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Conceptual paper

How to manage credit risk

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Abstract

Purpose: Managing credit risk is crucial for a company's solvency. Most of the company's receivables are in credit. Prompt payments are almost insignificant, and the delay of turnover payments has become a tendency, especially with the 2007/2008 financial crisis. Therefore, companies must know how to set individual credit to customers, how to protect from non-payments, how to act timely and how to minimize indebtedness. This paper aims to highlight answers to all these questions.

Methodology: This paper deals with the theoretical exposition of credit management, presenting illustrations and explaining how to interpret financial data.

Findings: Managing credit risk contributes to decrease the company's risk and to increase its value. Companies may establish credit policies to build relationships of respect and trust with customers. Moreover, it helps to decrease the company's indebtedness, and to increase liquidity. Finally, a company that control customers' credit avoids losing money due to customer's insolvency.

Originality: This paper represents a major contribution to the empirical literature and practice of managing credit. An in-depth study of the thematic is provided. We explain all the inputs needed for a future implementation of a customer credit limit, and how the company can manage credit in the way to maximize its value and minimize risk.

Keywords: Managing credit; credit risk; credit policies; credit limits; credit information; bad debt.

1. Introduction

Most companies give the opportunity to customers to pay later their sales and services. This strategy gives advantage to companies as more customers may be interest in acquiring goods and services. Although, it also leads to credit risk since customers may not pay their debts or may not pay in the agreed dates. Credit management helps companies to minimize credit risk.

Credit management has gain prominence in the last years, especially with the financial crisis of 2007/2008, when diverse firms went to bankruptcy or had solvency problems,

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leading to a delay or any payment of their obligations. This situation calls the attention to companies to the need to establish credit policies, and to control customers' credit to avoid bad debts.

This paper deals with the theoretical exposition of credit management. The main aim is to explain how companies should design credit standards and prepare credit management to increase its value, and to decrease risk.

The company should establish a relationship of trust and confidence with their customers to avoid bad debts. Moreover, it is important to know the market, the industry and the customer to make a correct decision when providing credit. Each customer has its specificities. Likewise, the company must collect information about them, to establish credit limits adjusted to their profile and ability to meet credit obligations. Credit risk models can be used to help to analyze customers' credit risk. Finally, the company must have credit managers to deal with customers' credit, and use all mechanisms to collect the money, avoiding bad debt.

This paper represents a major contribution to the empirical literature and practice of managing credit as it is an in-depth study about the thematic. Company's managers have all information they need to establish customer's credit limit, and to manage credit for the future, in the way to maximize the company's value and minimize its risk.

After this introduction chapter, chapter 2 explains the types of companies' risks, while chapter 3 reviews existing literature of credit risks. Chapter 4 discusses how to deal with credit management. The last chapter shows the conclusions of the work.

2. Firm´s risks

Risk is present in every company. If for one side, risk brings uncertainty as the company's future may not occur as expected, for another side, it is a way to increase the company's knowledge since calls attention to the need of an informed decision making. Therefore, companies must identify risks, measure them and take preventive decisions to minimize their negative impact.

There are diverse risk types. According to Neves (2012) it can be divided in two main groups: market and specific risk. The market risk, also called systematic risk, has impact on the performance of all companies in the same financial market. This risk cannot be eliminated through investment diversification. It is related with recessions, political turmoil, macroeconomic changes, changes in inflation rate, in interest rates, in exchange rate, among others. The specific risk, also called unsystematic risk, only impacts an industry or a group of firms. It can be divided into operational, financial or reputational risk (Neves, 2012). Operational risk results from managing operational revenues and costs, mainly fixed costs, since the company needs to support them even if has no activity in a specific period. It can result from internal processes which may not be adequate or failed, or from the difficulty to acquire and retain customers.

The financial risk measures how the company is handling with their money. It includes credit given to customers, and debt loan, and it takes into account interest rates (Deloitte, 2017). Lastly the company's reputational risk is the possibility of losing reputation that can result from a product failure or lawsuits. It is usual an adverse perception of one or more stakeholders (a competitor, the media, or other). In this type of risk, the social media is relevant, since a bad review can damage the company's image and confidence (Banco de Portugal, 2007).

