Credit Risk Management in the Financial Markets

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Abstract

The main task of the financial system is to ensure the flow of resources from sectors with an excess of funds to those with a gap in funds. The developments of the past twenty years in particular, have paved the way for new turnovers in the field of finance and with the globalization phenomenon, foreign capital flows are transported rapidly to the farthest corners of the world. In addition, more complex market structures emerge on the agenda as well as complex financial tools and crises and their impact becomes more permanent. Taking into consideration the dimensions global financial markets have reached, it is evident that problems occurring from the inefficiency of financial risk management have continued to grow. The search for a solution to 'risk management in the financial markets' - and particularly 'credit risk management' and its application - has gained importance. With reference to these determinants, our study focuses on 'credit risk' and 'management' and while the Basel III standards are the topic of discussion in terms of risk activities for the banking sector, an inquiry is made into how effective the models and arrangements put forth to prevent risk are.

1 Financial Markets

Markets are places where buying and selling procedures are carried out and explained as based on a consensual exchange of goods and services (Hahnel, 2002). Financial markets are mechanisms which enable the realization of capital and credit in the economy. At this point, the financial markets separate into both money and capital markets. While the Money markets comprise short term loans, the capital markets represent long term debt instruments. The stock market, bond market, commodity market, foreign exchange markets are all examples of the financial markets (Downes & Goodman, 1998).

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Figure 1 below, depicts the classification of the market structures. Accordingly, the capital markets consist of two types of elements: the primary and the secondary. The first element named as the primary market, consists of the money collection process of private or corporate organizations such as commercial companies, state organizations or non-governmental organizations (NGOs). In other words, the primary market consists of securities issued by private or legal institutions and markets where account owners realize first-hand procurement. The secondary market consists of buying and selling of shares, bonds, and securities between investors after the initial sale (Williams, 2011).

The basic financial activity on the primary markets, where the financial instruments meet their buyers for the first time, consists of short or usually long term debt securities undertaken by investment banks or underwriters and puts equity capital instruments on the market. Investment banks do not execute banking activities in the sense that we perceive banking activities. These organizations may engage in underwriting without any risks or may prefer to buy the financial entities from the disposing company and sell them to investors on a subsequent market. On the other hand, the existence of various trading venues enabling the repeated buying and selling of financial entities on the secondary market is extremely important. This trade is carried out in (i) organized stock markets (ii) over the counter markets through a computer network and telephone connections or (iii) the shadow markets (Kocaman, 2003).

For this reason, the main task of the financial system is to ensure the flow of resources from sectors with an excess of funds to those with a gap in funds. As the finance sector realizes these two main basic functions the following is realized: (1) computation costs are decreased, (2) trade is diversified, and (3) risk is managed (Haan, Oosterloo & Schoenmaker, 2009).
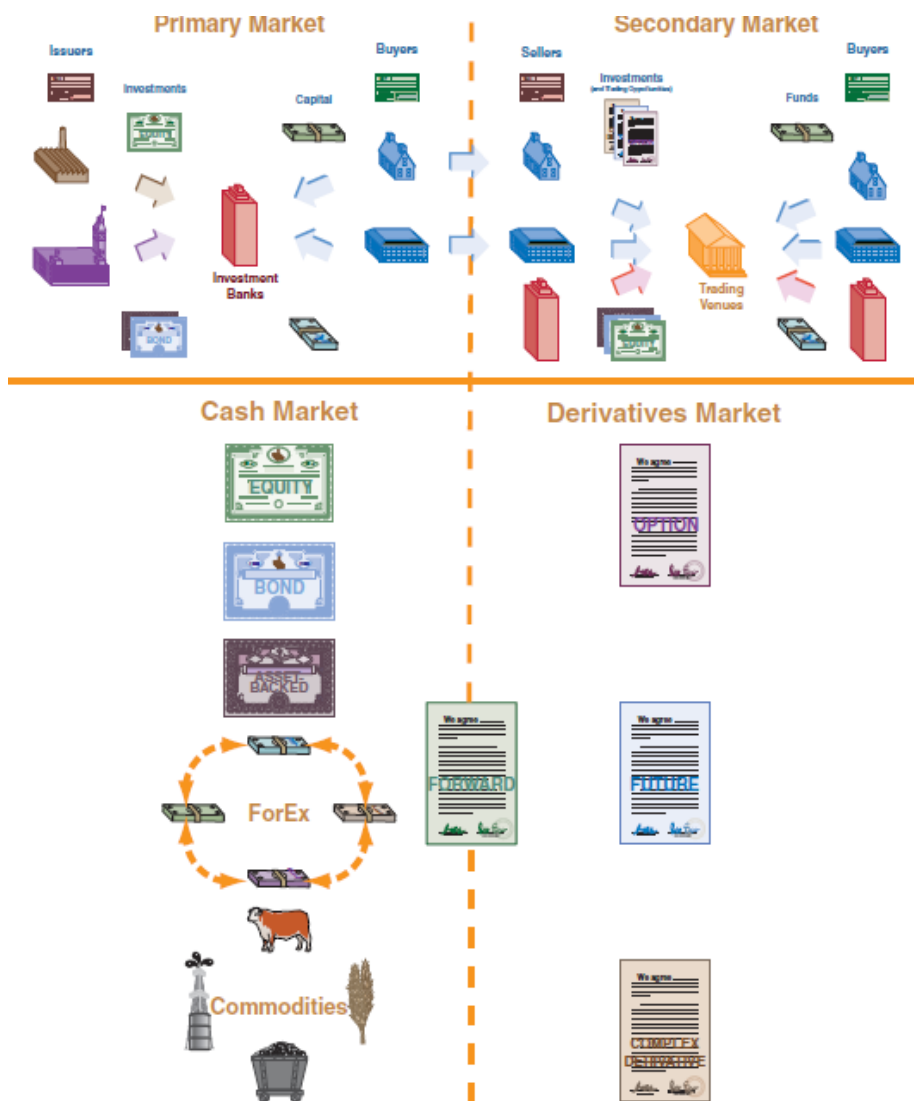
Figure 1: Taxonomy of Markets[1]

