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Master Thesis

Reverse Factoring

A step forward in the supply chain finance

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"Chains of habit are too light to be felt until they are too heavy to be broken."

Warren Buffett

Reverse Factoring

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Abstract

English

The present dissertation analyses macroeconomic circumstances associated with a greater use of reverse factoring in the Portuguese market. What is distinctive about reverse factoring is that it behaves not only as a payment service but also as a financing instrument. The former means that the financial institution takes care of the client's whole process of payment to suppliers. The later helps less creditworthy firms, which generally cannot access any other type of funding from the banking sector, to finance their production cycle. By conducting regression analysis, no relation was found between reverse factoring and economic growth. Behind this result may be the case that some firms use this instrument more when the economy is growing, whereas other firms may use it more when the economy is declining. Moreover, the liquidity side argument is supported by the fact that reverse factoring is greater when days payable outstanding of the State increase. Such finding reveals an inherent cultural dimension of this instrument, namely when referring to Southern European countries' payment practices.

Portuguese

A presente dissertação analisa condições macroeconómicas associadas a um maior uso de reverse factoring em Portugal. O que torna o reverse factoring um instrumento financeiro distinto é o facto de se comportar não só como um serviço de pagamentos, mas também como um instrumento de financiamento. No primeiro caso, a instituição financeira substitui-se aos clientes em todo o processo de pagamentos aos fornecedores. No segundo, visa auxiliar as empresas com um pior perfil de risco, as quais geralmente não conseguem aceder a outros tipos de crédito junto da banca, a financiarem o seu ciclo de produção. Efectuando uma análise de regressões, não foi encontrada uma relação entre o reverse factoring e o crescimento económico. Por detrás deste resultado, poderá dar-se o caso de algumas empresas usarem mais este instrumento quando a economia está a crescer, enquanto que outras poderão utilizá-lo mais em períodos de recessão económica. Adicionalmente, o argumento respeitante à liquidez é suportado pelo facto da utilização de reverse factoring aumentar com a dilatação dos prazos de pagamento do Estado. Tal conclusão revela uma dimensão cultural inerente ao instrumento, no que diz respeito às práticas de pagamento dos países do sul da Europa.

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Abbreviations

ALF: Associação Portuguesa de Leasing, Factoring e Renting

DPO: Days Payable Outstanding

GDP: Gross Domestic Product

i.e.: id est (that is)

INE: Instituto Nacional de Estatística

OLS: Ordinary Least Squares

1 Introduction

In the past, buyers and suppliers strived for working capital financing independently, without cooperating with each other. This happened because companies wanted to achieve different goals, which conflicted with those of their trading partners. On the one hand, buyers wanted to purchase additional inventory while, at the same time, extend the length of accounts payables terms. On the other hand, suppliers wanted to reduce the collection period. With these two opposite objectives, a mutually favourable solution did not seem possible. However, over the last decade, and mostly due to the difficult conditions created by the economic conjuncture and its consequent increasing need to reduce costs, companies have searched for less expensive sourcing opportunities. Larger and financially stronger companies realized they could bear the credit needs of its supply chain without compromising its own working capital goals, leading to a growing supply chain finance (SCF) procurement. Driven by this demand, many banks and some third party institutions started to develop supply chain finance solutions. As a matter of fact, this is also an opportunity for banks when they also find themselves in difficulties due to severe economic crisis. In few words, supply chain finance is a set of products and services offered by financial institutions, in order to better and easily manage supply chain's physical and information flows (Camerinelli, 2009). Along the years, several SCF solutions started to emerge, with different levels of sophistication. Some examples are letter of credit, factoring, reverse factoring and pre-shipment financing. This study focuses on reverse factoring, also known by the commercially registered expression Confirming®.

Reverse factoring is a cash-flow management product involving three parties - client, supplier and bank. It is an financial instrument through which the bank takes care of the client's whole process of payment to suppliers, with an inherent credit system. Reverse factoring main purpose is to help less creditworthy firms, who generally cannot access any other type of funding from the banking sector, to finance their production cycle, overcoming some shortcomings of other financial supply chain instruments, such as trade credit or traditional factoring. The aim of this dissertation is to analyse macroeconomic circumstances associated with a greater use of reverse factoring in the Portuguese market. In order to investigate this research question, it was tested whether there is a relation between this instrument and both the economic growth and the State payment terms.

By conducting regression analysis, the following conclusions were drawn. Regarding the evolution of the economy, a possible phenomenon may explain the lack of both a linear and a quadratic relationship. On the one hand, a group of companies may use reverse factoring more when stock receivables and number of customers increase, i.e., when the economy is going up. On the other hand, other companies may use it more to fight financial problems, in other words, when the economy is declining. Moreover, defining the State's payment terms as a proxy for liquidity problems in the economy, there is the possibility of reverse factoring serving as a solution for such problems. In fact, evidence was found that the use of reverse factoring increases when days payable outstanding of the State increase as well. This implies an inherent cultural dimension of the financial instrument, when referring to Southern European countries' payment practices.

This topic raises an important and interesting connection with managerial reality. First of all, it presents an exceptional payment system instrument which, apart from other tremendous benefits for the three participants involved in the process, allows companies with worse risk profile to overcome working capital difficulties, essential to pay daily operations and to finance future growth. Moreover, it discusses two macroeconomic effects that might be associated with the use of reverse factoring. In other words, two macroeconomic effects which may have a significant impact in working capital needs. Reverse factoring has received relatively little attention within the research community, meaning that this study provides an interesting context to hypothesize upon. In fact, even if Klapper (2006) has studied the correlation between factoring and the trends in the economy, this analysis has never been done for reverse factoring. Such similar products should entail identical results. However, this was not the case. Additionally, the relation between either factoring or reverse factoring and the days payable outstanding of the State was never questioned.

The remainder of the study is organized as follows. The upcoming Section reviews the relevant literature. Section 3 describes the important concepts and the context within the research topic. Section 4 introduces the data sources, the sampling procedure and the methodological approach chosen. Afterwards, Section 5 reveals and discusses the results. Section 6 presents the concluding remarks. Finally, Section 7 reflects on limitations and suggestions for further research.

2 Literature Review

2.1 Imperfect Capital Market

The capital structure irrelevance theory states that, under certain assumptions, a firm's value is not affected by its capital structure (Modigliani & Miller, 1958). In other words, the market value of a firm is completely independent of the way it chooses to finance its investments. The assumptions that underlie the theorem are: perfect capital markets (all traders have equal and costless access to market prices and information), rational behaviour and perfect certainty. However, in reality, these suppositions do not hold, meaning that the source of financing may impact firms results, due to the failure of markets.