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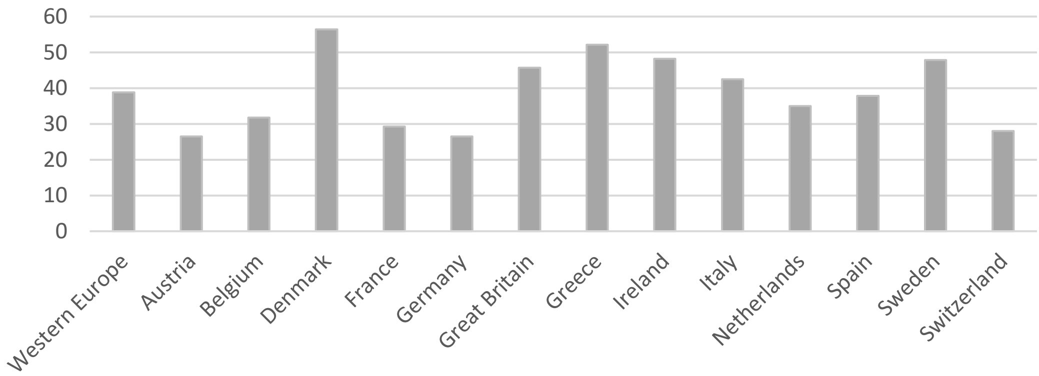
3. Credit risk

This work is about credit risk, one particular type of financial risk. Credit risk is related with the possibility of the customer do not fulfil their contract obligation with the company (Kollar, 2014).

Not all sales involve credit, depending not only on the company's industry, but also on the customer. Some industries receive their sales and services promptly. Are example: education, accommodation, catering and similar, and real estate industries (Banco de Portugal, 2018). Moreover, to export usually companies do not grant credit or when granting receive a part of their sales in advance to have some security, since it may be more difficult to receive from foreign customers due to the distance. Irregular customers may also pay in cash on delivery as the company do not have historical information about the customer's ability to meet their obligations (Brealey, Myers & Allen, 2016).

As said before, offering credit can increase the attractiveness of the company's sales and services, being a competitive advantage compared to other competitors (Siekelova, Kollar & Weissova, 2015). For this reason, almost all firms around the world give credit to customers. In the following figure is present the mean value of sales made on credit to Europe:

Figure 1. Proportion of sales made on credit (mean)



Source of information: Atradius (2017).

As we can see almost in all countries more than 50% of sales are made on credit, showing the need to manage customers' credit. As a consequence of giving credit, the company's account receivable in the balance sheet increases, but this does not mean that in the future its cash flow also increases (Siekelova, Kollar & Weissova, 2015). In fact, the customer may not pay back, causing impact in the company's indebtedness (Jaros, Melichar, Svadlenka, 2014). The company will not receive from its turnover but will lose money since the cost of goods sold, workforce costs, VAT and other taxes must be paid. In case of customers' non-payment, the company may recover VAT, but must prove that have tried to receive the money in debt. Moreover, to give credit the company may need to ask for a bank loan to finance its activity. Likewise, its financial costs increase, as well as bankruptcy risks. Therefore, the company must take into account all pros and cons of giving credit before providing it (Frajtova-Michalikova, Kocisova, Misankova, 2014). Finally, the company must set an individual credit segments of customers to recover debts and to deal with credit risk (Brealey, Myers & Allen, 2016).

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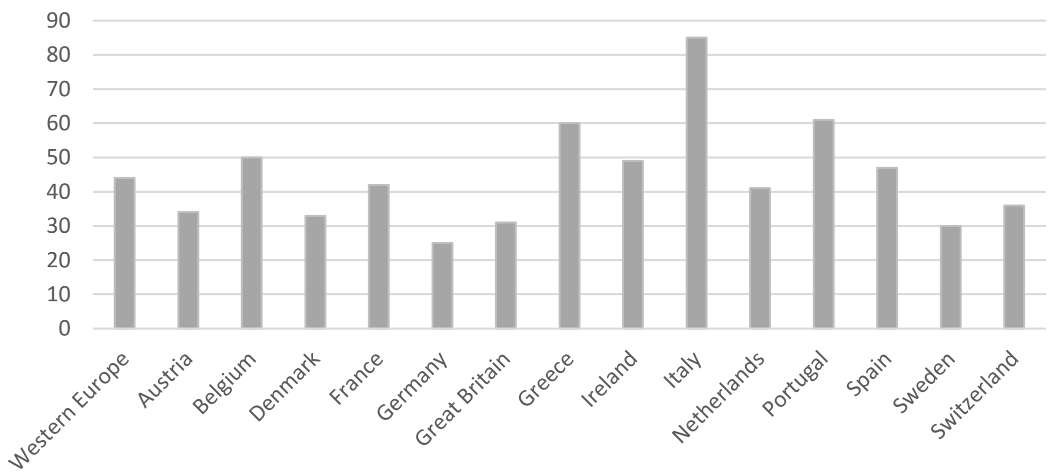
In the following figure is present the average days sales outstanding to some of the European countries.