Source: (Williams, 2011).

2 The Development of Risk Management on Financial Markets

An overall review of the financial markets in the post WWII period: this period is defined as a period with no capital mobility, different standards between countries are applied, geographical obstructions are important because of technological limitations, central banks control money supply and the exchange rate of currencies, when *full-blown financial crises* are practically unknown and a term when a major percentage of existing problems were contained on national markets. However, with the conclusion of the Bretton Woods system or the fixed foreign currency system in 1971-1972, the aforementioned structure started to change[2]. Developed continents and countries such as North America, Europe and Japan replaced the fixed currency system with the fluctuating

exchange system. In addition to the liberalization of capital accounts, this situation has functionalized the cross border flows of financial investments. At the same time, these countries have started to release new forms of financial activity methods (instruments) to enhance the competition of their own national financial organizations. The 1970's and 1980's were decades when cross border flows of capital, as well as credit from international banking activities, grew steadily. The year 1989 - when the Berlin Wall fell - started a new term for the financial markets. Particularly, the loss of national control over interest and currency exchange and the rapid developments in digital communication have defined efficient globalization. During this process, local, regional, and national financial market definitions began to lose their meaning and corrode. While developing markets and the transition economies of the former Soviet block participated in the financial liberalization efforts, the open incentives from IMF and the World Bank foreign capital flows became rapidly transportable to the most remote corners of the world (Barton, Newell, & Wilson, 2003; Kindleberger & Aliber, 2005).

Especially, the significant progress in information technologies as of the 1990's, incurred new transitions in the area of finance. In parallel with the exponential growth of trade new, derivative market structures have been intensely observed on the agenda and complex financial instruments emerged[3]. Securitization took its place among the outlooks of the modern capitalist era in parallel with rapid globalization (Kyrtsis, 2010).

In such a complex environment, financial crises have become more frequent and their impact more extensive. The financial markets have been released from the rigorous inspection of government bodies and inadequacies in terms of banking audits, lack of transparent accounting and financial reporting standards in terms of the financial markets, inadequacies in the legal infrastructure and insufficient corporate structure are significant indicators at this point (Barton, Newell, & Wilson, 2003).

In response to the increasing uncertainty in financial markets, risk management has gone through a significant revolution in the past twenty years.. One of the most important reasons has been major financial crises. While the World Bank determined 45 major systemic banking crises in the 1980's, this number increased to 63 in the 1990's. While the mentioned crises destroyed most if not all the capital of the banking system, it caused serious harm to the economies of the countries involved. The collapse of large and significant finance organizations such as Barings (1995), LongTerm Capital Management (1998), Enron (2001), Worldcom (2002), Parmalat (2003) and LehmanBrothers (2008) is extremely indicative at this point. While such financial crises cause great losses, the volatility in a country or region threatens all global economies due to its contagiousness. Considering the extent of global financial markets, risk management problems arising from the lack of inadequate risk management have reached significant dimensions (Barton, Newell, & Wilson, 2003; Gregory, 2010).

The basic models developed around financial risk management focus on the necessity to analyze risks correctly. In order to achieve specified targets, it is necessary primarily to make a correct analysis of potential risks encountered among the various groups. Subsequently by using tools and methodologies aiming at proactive risk management, we can target variables for risk groups that aim to make mutual affiliations under risk management more visible (Silvia, 2011).

3 Types of Risks in the Financial Markets

Risk is the concept used to define the potential hazards which might emerge in the future and also includes the possibility of winning or losing. However, the general tendency and usage is in the form of 'entering a loss'. Risk management defines the policies and recipes for procedures needing to be applied in order to prevent losses from existing risks or to minimize them (Wild, 2006).

The success of risk management is dictated primarily by the necessity to determine the source of the risk. Subsequently, grading the types of risks listed below, must be carried out and it is necessary to include even the weakest risk possibilities in terms of sensitive factors. Consequently, it is possible to list the most evident types of risks on the financial markets as follows (Kobeissi, 2013).

3.1 Market Risk

This type of risk is caused by the fluctuation of the prices on the market. It emerges as the result of the short term mobility of market prices (Haan, Oosterloo & Schoenmaker, 2009). A market risk can be a linear risk created by the risks in the prices of basic variables such as stock prices, interest rates, exchange rates, commodity prices and credit costs. Or alternatively, it may be a non-linear risk arising from the exposure to market volatility as might arise in a hedged position. Market risk has been the most studied financial risk of the past two decades, with quantitative risk management techniques widely applied in its measurement and management (Gregory, 2010).

