_{j,it}$ is the change in financing source "j", where j is Cheap Trade Credits, Long Term Bank Debt, Short Term bank Debt, Expensive Trade Credits and Other Debt. Def is the funding deficit defined as internal generated cash flows – investments –changes in working capital – changes in equity, where changes in working capital is defined as changes in (Debtors + Inventories + Cash and Cash Equivalents + Prepaid Expenses - Accrued Income). For Cheap Trade Credits DEF^1 is defined as above, for Long Term Bank Loans Def^2 is defined as Def^1 minus changes in Cheap Trade Credits, Def^3 for Short Term Bank Loans is defined as Def^2 . Robust standard errors are used. P-values are from Hansen [1997].

Financing Source (L)	Type of tests			
	Andrews [1993]		Andrews and Ploberger [1994]	
	Test value	P-value	Test value	P-value
Using entire sample				
Cheap Trade Credits	10.1621	0.0887	2.8844	0.0698
Long Term Bank Loans	15.5555	0.0089	5.4605	0.0054
Short Term Bank Loans	51.8251	0.0000	22.4051	0.0000
Expensive Trade Credits	68.5175	0.0000	31.4621	0.0004
Other Debt	66.4814	0.0000	30.4841	0.0002

Table 8: Tests of Pecking Order Theory

The following model is estimated:

$$L_{it}^{Cheap\ Trade\ Credits} = a_b^{CTC} + b_b^{CTC} \times Def_{i,t}^{CTC} + a_a^{CTC} \times D_{it\ \ it}^{CTC} + b_a^{CTC} \times D_{it\ \ it}^{CTC} \times Def_{i,t}^{CTC} + e_{it}$$

$$L_{it}^{Long\ Term\ Bank\ Loans} = a_b^{LTBL} + b_b^{LTBL} \times Def_{i,t}^{LTBL} + a_a^{LTBL} \times D_{it}^{LTBL} + b_a^{LTBL} \times D_{it}^{LTBL} \times Def_{i,t}^{LTBL} + e_{it}$$

$$L_{it}^{Short\ Term\ Bank\ Loans} = a_b^{STBL} + b_b^{STBL} \times Def_{i,t}^{STBL} + a_a^{STBL} \times D_{it}^{STBL} + b_a^{STBL} \times D_{it}^{STBL} \times Def_{i,t}^{STBL} + e_{it}$$

$$L_{it}^{Expensive\ Trade\ Credits} = a_b^{ETC} + b_b^{ETC} \times Def_{i,t}^{ETC} + a_a^{ETC} \times D_{it\ \ it}^{ETC} + b_a^{ETC} \times D_{it\ \ it}^{ETC} \times Def_{i,t}^{ETC} + e_{it}$$

Where L^j_{it} is the change in financing source "j", where j is Cheap Trade Credits, Long Term Bank Debt, Short Term bank Debt, and Expensive Trade Credits. Def is the funding deficit defined as internal generated cash flows – investments –changes in working capital – changes in equity, where changes in working capital is defined as changes in (Debtors + Inventories + Cash and Cash Equivalents + Prepaid Expenses - Accrued Income). For Cheap Trade Credits DEF^{CTC} is defined as above, for Long Term Bank Loans Def^{LTBL} is defined as Def^{CTC} minus changes in Cheap Trade Credits, Def^{STBL} for Short Term Bank Loans is defined as Def^{LTBL} – Long Term Bank Loans. The system is estimated using SUR. T-statistics in parenthesis.

	Dependent variables (L)			
	Δ Cheap Trade Credits	Δ Long Term Bank Loans	Δ Short Term Bank Loans	Δ Expensive Trade Credits
Constant before break a_b^j	0.000462	-0.004856	-0.005510	-0.003395
	(0.1254)	(-1.9091)	(-2.4243)	(-1.9000)
Constant after break a_a^j	0.003636	-0.006554	0.012079	0.006519
	(3.0223)	(-4.3302)	(8.9514)	(3.8720)
Def before break b_b^j	0.073172	0.097178	0.231143	0.196948
	(3.3159)	(4.9452)	(13.1786)	(13.2273)
Def after break b_b^j	0.031575	0.244804	0.111663	0.152862
	(4.6328)	(31.6611)	(16.2133)	(17.9857)

Tests of the predictions of the Pecking Order Theory:

$b_b^{CTC} = b_b^{LTBL} = b_b^{STBL} = b_b^{ETC} = 1$, $c^2(4)$=14852.7764 with Significance Level 0.00000000

$b_a^{CTC} = b_a^{LTBL} = b_a^{STBL} = b_a^{ETC} = 0$, $c^2(4)$=3024.2920 with Significance Level 0.00000000

$a_b^{CTC} = a_b^{LTBL} = a_b^{STBL} = a_b^{ETC} = 0$, $c^2(4)$= 19.8956 with Significance Level 0.0005

Joint test of all restrictions: $c^2(12)$=31498.5939 with Significance Level 0.00000000

Table 9: Testing for the driving factors in the change of financing sources.