Figure 2. Days' sales outstanding per country (mean)



Source of information: Atradius (2017) and Banco de Portugal (2018).

The mean number of days' sales outstanding to Western Europe is 44 days, being Italy in the top, with a mean number of 85 days, and Germany with the smallest number (25 days). Moreover, in the study published by Atradius (2017) they show that almost all countries in the study, except for France, have increased the days sales outstanding in the period of 2016-2017. To Portugal, the days' sales outstanding are, in mean, decreasing since 2014, as we can observe in the next table.

Table 1. Number of days sales outstanding by sector (mean values)

	Mean	Industry	Energy	Construction	Trade	Transportation	Other
dec 2006	63	77	48	87	52	78	59
dec 2007	64	79	36	88	54	74	64
dec 2008	61	77	31	82	54	75	56
dec 2009	67	86	37	96	55	86	59
dec 2010	68	85	37	114	52	83	67
dec 2011	70	78	35	134	55	85	70
dec 2012	70	76	40	148	55	82	72
dec 2013	70	75	40	165	54	79	71
dec 2014	66	73	41	144	52	73	70
dec 2015	65	72	38	147	50	70	68
dec 2016	62	74	40	138	49	69	60
sept 2017	61	71	40	128	50	65	59

Source: Banco de Portugal (2018).

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Analyzing table 1 we can conclude that the 2007/2008 financial crisis had impact on the average number of days' sales outstanding to almost all industries in Portugal, but the major impact was in 2009, especially to the construction sector. In 2010 the Portuguese country, due to the high public deficit, asked for the economic and financial assistance program applied by Troika. Diverse austerity measures were applied from May of 2011 till 2014, when the average days sales outstanding have reduced again, and the country have recovered some stability.

Atradius (2017) study, when analyzing Western European countries, found that in 2017 1.3% of sales made on credit were no collectable, being the domestic sales more uncollectable than the foreign ones. Going in line with this result, to Portugal the construction, consumer durables, and business services sectors are in the top of sales not collectable.

According to Bloem & Gorter (2001) two main reasons explain why customers may not comply their obligations: 1) an inadequate policy of credit management, and 2) inflation and/or special conditions of the market that may impact credit policies. This calls the attention to the need to manage customer's credit.

4. Managing customers' credit

"The goal of credit risk management is to find the acceptable level of risk due to the providing credit sales" (Siekelova, Kollar & Weissova, 2015: 327). According to Stiglitz & Weiss (1981) risk credit is usually related with the lack of information. The company has not enough information about customers and gives credit that may not be paid back.

To deal with credit management, the company must firstly know the customers' creditworthiness. It is important to build a relationship between the seller and the buyer since it makes easier both giving credit and receiving it.

Every company needs to develop their own credit policies, in the way to balance sales/services (increase) and risk (decrease). The company's risk depends on the clarity of the credit policy and its compliance (Carreira, 2012). Credit policies can be defined as a set of rules or criteria that the company uses to give credit to their customers (Batista, 2004). "If you are polite and firm, these tactics will not ruin customer relations. Conversely, you may earn your customers' respect" (Atradius, 2017).

Not always the company can predict or control all risks. Likewise, they must be prepared for unexpected situations. When a company is developing a credit policy need to take into account some internal and external factors. Regarding the internal factors, the company need to consider: the sales conditions, credit valuation, and billing policy.