3.2 Liquidity Risk

Liquidity risk is normally characterized in two ways. (i)Asset liquidity risk includes the risk that assets cannot be converted into cash as well as any incurred losses when assets are converted under the market price (Duffy & Germani, 2013). (ii) Funding liquidity risk is a type of risk encountered due to the imbalance between the input and output of the company's cash resulting in the inability to fund its payments (Gregory, 2010).

3.3 Operational Risk

Operational risk is a status of avoiding uncertainty and arises from people, systems, internal and external events. It includes human error (such as trade entry mistakes), failed processes (such as settlement of trades), model risk (inaccurate or poorly calibrated models), fraud (such as rogue traders) and legal risk (such as the inability to enforce legal agreements). Whilst some operational risk losses may be moderate and common (incorrectly booked trades, for example), the most significant losses are likely to be a result of highly improbable scenarios or even a ''perfect storm'' combination of events (Gregory, 2010; Satchell, 2007).

3.4 Value-At-Risk

Value-at-risk (VAR) has been a key risk management measure over the last two decades. Initially designed as a metric for market risk, it has been subsequently used across many financial areas as a means for efficiently summarizing risk through a single quantity

(Gregory, 2010). The VAR measure summarizes the expected maximum loss (i.e., Value at Risk) over a target horizon of N days within a given confidence interval of X percent. The Basel capital framework calculates capital for a bank's trading book using the VaR measure with N=10 and X=99%. This means that the bank is ninety-nine percent certain that the loss level over 10 days will not exceed the VaR measure. So the bank's loss is expected to exceed the VaR measure in only one out of every hundred trading days (Haan, Oosterloo &Schoenmaker, 2009).

3.5 Credit Risk

Indicates the possibility of the failure of a credit customer to fulfill the provisions of the contract in time and fail to pay the capital and/or interest payments (Duffy & Germani, 2013). In addition to the basic risk types listed here, there are various types of risks listed under sub-titles such as: interest rate risk, contagion risk, volatility risk, reinvestment risk, purchasing power risk (Kobeissi, 2013), country related risks - stemming from the risk of the debtor country's economic, social and political environment, or incorrect or inadequate regulatory changes which constitute a legal risk (Haan, Oosterloo & Schoenmaker, 2009). In addition, the concept of credit risk - the significance of which increases with each passing day - is the main theme of our subject.

4 Credit Risk

Credit risk is no stranger to investors these days. The U.S burst subprime lending crisis in 2008. Dubai burst a credit crisis in 2009. Europe burst sovereign debt crisis in 2010. The investors suffered huge losses in these crisises. So, credit risk has become another kind of risk investors have to face on top of market risk (Dash Wu, Olson & Birge, 2011). For this reason, credit risk will remain one of the most important types of risks in the future for both the banking sector as well as operations. Sometimes, even if commercial interests manage to prevail over risk management, credit risk and risk management will always get the attention they deserve (Grinsven, 2010).

4.1 The Scope of Credit Risk

Credit risk is the most common type of risk encountered by creditors, the individual or organization giving the loan. The credit risk is indicated by the inability of the debtor to comply with the provisions of the contract which could incur a loss for the creditor (Albrecher et al. 2013). In other words, credit risk covers risks due to upgrading or downgrading a borrower's credit worthiness (Tapiero, 2004). In general, the magnitude of credit risk depends on two factors: the size of the cash flows owed and the default probability of the counterparty to the transaction (Dubil, 2004).
Credit risk here refers only to default risk. The other main aspect of credit risk is spread risk or the risk of a change in value due to a change in the spread covered by market risk. For banks, credit risk is often the largest risk in the form of a number of loans to individuals and small businesses. Another major source of credit risk for many banks is counter-party risk for derivative trades. This is the risk that the opposite side to a derivative transaction will be unable to make a payment if it suffers a loss on that

transaction. In addition, an economic downturn (economic risk) is likely to increase the risk of default, and particularly for quoted credits an increased risk of default will be higher when the value of the equity stock is lower. For life and non-life insurance companies, the main credit risk faced is the risk of reinsurer failure. However, the greatest credit risk for most pension schemes is the risk of sponsor insolvency (Sweeting 2011).

It is necessary to emphasize once again credit risk consists of the unilateral status of the inability to fulfill the contract provisions of the debtor or the borrower (Haan, Oosterloo & Schoenmaker, 2009). Whereas the counterpart of a credit risk consists of any counter-party of the contract (buyer-to seller or debtor-creditor) who may be in default because the contract provisions were not fulfilled. An overall assessment reveals that Counter-party risk arises from securities financing transactions such as repos and the vast and often complex OTC (over-the-counter)[4] derivatives market. For this reason because of a derivative function which was realized one of the parties is both creditor and debtor which means that it is possible to hold the position of both a buyer and seller which reveals the importance of the counterparty credit risk. Until yesterday, counter-party risk was considered as a subset of the traditional credit risk. However, in 2007 we experienced the worst financial crisis since the 1930s. It spread from the USA to all the financial markets. Some financial institutions failed including the extremely high profile bankruptcy of the investment bank Lehman Brothers (founded in 1850). In addition, many other large financial institutions (for example, Bear Stearns, AIG, Fannie Mae, Freddie Mac, Merrill Lynch, Royal Bank of Scotland). For this reason, the first ten years of the 21st century were disastrous in terms of the risk management of derivative markets. Therefore, the counter-party risk[5] was accepted and graded with the status of a basic financial risk type by participants in the financial market (Gregory, 2010).