Deviations from the Modigliani & Miller (1958) theory have been used to explain capital structure in corporate finance and these informational imperfections are much more evident in small business finance (Berger & Udell, 1998). Following this reasoning, Fazzari, Hubbard & Petersen (1987) discuss that imperfect information can create "financing hierarchies". The authors mention that under perfect capital markets there is no cost differential between internal and external finance. However, asymmetric information causes suppliers of new equity to demand a large premium, making external funds more expensive than internal funds and creating, therefore, a financing hierarchy. Agreeing with Berger & Udell's (1998) findings, Fazzari, Hubbard & Petersen (1987) also state that these information asymmetries are more pronounced for new and small firms, meaning that these firms have more limited access to external finance than large ones. On the contrary, for mature companies, analysts specialize in assembling information for potential investors. As such information is expensive, it is only provided for firms with a large number of investors.

2.2 Trade Credit

When comparing with financial institutions, suppliers have informational advantage in evaluating and controlling the credit risk of their buyers, as they regularly obtain information and at low cost, from their transactions. Thus, trade credit may be a way for firms with better access to credit markets to intermediate finance to firms that are unable to raise it through more traditional channels (Petersen & Rajan, 1997). However, this solution has its drawbacks. Jacobson & Schedvin (2013) studied the importance of trade credit chains for the propagation of corporate failures. The intuition

is that, if the buyer becomes bankrupt, it will most likely fail to pay the claims held by the supplier. As a result, the supplier will incur in credit losses, which, in turn, can lead to insolvency and later to bankruptcy. Results show that, in fact, the debtor failure entails a significantly higher bankruptcy risk on the supplier. The authors also mention that these failures on the corporate sector involve considerably larger credit losses than the ones on the banking sector.

2.3 Factoring

Factoring may, as well, be a powerful instrument when it comes to finance high-risk informationally opaque sellers, as underwriting is based on the risk of the accounts receivables themselves and not on the risk of the seller (Klapper, 2006). Besides, the trade credit drawback may be mitigated as, usually, a third party assumes the risk of the buyer's capacity to pay.

According to Klapper (2006) and Hurtrez & Salvadori (2010), factoring is a financial transaction, in which the supplier sells its short-term accounts receivable at a discount (generally equal to interest plus services fees) to a specialized trade finance company and receives immediate cash. This financial service allows credit protection as it is often done "without recourse", meaning that the third party assumes the buyer's credit risk. This financial instrument is, then, a type of supplier financing that reduces the supplier days sale outstanding, increasing, therefore, the working capital. Also, the collection services and the monitoring of client payments are performed by the factoring company.

Some research has been done in order to understand what business and macroeconomic circumstances are associated with a greater use of factoring. Empirical tests find that this financial instrument is larger in countries with greater economic development and growth, with developed credit information bureaus and with weak contract enforcement (Klapper, 2006). There is also a strong link between factoring and different measures of firm size (such as log of total assets, turnover and value of sales), with smaller firms, which are under financial pressure and/or credit rationed, being more likely to use factors (Summers & Wilson, 2000). Actually, one can expect this relationship between firm size and the use of factoring to be considered as one of the factor's preferences because, even though factors may not specifically find smaller firms more attractive as factoring customers they do find them less attractive for other services. Similarly, Mian & Smith (1992) suggest that factoring is more likely among

firms with lower credit ratings. However, the authors state that, due to a small sample of firms that employ this financial instrument, tests provided only weak evidence with respect to variables that explain the use of factoring.

Klapper (2006) and Seifert & Seifert (2011) point out a significant disadvantage intrinsic to this financial instrument. Usually, suppliers sell a portfolio of receivables from several buyers to a single factor. As a matter of fact, factors tend to ask sellers for a minimum number of customers, in order to diversify the risk of being exposed to only one buyer. However, this makes factoring an expensive tool as it requires factoring companies to collect credit information and estimate the credit risk for a large number of buyers. Moreover, empirical evidence shows that not only the credit quality of the supplier's accounts receivable pool, but also the supplier's probability of bankruptcy have a negative impact on its propensity to factor with recourse, as discussed by Sopranzetti (1998). The paper states that if the supplier sells its entire accounts receivable, it no longer bears any credit risk, meaning that it has no incentive to monitor. This moral hazard problem will be reflected in the equilibrium price. The lower the quality of accounts receivable, as well as the lower the supplier risk profile, the higher the price. It reaches a point that no longer compensates to factor accounts receivable.

2.4 Reverse Factoring

The concept of reverse factoring will be later revisited. However, at this point, it is relevant to connect the few papers that address it with the literature review so far. One solution to the factoring shortcomings is the technology often referred to as reverse factoring (Klapper, 2006), a short-term financial instrument. As regards traditional factoring, moderate data studies have been performed. However, reverse factoring has received relatively little attention within the research community, the lack of data being one of the main reasons.

According to Hurtrez & Salvadori (2010) and Tanrisever et al. (2012) this supply chain finance solution is a three-way agreement, involving a financial institution (or factor), a buyer and a supplier that cooperate with each other in order to optimize the financial flows of the trade. It is a form of credit arbitrage as it relies on buyers' stronger credit rating (in other words, on buyers' lower short-term borrowing cost) to get suppliers (typically smaller, less creditworthy companies) liquidity on better terms. This occurs when the buyer is willing to display its invoices to the bank and suppliers on an

information platform that all three parties have access to. Reverse factoring may mitigate the problem of sellers' informational opacity if only receivables from specific informationally transparent, high-quality buyers are factored. If this is actually the case, banks can increase their operations without increasing their risk (Klapper, 2006). With high quality receivables banks can also increase profitability due to lower capital requirement, especially in light of Basel III (Hurtrez & Salvadori, 2010). Since the technique is buyer centric, factors are better able to monitor the payments and only need to collect credit information and compute the credit risk for selected buyers (Seifert & Seifert, 2011).

The first analytic study of reverse factoring is the working paper of Tanrisever et al. (2012). The paper develops a mathematical model to analyse the operational and financial benefits of reverse factoring within a supply chain. Laere (2012) improves the model of Tanrisever et al. (2012), by introducing default probability and taking a new approach to value reverse factoring. It is proven that, under the right reverse factoring contract, all three participants are able to make a profit. Apart from fees, reverse factoring adds more value for suppliers when the initial payment period is larger, when the payment period extension is smaller and when there is a significant need for external short term capital. When it comes to the buyer, the value is larger when the extension of the payment period is larger. For banks, it is more profitable to focus on buyers of which they have more information. Finally, regarding the supply chain as a whole, this instrument has more added value in sectors of activity where payment periods are larger.