1) *Sales conditions* is the way companies sell their products and provide services. For each customer, the company should define the maximum value of credit to grant, the days' sales outstanding, the cash or other discount, the delay in payments allowed, and when the orders should be blocked due to nonpayment (Siekelova, Kollar & Weissova, 2015). The payment terms should be adjusted to the specificities of customers, attending to their creditworthiness, guaranties, credit insurance, history and financial statements (Batista, 2004). In a way to encourage customers to pay before the due date, the company's manager must propose a cash discount to who pay promptly. All these conditions should be discussed with the customer.

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2) Regarding *credit valuation*, the company need to create a system that allow to analyze the risk of each customer, especially the risk of non-payment. For it the company should collect information about the customers and should use a credit risk model. Moreover, the company's manager must analyze the payment terms of liabilities to control eventual costs that could be avoided if the company receive promptly.

3) Finally, taking into account *billing policy*, the company should have a credit team that will analyze the customers do not pay their invoices, and should define which actions should be carry on collecting credit sales (Ross, Westerfield, & Jaff, 2016). They should decide the form of contact with the customer, and establish a strategy to recovery credits, deciding what to do when invoices become due is also fundamental (Brealey, Myers & Allen, 2016). The type of action should be written in internal manuals, with information about forms, letters, credit reports, and other. The procedures should be explained step-by-step to collaborators if the company want that they perform correctly (Carreira, 2012). The process finishes when the money is collected.

Moreover, it is important to monitor customers' claims to avoid non-payments due to difference of opinions. The company's manager must also introduce a stop-list, it means a list of customers with previous negative experiences.

The decision of giving credit is not stable over the years. The company's manager must check credit limit and analyze its credit decisions in future sales and services, as customer's financial situation change as well as the market.

The external factors are related with the industry' price policies, and competition, since the company must follow what is usually in the sector to retain and attract more customers, with the country and industry economic stability, as it may impact customer's payments, among others (Batista, 2004). For instance, the financial turbulence in 2007/2008 create some instability to companies (Gameiro, Soares, & Sousa, 2011). In Portugal, these financial problems were greater for companies that had businesses with Angola. The Angolan government block cash outflows of the country, even when customers allowed money transfers to Portuguese suppliers (Roberto, 2017). Consequently, diverse companies lost money, making it difficult to pay their debts, and sustain their solvency.

The number of insolvencies in Portugal increased till 2013, reaching a maximum of 10212, which represented around 2% of the existent firms in that time (Racius, 2018). This called company's attention to protect themselves.

4.1. Credit policies

According to Batista (2004) there are three basic credit policies that companies can adopt, some of them more risk than others. There is not an optimal credit policy, all of them have their advantages or disadvantages.

The first one, less risky, is the restrictive credit policy. This policy is characterized as a non-risk taken, because in this case companies do not give credit to customers without having relevant information to guarantee their payments (Batista, 2004). Normally companies that adopt this policy are small-sized companies that have their finances in order, without needing bank financing or companies which operate in a market niche.

These firms have no ambition to growth. Although, it can damage the company's image in the market, because in the same market there are some companies that have similar products and offer better credit conditions to customers. Likewise, this credit policy cannot be used in a long-term since it increases the company's operational risk as no customers may be interested in deal with the company (Batista, 2004).

The moderate credit policy, is another credit policy, riskier than the previous one. The major difference is the fact that in this case companies want to grow and for that they are willing to take more risks, giving credit to customers even without absolutely sure that they will recover it (Batista, 2004). Financially speaking, companies that adopt this policy can have some financial stress but will have a better position and stability in the market. This type of policy is the one more followers in the business world.

The liberal credit policy, the last one, is the riskier credit policy. It is usually taken to firms that want to have a strong position in the market, and for it the company is willing to grant credit to obtain more customers (Batista, 2004). Customers can take advantage to obtain more credit, although the company in the long run can have some problems regarding the payment collection which can lead to bad debts. Likewise, a liberal policy is a more temporary policy, over the time the company will have the need to change to a moderate policy.

4.2. Credit limit

To have a good credit management the company's manager must establish credit limits for each customer, depending on the customer's probability to pay back their debts. First, the company must evaluate the customer's finance through the analysis of their financial statements, commercial conduct in the market, credit scoring, among others (Batista, 2004). This information can be obtained directly from the customer or through other companies. A customer that provides all information gives confidence to the company, as have nothing to hide.

Establishing credit limits is easier to permanent customers because the company's manager has information of previous cooperation, such as previews payments, and the mean number of days the customer took to pay their invoices (Brealey, Myers & Allen, 2016). To new customers, especially the ones without sufficient information, the company can decide for not granting credit or grant a small limit.