Within this scope, various models and applications were incepted in order to measure credit risks correctly. The objective is to eliminate the possibility of incurring a loss or to minimize it. Even if the five major decision variables 'credit, liquidity, interest rate, cost, capital' management understanding comprises the basis of the applications established around risk management, it is evident that significant changes have been observed in understanding the management of these variables. New methods and technological developments have enabled a capability for deeper analysis of the affiliation between more access and variables for the existing data. The measurement methods of credit risk also vary within this understanding (Grinsven, 2010).

5 Methods used in the Measurement of Credit Risks

Many different approaches regarding the measurement of credit risk have been observed during the years. Some of those methods are mentioned below. Prominent application methods can be listed as: Traditional methods, modern methods, portfolio measurement models, innovations brought within the scope of the Basel standards. The aim here is to make a consistent or sufficient evaluation regarding the risk of inability to repay credit or fall into default (Porteous & Tapadar, 2006).

5.1 Traditional Methods

Traditional methods used to measure credit risk, new applications and methods on which the development of techniques are based. These are: (i) Credit Risk measurement with expertise method: This method, which is a subject assessment method, utilizes a series of factor analysis. Although numerous factor or factors may be taken into consideration in the assessment, basically the factors of 5C - which are Cycle Economic Conditions, Character, Capital, Capacity, Collateral - carry weight in decisions involving credit (Dash Wu, Olson & Birge, 2011). (ii) Credit Scoring Models: Credit scoring systems can be found in virtually all types of credit analysis, from consumer credit to commercial loans. The idea is to identify certain key factors that determine the probability of default (as opposed to repayment) and combine or weigh them into a quantitative score. In some cases, the score can be interpreted as a probability of default; in others, the score can be used as a classification system, placing a potential borrower into either a good or a bad group, based on a score and a cutoff point (Saunders & Allen, 2010).

5.2 Modern Methods in Credit Risk Measurement

5.2.1 Merton Based Models

According to this model of the firm, if the value of assets is less than the value of liabilities, the firm sets off with the understanding that it may be exposed to the risk of nonpayment. In other words, the possibility exists for risk if the assets of the firm cannot compensate for its debts. In this model, the changes in asset values is initially taken into consideration and 'threshold levels' or 'base levels' according to normal distribution criteria are determined. The default or nonpayment probabilities of the debtor can be calculated in accordance with the assets remaining under this level (Satchell, 2007).

5.2.2 Credit Rating Agencies and Historical Default Rate Approach

The most interesting characteristics of the historical default rate model is the historical assessment of the credit risk analysis; in other words, determination of the credit risk by basing it on historical data (Sweeting 2011). In this model, the credit rating agencies base their scoring by taking the 'default rates of bonds' and 'time to maturity' into consideration (Altman, 1989).

The measurement and management of financial risks is a major function of financial intermediation. In credit risk monitoring, when the traditional role of banks is taken into consideration and the monitoring of debtors with all forms of developed information, technology has also facilitated the existing progress in risk management. Within this context, it was endeavored to exploit statistical analysis in order to establish reliable methods for the processing of financial data. The most well known of these methods is the final grade given by credit rating agencies and these grades are the sole assessment tools in acquiring historical default rates (Haan, Oosterloo & Schoenmaker, 2009). Thus the credit rating process involves quantitative and qualitative analysis of a company's balance sheet, operating performance, and business profile (Kobeissi, 2013).

Some of the relevant rating agencies-Fitch, Moody and Standard & Poor - are important instruments particularly for assessing the credit risks of governments from the perspective of monetary and non-monetary companies. Available assessments are expressed as letters and numbers on a statistical scale (Table 1). For the assessment measurement of Standard

& Poor rating, for example: a rating system consists of AAA leading from the highest rating to AA, A, BBB, BB, B, CCC, CC, C, D as the lowest levels.

Table 1: Credit Ratings

Quality	Moody's	S&P	Fitch
prime	Aaa	AAA	AAA
high grade	Aa1/Aa2/Aa3	AA+/AA/AA-	AA+/AA/AA-
upper medium	A1/A2/A3	A+/A/A-	A+/A/A-
lower medium	Baa1/Baa2/Baa3	BBB+/BBB/BBB-	BBB+/BBB/BBB-
speculative	Ba1/Ba2/Ba3	BB+/BB/BB-	BB+/BB/BB-
highly speculative	B1/B2/B3	B+/B/B-	B+/B/B-
extremely speculative	Caa1/Caa2/Caa3/Ca	CCC/CC/C	CCC
in default	C	D	DDD/DD/D

Source: (Albrecher et al. 2013).

This system includes the rating grades used in the credit risk assessments by investors (creditors). Regardless of the erroneous or inconsistent results of the grading system, it has a significant impact in terms of both scope and avoiding time consuming procedures as well as enabling investors to carry out desirable and reliable grading in areas which require special expertise[6]. This status is particularly important when companies are determining historical default levels. Especially the statistical (scores) methods presented by rating agencies enable comparison in credit risk analysis and measuring (Haan, Oosterloo & Schoenmaker, 2009).