There is no empirical evidence on what macroeconomic circumstances are associated with a greater use of reverse factoring, as there is for factoring. Probably, as these two financial instruments are extremely similar, it is assumed that they are associated with the same economic environments, but this may not be the case. The lack of attention given to reverse factoring by the research community, as well as the abrupt turnover in the economic situation, generate a relevant context to speculate on the relation between reverse factoring and macroeconomic conditions. As this financial instrument is so close to factoring, it is proposed to test whether Klapper's (2006) finding that factoring is larger when the economy is growing, using data previous to the 2008 financial crisis, holds for reverse factoring, using more recent data. The author justifies this result by saying that, possibly, more firms use factoring for working capital

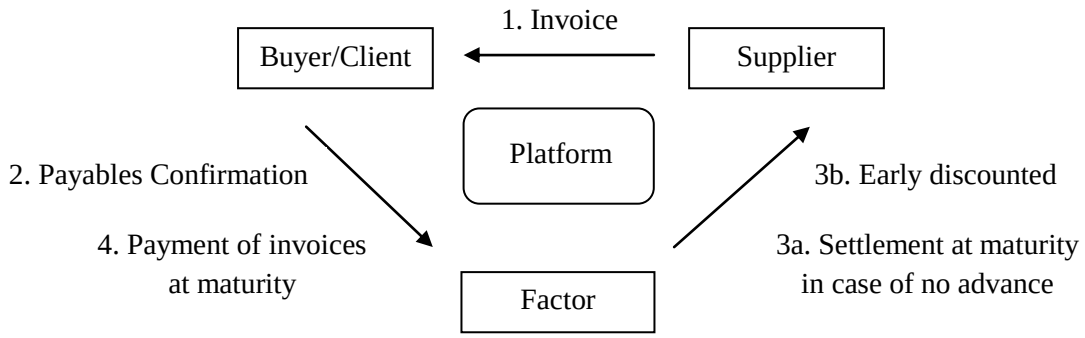
financing when their stock of receivables and number of customers increase. To test if this reasoning applies for reverse factoring, the hypothesis that reverse factoring is larger when the economy is expanding will be later tested in this thesis.

3 Reverse Factoring: conceptual framework and hypotheses development

3.1 Concept

After a brief introduction to reverse factoring in the Literature Review, more detailed information and explanations will now be discussed, in order to further understand its mechanism (Figure 1). Such information was collected in two interviews with practitioners from Santander Totta Bank and Espírito Santo Bank[1]. These two financial institutions offer slightly different solutions of this product, which are, in turn, a little different between the two banks.

Figure 1: Reverse factoring mechanism



Reverse factoring was designed in Santander Bank (Spain), trademarked as Confirming®, and it was introduced in Portugal in 1996, by the local subsidiary of the same financial institution, Santander Totta Bank. The reason for its creation in an Southern European country will be later clarified. Reverse factoring is a cash-flow management product, through which the bank takes care of the whole client´s payment process to the suppliers, with an inherent credit system. The client of the bank is the buyer. As such, this paper uses the terms "client" and "buyer" indistinctively, as this party of the triangle plays this pivotal role: client from the bank in the financial relationship, buyer from the supplier in the commercial relationship. Reverse factoring implies the confirmation (hence, the term Confirming®, coined by Santander Bank) by the bank of a client short-term payment to its suppliers (that do not need to be bank's

[1] The author is grateful to Mr Paulo Ventosa from Santander Totta Bank and to Mr José Resende and Mr Júlio Jacob from Espírito Santo Bank for their extremely knowledgeable insights on the topic.

clients), in a future due date, resulting from the sale of products or services. While in factoring it is the supplier who asks for an anticipated credit to the factor, in other words, it is the supplier who negotiates the factoring contract with the bank, in reverse factoring it is the financial institution which has the initiative (hence, the term "reverse") to establish a reverse factoring contract with the buyer. Apart from the fact that reverse factoring also acts as a payment manager, this last feature is the main difference between the two instruments.

Currently, in Portugal, Santander Totta Bank offers three distinct Confirming® solutions. One of them is Confirming Standard, where the bank merely acts as a payment manager. The whole procedure takes place in an online platform to which all the three parties - client, supplier and bank - have access to. It begins with the supplier sending an invoice to the buyer. Then, the client only has to confirm future payment instructions and the bank takes care of the entire process. Payment instructions have, then, to include transactions information and suppliers identification, so that the bank accurately debits the transactions amount from the client account and credits it to suppliers accounts, at maturity. Invoices can be confirmed every time the bank receives them or, instead, suppliers can do a permanent confirmation, to simplify the process. Additionally, the bank does not carry any responsibility in case the client's account does not have enough funds to pay the supplier on the due date. This means that the supplier assumes most of the default risk of the bank's client. Moreover, Confirming Standard does not imply credit provision to the supplier. However, advanced payment is possible if the supplier desires so. In that case, anticipation is converted in factoring, where the commission is borne by the supplier. It is, then, pretty clear that, once the bank does not charge expenses for providing Confirming® payment services, the main goal is to get as many anticipations as possible, to convert them into factoring. Another solution this bank offers is Confirming with Recourse which has just one distinction. Here, the bank has a claim against the supplier, for any payment deficiency, meaning that who now assumes default risk is the financial institution. The third solution, entitled Self-Confirming, only differs with regard to the provision of credit. In this case, invoices are always paid in advance to the supplier, with its consent, and who bears all the costs is the client.

Espírito Santo Bank offers two different reverse factoring solutions. Firstly, the System of Payments to Suppliers, which is similar to Confirming Standard. In other words, the client sends future payment instructions to the bank, with all necessary

information, so that the bank transfers the transaction amount from the client account to suppliers accounts, at due date. Invoices can, as well, be confirmed every time the bank receives them or a permanent confirmation can be done. Suppliers have also the option to ask for advanced payment. However, in this financial institution, commissions can be borne either by the client or the supplier. This solution targets medium and big companies with a significant high number of suppliers. These companies tend to have a good risk profile like, for instance, a large department store such as El Corte Inglés. On the other hand, for smaller firms with a lower number of suppliers, Espírito Santo Bank designed the BES Express Bill. In this case, the bank concedes a maximum ceiling of capital to the client and, in turn, the client concedes an upper limit to each supplier. Suppliers manage it as they wish, meaning that they can choose between receiving the payment on the due date or earlier, making this decision in the online platform. If suppliers anticipate the payment, they are the ones who bear the costs, receiving the anticipation net of services fees.

3.2 Advantages

Reverse factoring presents several advantages for all three participants involved in the process.