The credit given to a customer is highly influenced by its financial condition. A customer that have weak financial capacity will have a credit limit lower than a customer that have a strong financial capacity (Batista, 2004). Moreover, it is also influenced by the billing efforts applied to past due invoices. The lack of payment can give a reason to the company revise the customer's credit limit. For example, if the customer's financial situation changed in the last year, the credit department can reduce their credit. If after reducing it the customer continues to struggle and delay the payments the credit department can cut the credit.

Credit limits are a guideline for orders approval. Two situations can occur: 1) the orders do not exceed the customer credit limit, and 2) the credit limit is exceeded. When the order exceeds the credit limit, no more credit should be release. In the other situation, the company need to analyze the amount already in debt to see if the total amount is higher than the credit limit (and in that case the order should not be delivered or delivered if paid in advance), or if no (and in that case the order should be release). All situations should be taken into account to reduce the company's risk (Batista, 2004).

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To establish credit limits the company should have a department specialized to analyze all situations (Batista, 2004). Moreover, the credit limit should be reviewed constantly, because the customer's financial position can change.

4.3. Credit information

The company must collect relevant information about the customers and establish a relationship with them to establish an accurate credit policy (Tsuruta, 2013). This information refers to customer's historical payments, both with the company and others, and its financial statements, namely income statement and balance sheet (Ross, Westerfield, & Jaff, 2016). The analysis of new customer should be more extensive than for the existent ones, as for this last group the company already has a history of payments made.

Additionally, to information that can be given by the customer, the company can look for information obtained outside in specialized companies for it, such as, Atradius, Informa D&B and Cosec. The information provides by this companies is normally more complete, since have analysis of both financial and commercial information, as well as historical elements that can be relevant to establish an accurate credit policy. We will be presented next these companies and information that is provided.

- **Informa D&B**

Informa D&B belongs to the Spanish Informa D&B S.A, which is one company of the group CESCE. The company collects economic and financial information's to be an expert regarding credit risk. Its data base is one of the most used, with around 548 thousand users, and information of more than 1.6 million business entities (Informa D&B, 2017a).

To obtain information from Informa D&B, a company needs a user and a password. After that, to obtain the searching company (customer), the company uses its taxpayer number, and then will obtain a report (Informa D&B, 2017b). The more relevant information of this report is the monthly credit limit that Informa D&B recommends. There are two scenarios Informa D&B can say: 1) do not recommend credit to the customer, 2) the customer can have, for example, € 25000 of credit per month.

- **Atradius**

Atradius is a company that have more than 90 years of experience in credit insurance. It was found in Netherlands in 1925 (Atradius, 2017), but nowadays operates in diverse countries. Their focus is in credit insurance. Atradius is the dominant credit insurer in the Iberian Peninsula (Atradius, 2017).

Atradius main aim is to help companies to protect themselves from losses caused by customer's failure to pay an invoice through insolvency, or to pay under the established terms. A company that have a covenant with Atradius can enjoy a variety of benefits, such as: 1) increase access to bank loans or other types of financing, because Atradius can provide information to the company bank (and then they may give more credit), 2) have a competitive advantage by identifying opportunities as well as risks, 3) reduce the bad debt, and 4) find new markets or customers. They operate with just one policy, Modula that allows to cover several customers and markets (Atradius, 2017).