5.2.3 Risk Adjusted Return on Capital

The main risk types for banks are credit risk, market risk, and operational risk. The concept of economic capital can be used for measuring different risks in a comparable way. Economic capital is defined as the amount of capital a bank needs in order to be able to absorb losses over a certain time interval with a certain confidence level. Banks usually choose a time horizon of one year. The confidence interval depends on the bank's objectives. A common objective for a large international bank is to maintain an AA credit rating. Companies rated AA have a one-year probability of default of 0.03 per cent. This results in a confidence level of 99.97 per cent. Economic capital can be used to calculate the risk adjusted return on capital (RAROC) that is given by: (Haan, Oosterloo & Schoenmaker, 2009):

$$RAROC = \frac{Revenues - Costs - Expected\ Losses}{Economic\ Capital} = \frac{\pi}{E}$$

5.3 Credit Portfolio Risk Measurement Models

To be able to manage credit risk on portfolio level, banks must measure the portfolio risk. Popular tools for measuring credit risk are: CreditMetrics, CreditPortfolioView, Credit Risk+ and CreditPortfolio Manager. The focus of these systems is on downside outcomes - ie. payment problems, failure, etcetera. Measures of risk therefore tend to focus on the likelihood of losses rather than the characterization of the entire distribution of possible future outcomes. All these models try to measure the potential loss that a portfolio of credit exposures could suffer with a predetermined confidence level within a specified time horizon, commonly one year (Grinsven, 2010).

5.3.1 CreditMetrics and Credit Risk+ Models

CreditMetrics Model is a model developed by the international investment bank JP Morgan and Sponsors in 1997 within the framework of "value at risk VAR" for the risk measurement of entities such as credits not entities bought and sold or for the risk measurement of company bonds (Crouhy, Galai & Mark, 2000). CreditMetrics is based on credit migration. Fundamentally, its objective is to measure the annual change probability in the credit quality of customers. Credit Risk+ Model (credit risk plus model) is a comprehensive method estimating the probable distribution of losses from the default rate expected in credits as well as the losses which incur if the default is realized. Contrary to CreditMetrics, Credit Risk+ method focuses on the estimation of the amount of capital necessary to fulfill the losses over a specific amount by banks. Credit PortfolioView Model focuses on the estimation of risks potentially incurred during the return of credits by taking various possibilities incurring in economic conditions into consideration. Credit Portfolio Manager Model indicates that credit risks can be minimized by applying the portfolio diversification method (Gregory, 2010; Grinsven, 2010).

5.3.2 KMV Model

One of the credit portfolio risk measurements models is the Moody's KMV (Kealhofer-McQuown-Vasicek) Model. This model focuses on risk estimations by taking default frequency into consideration rather than the possibility of default (PD) itself. Particular changes in the credit qualities of companies, payment frequencies, improvement rates in payment frequencies and assessments acquired for the improvement rate distribution are very important in credit ratings (Gup, 2005).

5.3.3 Stress Tests

In addition, another method executes a credit risk measurement through stress tests. Stress tests are an entity consisting of methodological data often used to analyze financial risks of events involving the likelihood of exceptional events or those with a practically non-existent frequency. Although displaying the exceptional, it also provides guidance service for worst case scenarios. Presently, it serves as a guide in the measurement and assessment of the fragility of the financial system (Kolb & Overdahl, 2010).
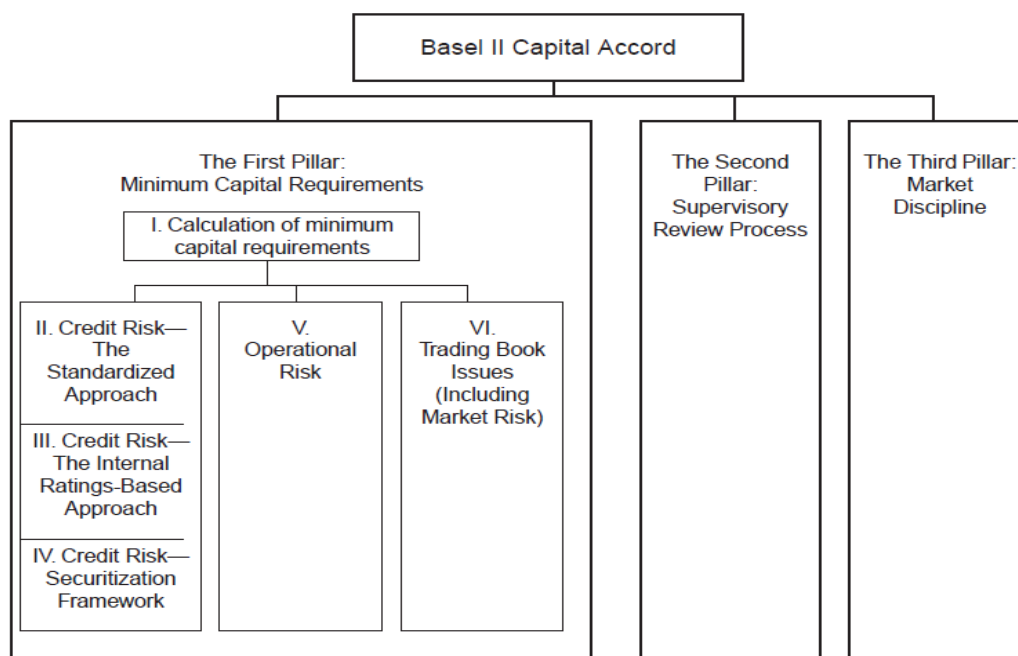
These models have proven their usefulness over the long run and continue to be utilized and improved upon as new modeling developments are incorporated into the fundamental models. Respectively (Saunders & Allen, 2010):