3.2.1 Benefits for the factor

Concerning factor benefits, reverse factoring builds stronger and more collaborative relationships with clients. Banks can also extend their business with small firms, the suppliers, without taking on more risk. This may grant cross-selling opportunities, as lenders can build the credit history of these firms. Reverse factoring increases the scale of financial flows by having a centralised treasury organization and it also increases factoring business, owing to payment advances. Additionally, the bank knows exactly where the money is being employed. This is not the case with bank loans, where the bank cannot monitor the purpose of the lending. This indicates that reverse factoring is a lower risk financial instrument. As a matter of fact, trade finance techniques have been considered an extremely low-risk operation. Actually, International Chamber of Commerce (ICC) Banking Commission (2001) performed a study[2] using trade finance transaction data of fourteen international banks. Such data

[2] "Global Risks - Trade Finace 2011"

comprises tenors, default rates, recovery rates and losses given default. Empirical evidence shows that trade finance is one of the safest, most collateralized and self-liquidating forms of finance. In fact, default probability is minimal even during the economic crisis. Actually, the study mentions that factors exterior to the trade finance industry were the basis of the 2008 crisis. During the interviews, Mr Paulo Ventosa from Santander Totta Bank stated that reverse factoring contract has an extremely low default rate, as well. In fact, when reverse factoring is done without recourse, the bank does not carry any responsibility in case the client's account does not have enough funds to pay the supplier, meaning that the bank does not incur in losses. On the other hand, when reverse factoring is done with recourse, defaults do not necessarily end in write-offs as the factor reimburses the amount of the transaction by selling the underlying merchandise. Alternatively, the bank can even do a credit insurance.

3.2.2 Benefits for the buyer/client

Regarding buyer benefits, reverse factoring allows to extend days payable outstanding. This is a consequence of a higher negotiating capacity with suppliers, as a result of using a secure financial instrument, without delays and with access to automatic anticipation. Better payment terms improve cash-flow management. Moreover, working capital needs are financed by suppliers instead of bank loans, improving the balance sheet structure. Actually, it seems that the likelihood of a buyer default on a regular bank loan is higher than default on a reverse factoring contract because paying the supplier guarantees business continuity, being easier to restructure the debt. Another advantage is that it reduces payment processing costs, as well as administrative tasks, imputing to the bank the whole payment management to suppliers. Lastly, the online platform makes it possible to have an easy access to updated, credible and rigorous information.

3.2.3 Benefits for the supplier

Reverse factoring allows suppliers to have access to an automatic credit revolutionary system with more favourable terms. This is only possible because the bank relies on buyers' stronger credit rating. If suppliers decide to take the credit, it decreases the length of accounts receivable period, as well as banks loans. Even without advancing the payment, it assures receiving on the due date and it avoids losses by irrecoverable payments. Furthermore, it reduces collection administrative costs. These

are advantageous features of the instrument, particularly if suppliers are, in fact, smaller and less creditworthy companies, as mentioned in the literature review. However, strong clients do not necessarily do business only with risky firms. It might be the case that some suppliers also have a good risk profile. In this case, suppliers would most probably take advantage of the cheaper line of credit instead of asking for a bank loan. Therefore, it is important to test the creditworthiness of the suppliers. This was attempted during the dissertation, but data availability and confidentiality prevented the results from going far. An outline of the best effort is presented in Appendix 1.

With all these advantages for the three parties involved in the reverse factoring arrangement, it is only natural that this instrument increases business flow, essential to keep up with the economic expansion. On the other hand the association between economic growth and the use of traditional factoring - extremely similar to reverse factoring - is a hypothesis previously tested in the literature (Klapper, 2006). Hence a positive correlation between reverse factoring and economic growth is expected, which gives rise to the following hypothesis, adapting Klapper's (2006):

H1: Reverse factoring is larger when the economy is growing

3.3 Payment Trends in Europe

Liquidity problems have been a major cause of the growing risk of failing of European businesses, due to an increasing number of firms and people not paying their invoices. Most of these businesses are small and medium sized enterprises, which, in fact, are the lifeblood of the European economy. Since the economic downturn around six years ago, Europe's private enterprises, roughly 97%[3] of them with a small and medium size, have dealt with higher costs to grow, or, at least, to secure their business. However, traditional routes of funding, such as bank loans, have become less viable and little has been done to help these companies, especially in their battle to handle late payments. According to Intrum Justitia (2012)[4], there is a substantial distinction in late payment behaviour between the financially stronger north and the weaker south of Europe, as Figure 2 illustrates. In 2012 northern countries took an average of 33 days to pay business-to-business transactions, whereas southern countries took around 91 days.

[3] Source: Intrum Justitia, "European Payment Index 2012"
[4] "European Payment Index 2012"

However, this distinction in 2012 is not a one-off case. In Intrum Justitia's reports from previous years the pattern remains the same and the existence of strong regional differences is always mentioned. This is actually a serious problem for the integration of Europe's internal market.

Figure 2: European business-to-business payment terms

Source: Intrum Justitia (2012)

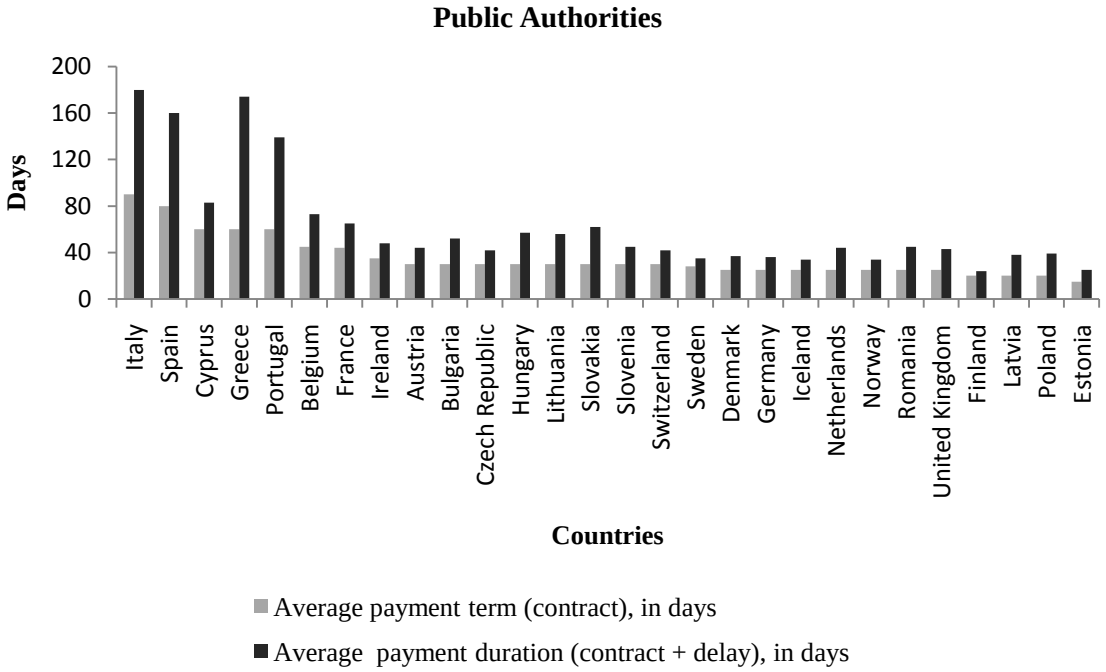
Not surprisingly, as previously mentioned, reverse factoring was initially created in a southern Europe's country, namely in Spain. As a matter of fact, Confirming® services in Santander Totta Bank (Portugal) are specifically targeted to suppliers residing in Portugal or Spain.