The following model is tested:

$$L_{it}^{Cheap\ Trade\ Credits} = a^{CTC} + b_1^{CTC} Investments_{it} + b_2^{CTC} \Delta Working\ capital_{it} + b_3^{CTC} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Long\ Term\ Bank\ Loans} = a^{LTBL} + b_1^{LTB} Investments_{it} + b_2^{LTBL} \Delta Working\ capital_{it} + b_3^{LTBL} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Short\ Term\ Bank\ Loans} = a^{STBL} + b_1^{STB} Investments_{it} + b_2^{STBL} \Delta Working\ capital_{it} + b_3^{STBL} \Delta Debtors_{it} + e_{it}$$
$$L_{it}^{Expensive\ Trade\ Credits} = a^{ETC} + b_1^{ETC} Investments_{it} + b_2^{ETC} \Delta Working\ capital_{it} + b_3^{ETC} \Delta Debtors_{it} + e_{it}$$

Where L^j_{it} is the change in financing source "j". Notice that changes in working capital is defined slightly different than in Table 8, change in working capital is defined as changes in (Inventories + Cash and Cash Equivalents + Prepaid Expenses - Accrued Income). The system is estimated using SUR. T-statistics in parenthesis.

	Change in Finance Source (L^i)			
	Δ Cheap Trade Credits	Δ Long Term Bank Loans	Δ Short Term Bank Loans	Δ Expensive Trade Credits
Constant term a^i	0.0048	-0.0319	0.0072	0.0091
	(2.1200)	(-13.7032)	(3.1732)	(3.0982)
Δ Investments b_1^i	0.0131	0.3603	0.0740	0.0470
	(1.5425)	(41.1893)	(8.6924)	(4.2560)
Δ Working Capital b_2^i	0.0139	-0.0108	0.0340	0.0382
	(2.2526)	(-1.6931)	(5.4610)	(4.7332)
Δ Debtors b_3^i	0.0303	0.0391	0.0663	0.1225
	(3.4381)	(4.2960)	(7.4794)	(10.6525)

Tests of restrictions for Asset Side Story:

$b_1^{CTC} = b_3^{CTC} = b_2^{LTBL} = b_3^{LTBL} = b_1^{STBL} = 0, \quad c^2(5) = 180.0668$ with Significance Level 0.0000

Tests of Static Trade-off Theory:

$b_1^{CTC} = b_2^{CTC} = b_3^{CTC} = b_1^{LTB} = b_2^{LTBL} = b_3^{LTBL} = b_1^{STB} = b_2^{STBL} = b_3^{STBL}$

$c^2(8) = 1637.629095$ with Significance Level 0.0000

Relax cross equation restrictions

$b_1^{CTC} = b_2^{CTC} = b_3^{CTC}$, $c^2(2) = 2.3895$ with Significance Level 0.3028

$b_1^{LTB} = b_2^{LTBL} = b_3^{LTBL}$, $c^2(2) = 1331.03$ with Significance Level 0.00000000

$b_1^{STB} = b_2^{STBL} = b_3^{STBL}$, $c^2(2) = 57.0300$ with Significance Level 0.00000000