(i) Mortality rate systems: Mortality rate systems, following the insurance industry's approach: Mortality models utilize techniques commonly used in the insurance industry. Based on a portfolio of loans or bonds and their historic default experience, a mortality rate system develops a table that can be used in a predictive sense for one-year, or marginal, mortality rates (MMR) and for mult- year, or cumulative, mortality rates (CMR). Combining such calculations with LGD (loss given default) can produce estimates of expected losses.

(ii) Neural network systems: The development of a computerized expert system to forecast the probability of default requires acquisition of the human expert's knowledge. Since this is often a time-consuming and error-prone task, many systems use induction to infer the human experts' decision processes by studying their decisions.

5.4 Basel Standards

Bank for International Settlements. The BIS, founded in 1930, and located in Basel, is the most important (Malz, 2011). Recognizing that financial institutions in general, and banks in particular, play a critical role in the global integration of markets, an important component of the international regulatory effort in recent years has been the work of the Basel Committee on Banking Supervision and the resulting BaselAccord. Adopted in 1988, the risk-based capital standards have as their purpose to make regulatory capital requirements responsive to the credit risk in banks' portfolios of assets and off-balance sheet activities and to establish among the member countries' banks a uniform definition and minimum regulatory level of capital. Over time, the 1988 Accord has become the standard for banks worldwide, having been adopted in over 100 countries. A cornerstone of the Basel Committee's framework is the 1988 Capital Accord (Basel I) which provided for a minimum capital requirement of 8% for internationally active banks in order to 1) ensure an adequate level of capital and 2) competitive equality. Basel I focused exclusively on credit risk (Gup, 2005).

Table 2: The Structure of the Basel II Capital Accords

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│           Basel II Capital Accord        │
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The First Pillar: Minimum Capital Requirements	The Second Pillar: Supervisory Review Process	The Third Pillar: Market Discipline
I. Calculation of minimum capital requirements		
II. Credit Risk— The Standardized Approach — III. Credit Risk— The Internal Ratings-Based Approach — IV. Credit Risk— Securitization Framework / V. Operational Risk / VI. Trading Book Issues (Including Market Risk)		

Source: (Saunders and Allen, 2010).

The proposed goal of the new Basel Capital Accord (known as Basel II or BIS II) is to correct the mispricing inherent in Basel I (or BIS I) and incorporate more risk-sensitive credit exposure measures into bank capital requirements without changing aggregate capital requirements[7]. The fluctuations on the market in particular, as well as financial risks from new derivative products and the crises in the banking field, were the reasons for the implementation of the new Basel Capital Accord (2007). Within the scope of Basel II, the regulating and supervising role of the state was enhanced and simple accounting techniques were applied to execute the procedures both on the part of the borrower as well as the lender in a more transparent environment (Table 2). The objective was to protect the capital structures of the by enabling the necessary arrangements with the equity capital according to the risk levels of the credits given by the banks. In addition, more stringent and deterrent measures were applied in order to ensure that businesses used the credit they took for its intended use. Furthermore, in credit rating, the companies are endeavored to establish a multi faceted perspective in credit risk rating by including credit repayment levels in addition to financial table analyses and calculations for structural factors such as investment amounts and market shares. In this context, the current Basel Committee framework requires three elements, referred to as "pillars":
1. Minimum capital requirements
2. Supervision of banks
3. Disclosure, leading to stronger market discipline. Table 2, Most of the details in the June 2006 proposals relate to pillar 1, whereas pillars 2 and 3 are generally left to the discretion of national bank regulators. Inasmuch as the global financial crises of 2007-2009 inspired the reconsideration of the Basel II proposals (Malz, 2011; Saunders & Allen, 2010).

Efforts have been made to eliminate the deficiencies of Basel II by means of introducing Basel III accepted in the 12th of September 2010 and planned to be applied gradually until 2019. One of the most significant changes made within the scope of Basel III increased the legal capital requirements of banks significantly compared to Basel II[8]. A regulatory "leverage ratio," a simple measure based on the size of a bank's balance sheet, putting a floor under regulatory capital ratios, is also under discussion. Finally, regulatory liquidity ratios, which would go beyond capital standards, are contemplated. Within this context, the objective is to increase the core capital to 4,5% to strengthen the capital and increase the rate of the total core capital to 6%. Furthermore, going for new regulations regarding minimum liquidity rates in addition to increasing minimum capital rates, further aggravating the applications dealing with the auditing of banking and the implementation of efficient methods in the calculation of counterparty risks are noteworthy basic changed incepted within the scope of Basel III (Malz, 2011).