Naturally, business-to-business and public authorities payment terms are interconnected. As the State extends its payment terms, companies are pushed to extend theirs as well. Therefore, they follow roughly the same pattern, as it is clear comparing the previous graph with Figure 3. No wonder that, in February 16th 2011, the European Parliament[5] created measures against late payment of commercial transactions. It was

[5] Directive 2011/7/eu of the European Parliament and of the Council

established that days payable outstanding should not exceed 60 days for private companies and 30 days for public authorities.

Figure 3: European public authorities payment terms



Source: Intrum Justitia (2012)

If reverse factoring is being used in commercial transactions to improve payment terms, contributing to solve liquidity problems, why is this innovation not used by the Portuguese State as well? Nowadays, companies pay the value-added tax a lot sooner than they receive it, affecting cash-flows. An interesting idea would be to use reverse factoring to match receivable and payable value-added tax, which would facilitate payments operations, as well as speed up the process. Actually, in Portugal, on December 18th 2009, the Parliament issued a resolution[6] promoting the use of reverse factoring by the Government to ensure payments to suppliers of the Central Public Administration. Later, on July 18th 2013, a similar resolution[7] was issued, this time to guarantee State payments to small and medium-sized enterprises (SME's). However, these suggestions were not successful. During the interviews, Mr José Resende from Espírito Santo Bank claimed that the State is not able to accurately comply with

[6] Parliament Resolution n.º 110/2009
[7] Parliament Resolution n.º 107/2013

payment terms. Therefore, if the State actually used this financial instrument, public debt would increase. In that sense, the State prefers delaying payments to other companies rather than to banks.

Summarizing, in Europe, southern countries take more time to pay then northern ones and reverse factoring was created in one of the European countries with larger payment terms. Moreover, State payment terms influence the days payable outstanding of the whole country's economy. Having this in mind together with the fact that reverse factoring helps to decrease days payable outstanding, it is straightforward that there might be a relation between reverse factoring and the State payment cycles. Thus, a second hypothesis was formulated:

H2: Reverse factoring is larger when the State payment terms are larger

4 Data & Methodology

4.1 Sample

To test the hypotheses of this dissertation and conclude which are the macroeconomic circumstances associated with a greater use of reverse factoring in Portugal, secondary data was used. Namely, information was collected from Associação Portuguesa de Leasing, Factoring e Renting on the volume of reverse factoring, from Bloomberg database on the volume of Gross Domestic Product and also from the Portuguese Ministry of Finance on the State Days Payable Outstanding. Data is relative to Portugal and it ranges from November 2007 to June 2013, summing up a total of 68 observations.

4.2 Measures

The following model variables, described in Table 1, were used to explain the relation between the use of reverse factoring and both the economic growth and the State payment terms.

Table 1: Description of variables to test *H1* and *H2*

Variable	Description
Reverse Factoring	Volume of reverse factoring in Portugal. *Source: ALF*
GDP_{t-1}	Adjusted 1-month lagged volume of the Gross Domestic Product in Portugal. *Source: Bloomberg*
DPO_{t-1}	Adjusted 1-month lagged value of the Days Payable Outstanding of the Portuguese State-Owned Enterprises Sector. *Source: Ministry of Finance*
Dummy Time	Dummy for each year between 2007 and 2013

Dependent variable

Reverse Factoring corresponds to the total volume of reverse factoring in Portugal, in million euros, by month.

Independent variables

GDP_{t-1} is the 1-month lagged volume of the Gross Domestic Product in Portugal at 2006 constant prices, in million euros. Companies will only react to changes in the

economy at least one period after the change, and that is the reason the variable is 1-month lagged. Originally, the data was quarterly. However, to increase the number of observations, data was converted into monthly by using the monthly growth rate from one quarter to another. This variable is an indicator of the country's economic output and growth.

DPO_{t-1} is the 1-month lagged value of the Days Payable Outstanding of the Portuguese State-Owned Enterprises Sector, in days. Again, companies will only react to changes in the economy at least one period after the change, being this the reason for the variable to be 1-month lagged. Originally, data was quarterly. Although, aiming to increase the number of observations, it was assumed each month to have the value of the corresponding quarter. This variable measures the average number of days the State-Owned Enterprises Sector takes to pay the companies.

Control variables

Dummy Time is a dummy variable for each year from 2007 to 2013. It aims to control for other effects which may be correlated with the independent variable. For instance, in the first two years under analysis there is an exponential growth of reverse factoring, which may be explained by the previous regressors. However, since it is a roughly recent financial instrument, this growth may also be explained by the fact that more financial institutions started offering it or even because companies became aware of it. Likewise, this variable was introduced in the model.

4.3 Method

In order to test the hypotheses of the study, the Ordinary Least Squares method was applied. Using Stata statistical software, the following time series models were estimated (Equation 1 and Equation 2). It is expected the coefficient of the independent variables - β - to be significant and positive, in order to support both hypotheses.