Figure 1

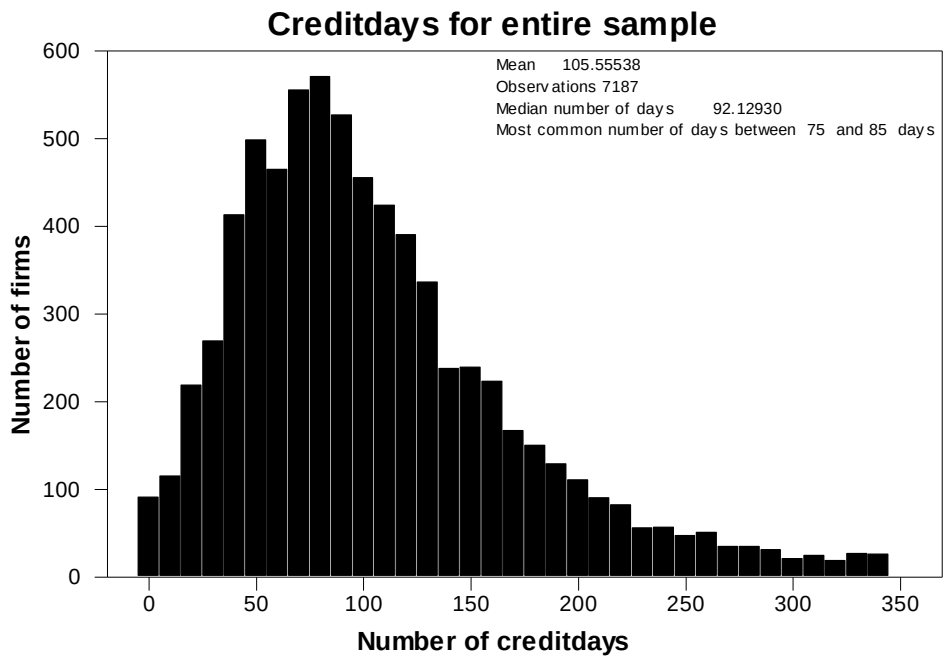

Figure 2

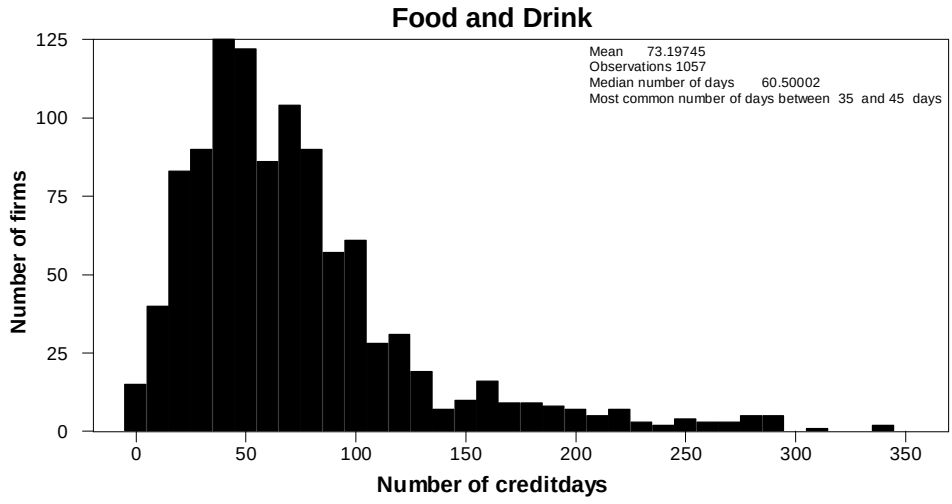

Figure 3

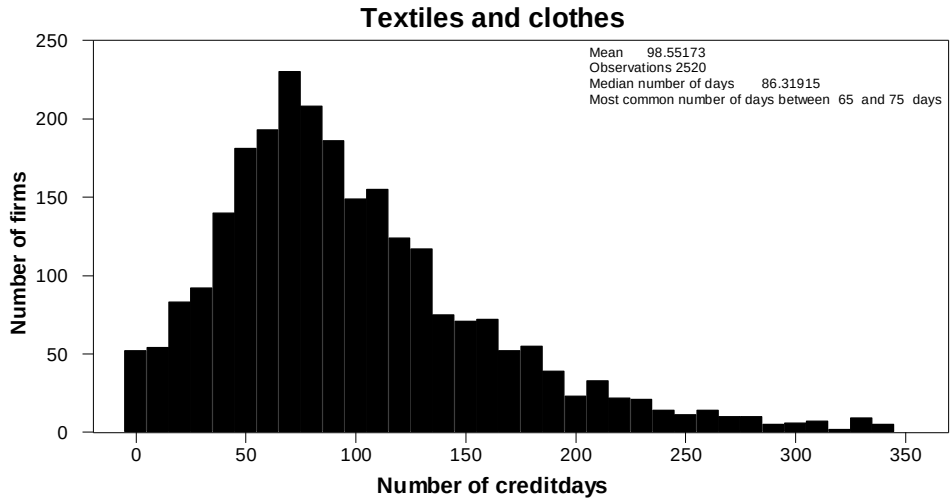