6 Credit Risk Management

When considered in general terms the basic content of our study is the status of the credit risk being managed by the institutions. Within this context, even if possible to mention numerous financial organizations, a detailed analysis is limited to four main categories. These can be sequenced as (i) banks (ii) insurance companies (iii) pension schemes and (iv) foundations and endowments; however, our basic inspection area consists of banks. Within this scope, it is possible to separate banking risks into two as 'systematic' and 'non-systematic' risks (Bliss & Kaufman, 2008; Fumagalli & Mezzadra, 2010). Accordingly, systematic risks consist of risks caused by the market or from cyclical fluctuations; exchange rate risks and interest rate risks can be considered among systematic risks. On the contrary, non-systematic risks (pertaining to the operation) consist of bank assets, staff quality, customer quality, and risks pertaining to operations (such as the organization capability of banks), the concepts of credit risk, liquidity risk, and operational risks are grouped under this title. At this point, it is important to understand the nature of risk very well in order to manage it (it is important to understand their nature). For this reason, the term 'risk management' indicates a very extensive approach and accordingly risks must be assessed according to the following phases:

• recognizing the context;
• identifying the risks;
• assessing and comparing the risks with the risk appetite;
• deciding on the extent to which risks are managed;
• taking the appropriate action; and
•reporting on and reviewing the action taken (Porteous & Tapadar, 2006; Sweeting, 2011).

It is very important that those responsible for risk management take decision variables such as liquidity, credit, interest rate, cost, capital into consideration when preparing a road map. For this purpose (i) it is necessary to comply with the standards specified in the law, legislation and regulation in risk management (ii) those responsible for risk management must have the wherewithal to make an adequate, reliable and correct 'rational decision' regarding the return of the credit, the status of the borrower on the

market, the efficiency of measures if the credit is not repaid, (iii) it is clear that a common outlook in the decisions to be taken must be achieved, (iv) it is necessary to adjust the risk conditions according to the existing regulations (v) it is necessary to clearly state who are responsible for the application (in most cases only one person is responsible), in other words responsibility and accountability must be stated clearly. Because of this, the individuals, processes, and systems must be defined fully and clearly. What measures will be taken when, which methods will be applied for this purpose and who are responsible for their application must be individually determined 'in writing and clearly' (Grinsven, 2010).

In general, it is very important that banks benefit from high tech technology and expand their utilization networks. Thus it will be possible to fill any existing gaps in terms of information and execute correct and timely financial assessments and prepare appropriate risk models (Marc, 2010). In addition, it is also important that banks give careful consideration to and comply with the determined regulatory precautions. It is particularly important that the loan repayment capacity of companies is analyzed well. In addition it is essential that the status of the companies on the market and the probable impact incurred by new entries on the existing market are assessed. The policies of companies in terms of the markets as a result of the globalization of markets, corporate management capacities, market specialization levels, rating analyses including financial tables, capital and collateral[9] structures, features such as techno-organizational inefficiencies, moral hazard[10], and operational errors must be monitored carefully. In order to eliminate lack of confidence it is necessary that instabilities due to political-geopolitical reasons, dynamics affected by internal and external shocks, and risks incurring from the inadequacy of justice systems, must be analyzed properly (Kyrtsis, 2010). Finally, methods such as (i) the current exposure method (CEM) (ii) the standardized method (SM) (iii) the internal model method (IMM) must be exploited sufficiently in the calculation of EAD (Exposure At Default) in terms of the derivative markets (Gregory, 2010).

7 Conclusion

Credit risk management consists of solutions to prevent or minimize the risks of organizations (particularly banks) which base their activities on credit transactions. For this purpose after Basel II, the innovations brought by the Basel III process are considered important in terms of the healthy functioning of loaning process for banks as well as for companies. Arrangements such as the strengthening of the capital structures of banks and drawing the high leverages rates (high debt) to acceptable levels are among the noteworthy base features within the scope of Basel III. Furthermore, it is clear that the application of the relevant process will weaken when government controls and inspections are insufficient. Furthermore, various experimental approaches show that a part of the methods based on credit risk measurement have a limited practical success. Models may be inadequate when different data requirements are taken into consideration (for example credit spread data). What is more, 'credit risk management', more frequently encountered in financial risk management during the past years, becomes more pronounced as a hazard from the extreme use of quantitative methods. On the other hand, the difficulty of acquiring information may develop into a moral hazard limiting the monitoring of the real behavior of debtors. Within this context, controlling the compliance of business proprietors with financial regulations is vital. In addition, high coordination costs may be

a disappointment for banks in terms of controlling credit risks. It is particularly important that developing countries are more sensitive to the credit risk arising from the dollarization of the financial sector.

In this process, the recent downturn and incurred losses suggest that proactive credit risk management is not common yet. It is evident that the application of existing measures do not go beyond being short-lived. It is important that financial statements and reporting standards presented as an important tool in risk control become efficient management tools within the scope of internal and external rules. It is necessary to diversify risks and enhance the customer base in order to minimize the concentration of the risks banks are exposed to as well as enabling the efficiency allocation of credits to the markets.

This is why it has become necessary to benefit from credit derivatives in terms of credit risk management in the international area. It is particularly evident that the rapidly growing credit default swap market may provide some beneficial tools in terms of risk protection. Furthermore, the increase of the legal capital adequacy of banks within the scope of Basel III in comparison with Basel II is a comprehensive approach. Thus, while it becomes possible to take more credit risks, it also has a stimulating and positive impact on investments, growth and employment. Although there are encouraging applications within the scope of Basel III in terms of better risk management for banks, it is clear that the inception of such applications will take time. On the other hand, it should not be forgotten that 'control' is an element of good risk management. In addition, it is also extremely important in the improvement of credit risk management and credit risk mitigation that the legislative changes of legal systems are adapted to the current conditions. On the other hand, taking the diligent consideration of applying 'collateral' against risks is one of the basic conditions of achieving successful credit risk management.