Equation 1: Linear regression to test *H1*

$$Reverse\ Factoring = \alpha + \beta\ GDP_{t-1} + \gamma\ Dummy\ Time$$

Equation 2: Linear regression to test *H2*

$$Reverse\ Factoring = \alpha + \beta\ DPO_{t-1} + \gamma\ Dummy\ Time$$

5 Results

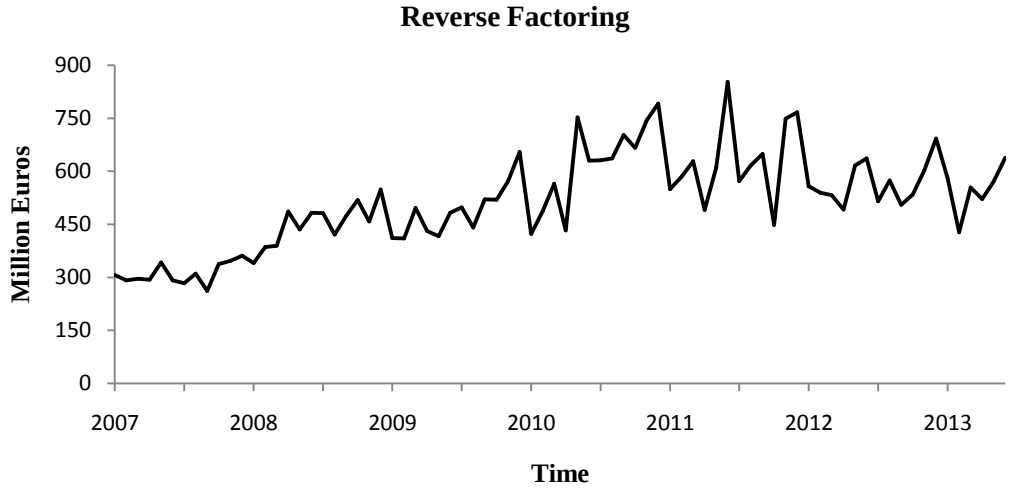
5.1 Descriptive Statistics

Table 2: Descriptive statistics

(in million €, except DPO_{t-1} which is in days)	Observations	Mean	Std. Deviation	Minimum	Maximum
Reverse Factoring	68	545	113	340	853
GDP_{t-1}	68	13 379	327	12 641	13 817
DPO_{t-1}	68	125	35	73	188

Analysing the descriptive statistics present in Table 2, one can perceive that the average reverse factoring in Portugal, from November 2007 to June 2013, is 545 million euros. January 2008 presents the lowest value, whereas June 2011 presents the highest one. These observations suggest that the volume of this financial instrument grew during these months, at a relatively high pace. However, it is possible to verify a relatively slowdown in the last periods under analysis. This can be confirmed in Figure 4.

Figure 4: Reverse factoring evolution in Portugal, between November 2007 and June 2013



When it comes to GDP_{t-1}, the minimum value corresponds to March 2013 and the maximum one to December 2007, evidencing the deterioration of the economy, in

the context of the latest financial crisis. This may indicate a negative correlation with reverse factoring. Regarding the State payment terms, it takes an average of 125 days to pay the companies, which represents a very high number when compared to other European countries, as previously verified. Its maximum is a staggering number of 188 days, i.e., around half a year, in the second quarter of 2012. The minimum of 73 days belongs to the third quarter of 2009. This points towards a positive correlation with reverse factoring and a negative one with GDP_{t-1}.

5.2 Pearson's product-moment correlation coefficients

Table 3: Correlation matrix

	Reverse Factoring	GDP_{t-1}	DPO_{t-1}
Reverse Factoring	1.000		
GDP_{t-1}	-0.179	1.000	
DPO_{t-1}	0.279	-0.551	1.000

Recalling, Klapper (2006) shows that "factoring is larger when the economy is growing". The author believes that the positive correlation is a consequence of the increase of stock receivables and number of customers, leading more companies to use factoring for working capital financing. However, as it would be expected from the previous analysis, Table 3 shows that the correlation between reverse factoring and GDP_{t-1} is negative, suggesting that Klapper's (2006) findings do not hold for reverse factoring. According to literature, suppliers which use reverse factoring have a worse risk profile. So, it might be the case that the demand for reverse factoring increases when the country's economy is declining, as these companies' financial problems increase during an economic downturn. Moreover, the intuition concerning the correlation between reverse factoring and DPO_{t-1} is now confirmed. This might be explained by the same reasoning. If suppliers have a worse risk profile, when payment terms increase, they will use reverse factoring to decrease the length of accounts receivable period. Finally, GDP_{t-1} and DPO_{t-1} have a significant level of correlation, which would cause a multicollinearity problem if put together in the same model. Multicollinearity increases the probability of making type II errors, i.e., the failure to reject a false null hypothesis. The correlation between these two variables is negative. In

fact, if the economy is going down, there is a high possibility of the State to increase the days payable outstanding. However, even if payment terms are affected by economic cycles, it cannot be considered an entirely economy cycle phenomenon. Actually, some companies make use of late payments as a normal cash-flow management practice. In Europe, 36,3% of domestic and 43% of cross-border late payments are intentional. As a matter of fact, this represents a decline in business ethics, reinforcing, once again, the threat for the internal market development.

5.3 Regression

Table 4: Results

Observations: 68

Regression	Independent Variable	Expected sign	Coefficient	p-value	Adjusted R^2
(1)	GDP_{t-1}	(+)	-63.529	0.612	0.376
(2)	DPO_{t-1}	(+)	2755.364**	0.011	0.437

Note: *,** and *** denote statistical significance at 10%, 5% and 1%, respectively, for the p-value test.

Results from regressions (1) and (2) are presented in Table 4. From regression (1) it is not possible to take any conclusion about hypothesis *H1*, since the coefficient of GDP_{t-1} is not statistically significant, meaning that the null hypothesis is not rejected. This means that there is not linear relationship between reverse factoring and GDP_{t-1}. On the one hand, Klapper's (2006) findings imply that the correlation between factoring and the growth of the economy is positive because it might be the case that more firms use factoring to keep up with demand increase. As factoring and reverse factoring are very similar instruments, it could also be the case that reverse factoring increases when stock receivables and the number of customers increase as well. On the other hand, as it was suggested by the Pearson's product-moment correlation coefficients analysis, it might also be the case that the demand for reverse factoring increases to fight financial problems. In this scenario the correlation would be negative. These opposite reasonings might be the explanation for the statistically insignificance of the GDP_{t-1} coefficient.

In contrast, regression (2) support hypothesis *H2* given that DPO_{t-1} coefficient is statistically significant, meaning that the null hypothesis is rejected. According to *H2*, reverse factoring is larger when the State payment terms are larger, confirming the

positive causality revealed by the Pearson's product-moment correlation coefficient. Lastly, if both variables of each model were statistically significant, they would be combined in the same model to monitor the impact of adding each one. However, this was not the case.