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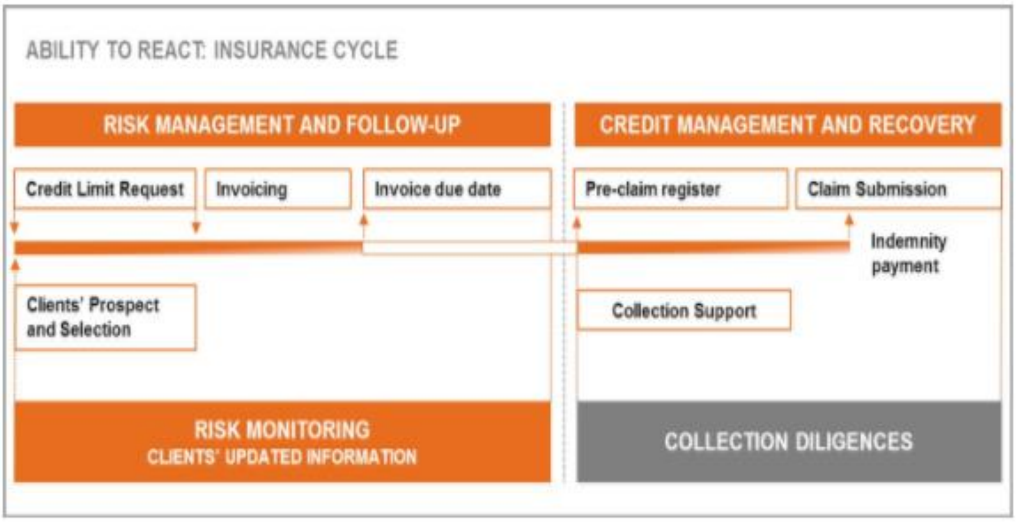
In this database, the company can find how much a customer is insured by Atradius. If the customer is not in the database, the company can ask about a credit check to see how much Atradius can grant. There is anonymous policy. If the customers have two positive experiences in a year, Atradius can grant € 25000. Companies that have an insurance like Atradius tent to have less losses but need to have personal with time to analyze all relevant information, when granting credit to customers.

- **Cosec**

Cosec is a credit insurance company that is leader in Portugal since 1969 (Cosec, 2017). They offer credit solutions and control in both internal and external markets, and cover investment in political risk countries. This company helps to coverage against non-payments for credit sales, in Portugal or abroad, until the limits that they grant (Cosec, 2017).

Cosec requires a credit policy to each company (customer). In figure 3 we can see how the procedure works.

Figure 3. Cosec's Insurance cycle



Source: Cosec.

First, the company will send the customer's financial statements, and ask for a credit limit. In that moment, the company will fulfil all the requests of the previous figure. After Cosec will analyze and see if the credit will be granted. If Cosec gives the credit guarantee, the company can sell the products to the customer, otherwise Cosec is not responsible for the company's decision.

4.4. Credit risk model´s

To analyze the customer's risk, companies can also use credit risk models. These models can be group in traditional models: scoring and rating, and new models, the hybrid ones.

The credit scoring is a statistic analysis of the credit quality that estimate the probability of default in the form of score (Caeiro, 2011). The rating models are similar with the previous ones, but instead of a score give a credit rating, which is established based on

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detail financial history about the customer's ability to meet its obligations. Ratings are provided by credit agencies that classify the risk of credit into letters, for example between Aaa to C, to classify the credit from the better to the worst, respectively. The more common rating agencies are the rating of Moodys, Fich, S&P (Caeiro, 2011).

There are also some credit models, called as hybrid models, that help companies and banks to measure the potential loss that a credit exposer cannot offer (Klieštik & Cúg, 2015). One is the Merton Model. This model uses data from the stock market to access the credit risk of the company loan and individual holdings. It allows an easier valuation of the company and helps to analyze and verify the company's ability to retain solvency, by analyzing debt totals. It also can be used to expect future developments (Misankova, Kocisova, Frajtova-Michalikova, & Adamko, 2014). Although, the assumptions of this model hardly reflect the real world, because it focuses more in future experience, but the previous experiences are more relevant to estimate non-payments or delays.

The Credit Metrics model, created by the JP Morgan in 1977, measures the credit risk in a portfolio context (Kollar, Weissovalvana & Siekelova, 2015). This model is appropriate to all the types of financial instruments. According to Jorion (2006) the model is used has a valuation of bond prices. It consists in four parts: the first part is called Value at Risk (VAR) due to credit and analyzes the risk of an individual bond by using standard deviation and percentiles. The second part is called as Portfolio Value at Risk due to credit and allows to identify the portfolio' credit risk. The third part is called Correlation and the fourth one Exposures and together reflect the risk of an entire portfolio. The third part considers the cross-correlation values of the current bond prices. In case of an increase of the bonds, the risk should decrease. The fourth and last part analyses the credit risk of those instruments, whose value have a sensibility to changes in the market values (Kollar, Weissovalvana & Siekelova, 2015). This model valuates a single bond or a portfolio in a period that helps to express credit risk. It is used not only to analyze default, but also to see the risk of changes in bond prices (Kollar, Weissovalvana & Siekelova, 2015).