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Appendix

Markets segment into primary versus secondary and cash versus derivative to highlight different aspects of their purpose.

One may distinguish two overall periods in the post-WW2 world economy financial system; the Bretton Woods period, and the 'free capital' period. Much can be said about these two periods and their financial regimes.

Financial derivatives are financial instruments that are linked to a specific financial instrument or indicator or commodity through which specific financial risks can be traded in financial markets in their own right; their value derives from the price of the underlying item (i.e. thereference price) and, unlike debt instruments, no principal amount is advanced to be repaid and no investment income accrues.

Over-the-counter (OTC). Any financial transaction that is arranged or traded away from a formal exchange. dealing may be done in telephonic form or in electronic form (via electronic communications networks and other network-based platforms), and may feature varying degrees of price transparency. Most trading in fixed income, foreign exchange, and customized derivatives occurs otc rather than via exchange.

There are many ways to mitigate counterparty risk. These include netting, margining (or collateralisation) and hedging. All can reduce counterparty risk substantially but at additional operational cost. Central counterparties may act as intermediaries to reduce counterparty risk but create moral hazard issues and give rise to greater systemic risks linked to their own failure. Furthermore, the mitigation of counterparty risk creates other financial risks such as operational risk and liquidity risk. This means that the full understanding of counterparty risk involves the appreciation of all aspects of financial risks and the interplay between them.

A series of financial market crises from the mid-1990s onwards led to growing debate about the reliability of ratings, and whether they were slow to give warning of impending trouble. After the enron debacle, which again the ratings agencies had failed to predict, some critics argued that the big three agencies had formed a cosy oligopoly and that encouraging more competition was the way to improve ratings.

The Basel Committee on Banking Supervision began its deliberations on how to address the shortcomings of Basel I in the late 1990s, and it has issued a steady stream of pronouncements and proposals beginning in 2001. In June 2004, the Basel II guidelines were announced that rely on a combination of capital requirements, supervisory review, and market discipline to reign in bank risk taking. Van Deventer and Imai (2003) point out the biggest weakness of the Basel II approach: Capital ratios, however derived, are weak predictors of the safety and soundness of financial institutions and they significantly underperform models like the Loss Distribution Model of the Federal Deposit Insurance Corporation .

See, Basel Committee On Banking Supervision, Part 1: Minimum capital requirements and buffers .

Collateralization has become an important feature of the derivative market. The best-known example of this is the collateralised debt obligation (CDO). This provides a ways of turning a bank's loans into a form of security held at arm's length from the bank. As a result, the risk and reward of the loans is transferred from the bank to a range of investors The detrimental effect most commonly pointed to is the potential for *moral hazard* involving increased risk taking, to exploit the benefits of a guarantee, with potentially adverse consequences for financial system stability.

Selecting an equilibrium without taking account of debtor's behaviour is inappropriate if different solutions to the creditor co-ordination problem alter incentives of the sovereign debtor. If the probability of project termination were reduced to zero, for instance, this could have the perverse consequence of actually increasing the possibility of sovereign debt crises, as the sovereign debtor uses the money borrowed from creditors unwisely. It is possible, therefore, that a positive probability of termination may be needed to solve the debtor moral hazard problem.
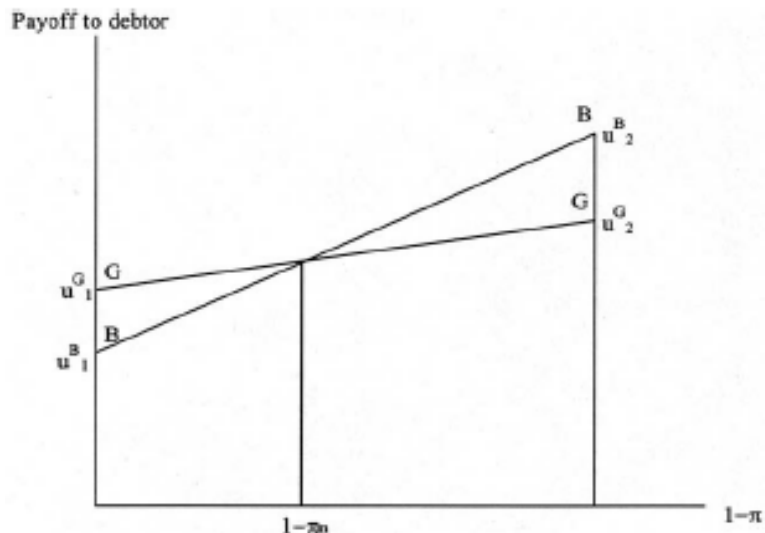
Debtor moral hazard: the no-shirking constraint.
Figure 2: Sovereign borrowing with moral hazard

This is shown in Figure where *BB*, the schedule showing expected payoffs to bad effort, is steeper than *GG* which gives the expected payoff to good effort. If the probability of continuation $1\_$, was equal to 0, second-period payoffs would of course be irrelevant. As $1\_$ increases to one, however, the prospect of continuation with high private benefits makes bad effort ("shirking") more attractive.