5.4 Robustness Check

Given the results of regression (1), it was suggested that maybe reverse factoring increases both when the country's economy is going up, to keep up with demand, or when it is declining, to fight financial problems. If this was actually the case, a quadratic regression would fit the data. Therefore, the relation between reverse factoring and the economic growth will now be tested, applying the following time series model:

Equation 3: Quadratic regression to test *H1*

$$Reverse\ Factoring = \alpha + \beta\ GDP_{t-1} + \delta\ GDP\ ^{2}_{t-1} + \gamma\ Dummy\ Time$$

Table 5: Robustness check results - *H1*

Observations: 68 Adjusted R^2: 0.367

Independent Variable	Expected sign	Coefficient	p-value
GDP_{t-1}	(-)	-3165.009	0.623
GDP_{t-1}^2	(+)	0.117	0.630

Results from the quadratic regression are presented in Table 5. It is not possible to take any conclusion about the hypothesis that reverse factoring increases both when the country's economy is going up or when it is declining, since there is no statistical significance. This means that, for the period under analysis, there is not a quadratic relationship between reverse factoring and GDP_{t-1}. One additional suggestion could be provided regarding the lack of both linear and quadratic relation between these two variables. It might be the case that some firms use this instrument more when the when stock receivables and number of customers increase (positive linear relationship), whereas other firms may use it more to fight financial problems (negative linear relationship).

OLS assumes homoscedasticity, i.e., the variance of the error term is constant. Violations of this assumption can invalidate statistical inferences. An evidence that might point towards heteroscedasticity is when p-values are substantially low. That is the case of DPO_{t-1} coefficient, which presents a p-value of 0.011. Therefore, regression (2) will be run once again, this time specifying vce (robust) command in order to obtain robust estimators. This is equivalent to requesting heteroscedasticity-consistent standard errors, which are used to allow the fitting of a model that does contain heteroscedastic residuals.

Table 6: Robustness check results - *H2*

Observations: 68 Adjusted R^2: 0.437

Independent Variable	Expected sign	Coefficient	p-value
DPO_{t-1}	(+)	2755.364**	0.011

Note: *,** and *** denote statistical significance at 10%, 5% and 1%, respectively, for the p-value test.

It can be concluded from Table 6 that regression (2) support hypothesis *H2*, indeed. The DPO_{t-1} coefficient is still statistically significant and it has roughly the same value. It makes almost no difference whether vce (robust) command is specified or not. This means that, in this model, the homoscedasticity assumption is true.

6 Conclusion

This dissertation studied a particular form of intra-chain collaboration, reverse factoring, in Portugal. The possibility that reverse factoring may offer some advantages results from the failure of markets. In perfect capital markets, a firm's value does not depend on the way it chooses to finance its investments. However, due to information asymmetries, reverse factoring adds value to the three parties involved in the process - financial institution, client and supplier.

What is distinctive about reverse factoring is that it behaves simultaneously as a payment service and a financing instrument, playing both roles with advantages when contrasting with traditional ways of doing so. Regarding acting as a payment manager, as it imputes the whole payment process to the bank, it decreases administrative tasks for both buyers and suppliers. On operating as a financing instrument, first of all, it provides better accounts payable and receivable terms. Secondly, suppliers have access to an automatic credit revolutionary system with more favourable conditions. This is particularly important since, according to literature, this credit system is used within sectors of activity with a worse risk profile, which probably cannot have access to bank loans. As reverse factoring relies on buyers' credit rating, it enables high-risk suppliers to transfer their credit risk to their buyers, allowing the former to have access to credit. Concerning the factor, this instrument also has same major benefits as it is a low risk tool and it may grant cross-selling opportunities with suppliers.

Moreover, no conclusions could be taken regarding the relation between reverse factoring and the economic growth. There is neither a linear nor a quadratic relationship between them. It might be the case that a group of companies use this instrument more when stock receivables and number of customers increase, in other words, when the economy is expanding. In contrast, other companies may use it more to fight financial problems, that is, when the economy is going down.

Last but not least, strong regional differences are observable within payment terms in Europe. There is a substantial distinction in late payment behaviour between the financially stronger north and the weaker south of Europe. The later presents a substantially higher payment duration. Not surprisingly, reverse factoring, having the feature of providing better accounts payable and receivable terms, was initially created in a southern Europe's country, namely in Spain. In fact, empirical tests show that reverse factoring is larger when the State payment terms, which influence the days

payable outstanding of the whole economy, are larger as well. This financial instrument has, therefore, an inherent cultural dimension regarding the Southern European countries' payment practices.

7 Limitations and Further Research

Limitations present in the study should be highlighted and future research should try to overcome them.

Regarding the regression run in Section 3 to test the suppliers risk profile, there are some remarks to be done, present in Appendix 1. There are, as well, some limitations regarding the regressions developed to test the hypotheses of this dissertation. First of all, the independent variable DPO_{t-1} does not reflect payment terms of the State as a whole. As an alternative, an average of the days payable outstanding of all public entities - Central, Regional and Local Public Administration, as well as the State-Owned Enterprises Sector - weighted by the number of entities in each of these sectors should be used. Another prominent limitation is the small dataset of the analysis, meaning that it is important to test it for a longer period. These adjustments would produce more accurate results as data would better fit what is being tested and the sample would better represent the population.

The centre of this study was the Portuguese market. So, in addition to the previous improvements, the study could be extended to other markets to see if findings hold. It would as well be interesting to test, once again, the impact of the economic growth in the use of reverse factoring, but this time splitting the sample in two different groups of firms. Such division could be based, for instance, on the firms' size. The goal would be to analyse if results are consistent with the suggestions provided for the absence of a linear and a quadratic relationship between these two variables.

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9 Appendices

9.1 Appendix 1

The following hypothesis was tested:

Suppliers which use reverse factoring have a worse risk profile

Sample

Information was collected from Associação Portuguesa de Leasing, Factoring e Renting on the volume of reverse factoring by sector of activity, as well as from Instituto Nacional de Estatística on indicators and financial ratios. Data is relative to Portugal, it ranges from 2008 to 2009, annual values, and it comprises 17 sectors of activity (Table 7), summing up a total of 34 observations.

Table 7: Suppliers' sectors of activity

Session	Description
A	Agriculture, livestock, hunting, forestry and fishery
B	Extractive industry
C	Manufacturing industry
D	Utilities
E	Water and wastewater systems
F	Construction
G	Wholesale and retail; motor vehicles and motorcycles repair
H	Transport and storage
I	Accommodation and restaurant services
J	Information and communication activities
L	Real state
M	Consultancy, scientific and technical activities
N	Administrative activities and support services
P	Education
Q	Health care and social support
R	Artistic, entertainment, sports, and recreational activities
S	Other service activities

Note: Data compiled according to Classificação Portuguesa das Actividades Económicas - Revisão 3.

Measures

Seven model variables, present in Table 8, were used to explain the relation between the use of reverse factoring and the financial position of each sector of activity.