Figure 4

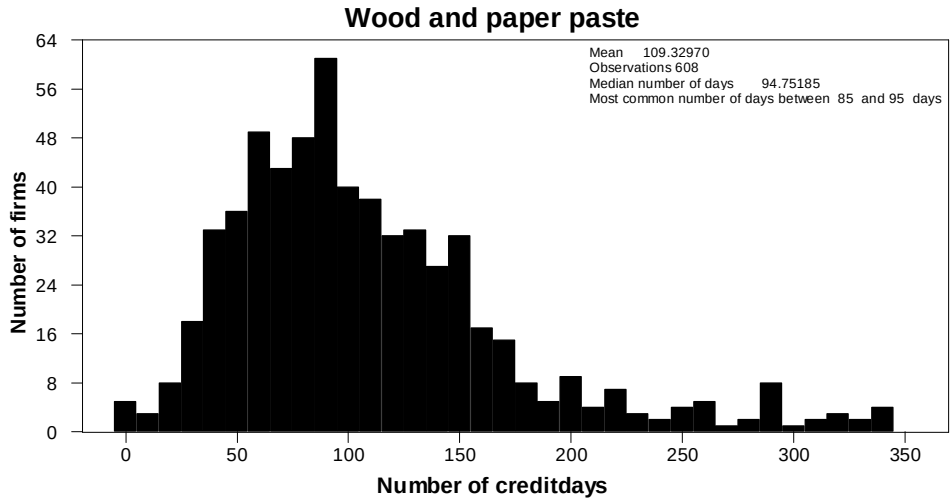

Figure 5

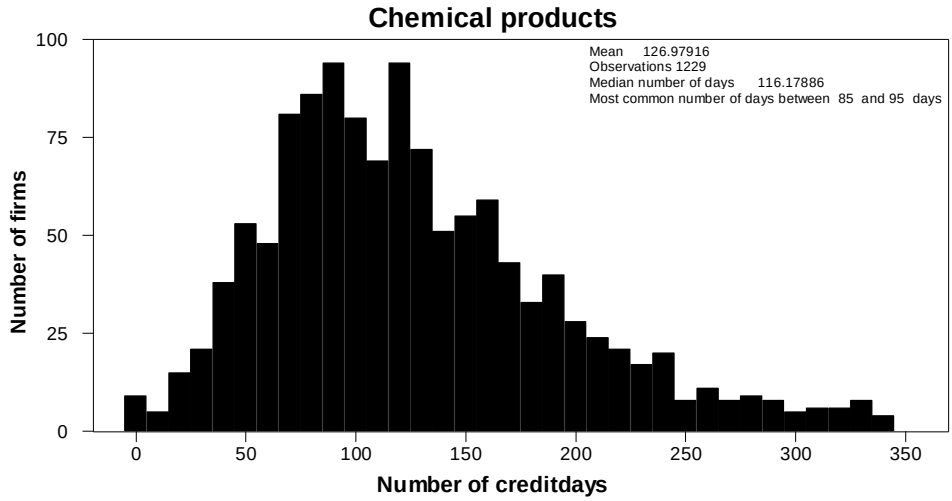

Figure 6

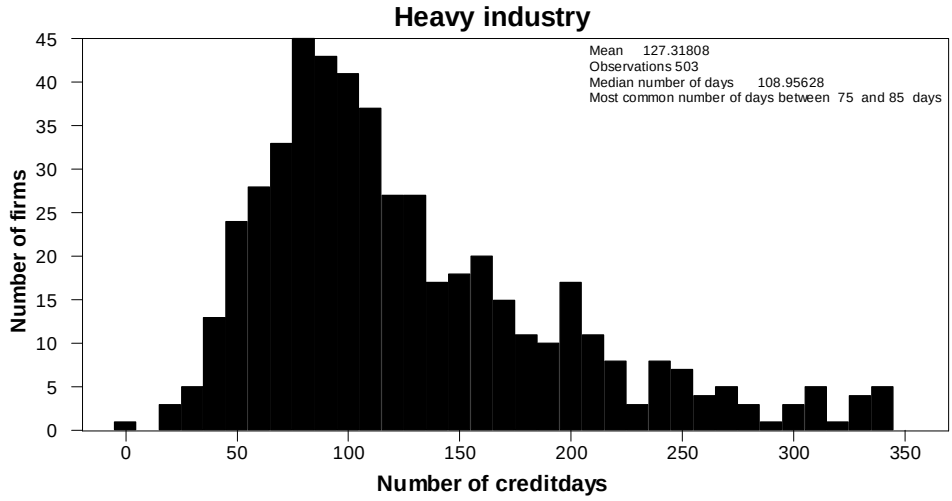

Figure 7