The CreditRisk+, which is more used for insurance problems, meddles credit risk. Default is a factor which influences credit risk in several ways. This model is different from the previous ones, because does not require any assumptions about the cases of default and consider the rise of risk (Mun, 2004). CreditRisk+ is known as an attractive model in terms of calculation, because only requires a few inputs. Although this model does not consider the market risk of the defaulter, which is a disadvantage thought other models.

For last, the Credit Grades was created to show transparency, consistent, and accuracy. This model has a big range of publicly-tradable firms to quantify their individual risk. Credit Grades, on contrary to Credit Metrics, quantifies as an individual financial instrument (Kočišová & Mišanková, 2014). According to Boďa & Kanderová (2010), Credit Grades have an extensive database of default companies. The data that is used in this model is based in the observation of the market. For that reason, this model captures the market dynamics, something that other models do not. By analyzing the credit spreads, we can monitor the evolutions of the risk of a company. If the credit spread increases, the risk of the company also increases.

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4.5. Collecting customer´s credit

The process of managing credit only finishes when the creditor pays his obligations. The company may establish a process to collect credits and avoid bad debts that can strangle the company's finance. First the company should have a department with sufficient personal to collect payments (Albright, 2017). Batista (2004) suggests that the company need to be informed about collections efficiencies, it means, the company's administration should know about the results and actions that were made regarding bad debt. An important tool for this analyze is the map of age of debt. In this map the company has the whole picture regarding the bad debt of each customer. The map has the amount that was invoiced, the invoices that are not due, the ones that are due from 1 to 30 days, from 31 to 60, from 61 to 90 and more then 90. The following table provides an example.

Table 2. Age of debt

	Balance	**Not overdue**	**0-30 days**	**31-60 days**	**61-90 days**	**More than 90 days**	**Impairments**
Customer A	515399			28278		487121	0
Customer B	198429					198429	
Customer C	312634	104429	51747	33266	14785	166762	-58356
Customer D	131019			416	17660	169064	-56120
Customer E	185023		185023				

Source: Researchers.

Cisko & Kliestik (2013 in Siekelova, Kollar & Weissova, 2015) recommend that when the credit is overdue, the credit manager must make a phone call to customers to recall them to pay their obligations, and at the same time send an email. After two weeks if the customer continues to fail its obligations, the credit manager must write a formal letter to quest for rapid payment of the credit. After six weeks another formal letter must be send, with a proposal of rescheduling the payments. After eight weeks, depending on the nature of the debtor and the amount in debt, the company can transfer to the court or specialized agencies these bad debts. In case of non-payment, and after trying to collect the credit, the company must create impairments of the credit overdue.

5. Conclusion

Every company takes several risks. Credit risk is the uncertainty the company has to receive (or no) the credit given to customers. To avoid this risk the company should have an effective and efficient credit management.

This thematic is not new but has gain prominence with the 2007/2008 financial crisis, when diverse companies went to bankruptcy leading to solvency problems to other companies. Nowadays, every manager must focus on credit given to customers. This work provides all information needed from the decision to give credit till to effectively collect the money. How should be analyzed the customer's risk? Which information should be collected and where to take it? How much should be the credit limit? Which procedures should be used to collect the money? Answers to these and other questions are provided in this paper. We provide a detail information about how to design credit

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standards and to prepare credit management for future. The information in this work is very useful to all company managers to know how to deal with credit management.

The company should collect information about the market, the industry, and more important the customer. Every customer is an individual consumer, with singular specificities. Therefore, even if the company has credit standards for groups of customers, they should adapt it to a specific one. This helps the company to reduce its uncertainties and increases its stability. Moreover, the company must establish a credit policy with all information necessary to assure granting credit.

Managing credit helps the company to establish long, and respectable relationships with customers. Likewise, sales and services will be more profitable, and the company's risk, at least credit risk decreases. Collecting the money on time contributes to decrease the company's indebtedness, and to promote its sustainability and market value. Therefore, credit management is a key task of each company.

This paper is a conceptual paper. For future research it is relevant to analyze if companies that manage credit have less risk and more solvency that others and the impact of managing credit in the companies' performance. We call attention that managing credit helps to reduce uncertainty and increase the company's stability, but we have not analyzed this impact, so we recommend a future analysis on it.

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