Table 8: Description of variables to test suppliers creditworthiness

Variable	Description
Bankruptcies	Number of bankrupt companies divided by the total number of companies. *Source: INE*
Reverse Factoring	Volume of reverse factoring divided by the total assets. *Source: ALF and INE*
Liquidity	Quick liquidity ratio. *Source: INE*
Investment	Retention rate. *Source: INE*
Profitability	Operating return on sales ratio. *Source: INE*
Debt Capacity	Total equity divided by total debt. *Source: INE*
Size	Total revenue divided by total assets. *Source: INE*

Dependent variable

$Bankruptcies = \frac{\#\ Bankruptcies_{\ s}}{\#\ Companies_{\ s}}$, where *s* is the sector of activity. This dependent variable was used as a measure of sector risk profile. It corresponds to the percentage of bankruptcies in each sector, rather than the actual number of bankruptcies, as different sectors have different number of companies. As more companies go bankrupt, more risky the business sector is.

Independent variable

$Reverse\ Factoring = \frac{Reverse\ Factoring\ Volume_{\ s}}{Total\ Assets_{\ s}}$, where *s* is the sector of activity. This ratio measures the reverse factoring volume relative to the total capitalization, as sectors size varies a lot. Reverse Factoring Volume corresponds only to invoices paid in advance to the supplier and it also includes transactions on traditional factoring.

Control variables

There are some other variables that may affect the dependent variable irrespective of the amount of reverse factoring. Therefore, they must be included in the model.

Altman's Z Score, developed by Edward Altman in 1968, was the first model to use accounting ratios to predict default and is still the most popular discriminant score model applied to credit risk (Altman, 1968). The aim was to classify firms into one of

two *a priori* qualitative groups: bankrupt and non-bankrupt. Altman's original model (Equation 4) considers publicly held firms in the manufacturing sector and uses five differently weighted financial ratios:

Equation 4: Altman's Z Score original model

$$Z\ Score = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.9X_5$$

Where,

X_1: The Working Capital/Total Assets ratio is a measure of the net liquid assets of the firm relative to the total capitalization;

X_2: Retained Earnings/Total Assets is a measure of cumulative profitability over time;

X_3: Earnings Before Interest and Taxes/Total Assets is a measure of the true productivity of the firm's assets, abstracting from any tax or leverage factors;

X_4: Market Value of Equity/Book Value of Total Debt shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the assets and the firm becomes insolvent. This ratio is important because it adds a market based ratio to the model, having an advantage to models that are strictly based on accounting ratios;

X_5: Sales/Total Assets. The capital-turnover ratio is an efficiency measure of a firm's assets. It measures the ability of assets to generate sales.

Later, in the second model (Altman, Haldeman & Narayanan, 1997) several variations of the original Z score model were developed, to tailor it for different types of business sectors. This revised model differs in the weights attributed to the different multiples used in the function, as well as, the inclusion or omission of some ratios, to give weight to relevant industry-specific shortfalls in the model. Even thought, Altman's original model has been widely used for analysing different industry sectors. As a matter of fact, previous literature suggests that the original model works just as well in predicting bankruptcy when applied outside of the manufacturing sector (Li,

2012). Assuming that the original model is accurate, the following control variables were included:

Liquidity, as a proxy for X_1. This variable corresponds to the quick liquidity ratio, which measures the sector's ability to meet its short-term obligations using its most liquid assets;

Investment, as a proxy for X_2. This variable corresponds to the retention rate, in other words, the percentage of earnings credited to retained earnings;

Profitability, as a proxy for X_3. This variable measures operating return on sales of the sector and is an indicator of the sector's ability to generate earnings from sales;

Debt Capacity, as a proxy for X_4. This variable corresponds to the equity to debt ratio and it aims to analyse the financing methods of the sector;

Size $= \frac{Total\ Revenue_{\ s}}{Total\ Assets_s}$, where *s* is the sector of activity, and it corresponds to X_5. This variable implicitly accounts for the size of the sector.

Method

Using Stata statistical software and the Ordinary Least Squares method, the following panel data model was estimated (Equation 5). It is expected the coefficient of the independent variable - β - to be significant and positive, in order to support the hypothesis.

Equation 5: Regression to test suppliers creditworthiness

$$Bankruptcies = \alpha + \beta\ Reverse\ Factoring + \gamma\ Liquidity + \delta\ Investment + \mu\ Profitability + \theta\ Debt\ Capacity + \rho\ Size$$

Regression

Table 9: Results of the regression to test suppliers creditworthiness

Observations: 34 Adjusted R^2: 0.267

Independent Variable	Expected Sign	Coefficient	p-value
(Constant)		0.356***	0.001
Reverse factoring	(+)	0.585*	0.080
Liquidity	(-)	-0.301	0.216
Investment	(-)	-0.191**	0.012
Profitability	(-)	-0.683	0.120
Debt Capacity	(+)	0.004	0.892
Size	(-)	-0.106	0.134

Note: *,** and *** denote statistical significance at 10%, 5% and 1%, respectively, for the p-value test.

Results show that the correlation between bankruptcies and reverse factoring is positive - 0.3394 - suggesting that the more suppliers use reverse factoring, the higher the percentage of bankruptcies, in other words, the worse the sector risk profile. In fact, regression results (Table 9) support the hypothesis as β is significant at 0.08. Literature viewpoint on the suppliers' creditworthiness is then verified. Furthermore, wholesale and retail, motor vehicles and motorcycles repair, construction and manufacturing are the top three industries which use reverse factoring the most. It would be expected as these are sectors of activity dominated by a small number of large buyers. In other words, where buyers have bargaining power.

Limitations

Regarding the regression to test the suppliers risk profile, there are some remarks to be done. Due to a question of confidentiality, it was only possible to collect information by industry. However, ideally, this analysis should be done with companies. This would enable to use the actual Altman's Z Score as a dependent variable, instead of using the proxies of Altman's Z Score ratios as control variables. This score has a contemporary relevance as a managerial decision making tool and it is particularly appealing due to its simplicity. Actually, it has been widely used by lending institutions

in having an overview of a company's creditworthiness. However, it is not commonly applied for industries, as it was here attempted. Moreover, the independent variable includes transactions on traditional factoring. However, the analysis should be carried out only with factoring from reverse factoring anticipations because that is what the regression is trying to test. Finally, there is a limited number of observations which should be extended to closely approximate the population. All these corrections would make it possible to do a more accurate study by using a more precise risk profile measure, by focusing purely on reverse factoring transactions and by reducing the risk of the sample being unusual just by chance.