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MA in Politics and Economics of Contemporary Eastern and S.E. Europe

RISK MANAGEMENT IN BANKING;

THE CASE OF GREEK BANKING INDUSTRY

By

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ABSTRACT

Risk Management is a main strategy used by the companies in order to minimize business risks, avoid adverse outcomes and assure their development and success as organization in their field. Risk Management strategy is an every day process of identifying, evaluating, operating and monitoring risks and aim to immune the company from the potential hazards. This strategy can be effectively achieved with the utilization of the appropriate methodologies and 'tools'. Greek banks are among the companies that are willing to follow and adopt this strategy and for this reason they invest a lot on new developments and innovations. The objective of this study is to examine whether the risk management process is adopted and how is managed by the Greek banks.

For the purpose of this study a quantitative research method is used and more specifically a posted questionnaire which has been distributed to banks of Thessaloniki, one of the biggest cities in Greece. The quantitative method is deemed the most appropriate for this study because the quantitative research is about a statistical analysis that can prove whether a concept or idea is better than the alternative. Moreover, the questionnaire was chosen as the proper data collection method since it is less expensive, less time consuming, it can not lead to biased interviewers and the respondents can answer it in convenience and discretion.

Concerning the findings of the research, they reveal almost whatever is stated in the literature review which is about the secondary data that already exist. The literature review and the analysis of the Risk Management concept are confirmed since the findings prove that the Greek banks implement widely the risk management with a range of methods and 'tools' which lead to the effective and enhanced management.

The results of the research can lead to managerial implications that are about the ability of the managers to create more advanced models, to train personnel so as to have skilled and expertise employees, to adopt a more responsible attitude against the financial products and put as priority the long run profits which would lead to a more stabilized and safer financial environment.

DECLARATION OF ORIGINALITY

"I declare that my work entitled "Risk Management in Banking; The case of Greek Banking Industry" for the degree of MA in Politics and Economics of Contemporary Eastern and S.E. Europe , embodies the results of an original research programme and consists of an ordered and critical exposition of existing knowledge in a well-defined field.

I have included explicit references to the citation of the work of others or to my own work which is not part of the submission for this degree."

Karaviti Stavroula
31st December 2009

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ABBREVIATIONS AND GLOSSARY

BOD = Board of Directors

CDS= Credit Default Swap

IT= Information Technology

HFLS= High-Frequency Low-Severity

LFHS= Low-Frequency High-Severity

OTC= Over-the-Counter

RAROC= Risk-adjusted Return on Capital

FRAs= Forward Rate Agreements

VaR= Value at Risk

SPSS= Statistical Package for Social Sciences

RMM = Risk management methods

EBR = Elimination of banking risks

RMP= Risk management process

CR = Company's revenues

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

In the middle of an economic crisis and a still uncertain future that stemmed mainly from mismanagement of financial risk, the whole literature and managers have turned back to the basics: the meaning of proper management of risk. Especially banks were affected first and the most and now have to face the ongoing consequences: unpaid or delayed loans, expensive deposits, limited new revenues, low trustworthiness and confidence…

Risk management in banking contains a combination of processes and models, results of scientific research, that banks base on them to implement risk-based policies and practices. Banks are not any more practice traditional financial intermediation in low risk environment. A broad range of innovative and evolutional financial products, available globally at current time, have taken place and turned banking into a dynamic and active risk management process of assets and liabilities in a low regulated, high-risk environment.

A complex system of techniques and management tools are used from banks to measure, monitor and control risks that are mainly categorized in credit risk, market risk, interest rate risk, liquidity risk, operational risk and legal risk. In fact, risk is referred to any uncertainty that might bring losses and good management of this enhances the return profile of the bank portfolio. Main progress and goal in this area is the creation of new quantified risk measures for all above categories, providing also new categories of risks and the creation of more realistic indicators.

The fact that today's risks may become tomorrow's losses and that maybe is not something immediate visible makes risk measurement imperative need for the banks and the department that deals with it essential for the survival of the organism. The basic reasons that made the risk-based practices to develop quickly are: banks have major incentives to move rapidly in that direction, regulations developed guidelines for risk measurement and for defining risk-based capital (equity) and the risk management 'toolbox' of models enriched considerably, for all types of risks, providing tools making risk measures instrumental and their integration into bank processes feasible.

The purpose of this study is to examine whether the risk management in banking with the form of identifying, analysing, assessing, rating, monitoring, controlling and communicating risks is used by the Greek banking industry in order

to secure and maximize organizations' revenues. In this way, the theory and the research done until now for the risk management concept will be analysed and a quantitative research will take place so as the risk management process in Greek banking industry to be tested. Moreover, all the aforementioned will be followed by an analysis of the findings and conclusions.

CHAPTER 2: BANKING INDUSTRY ENVIRONMENT

2.1 ANALYSIS OF THE BANKING INDUSTRY ENVIRONMENT

The banking industry sector is characterised by intensive competition considering both the cost and the products. For this reason, the banks are forced to identify and adopt new and more efficient ways to fight their competitors and to gain more customers that will be retained and loyal. In this way, banks make efforts to reduce costs and make better offers by screening borrowers and differentiating the prices accordingly so as to maximize the profits and minimize the losses-risks.

Generally, in the past the banks were product oriented which means that were interested in selling as more products as possible without paying much attention to their customers' ability to pay back. In this way, they were interested to take as much market share as possible so as to "exploit the relative cost advantages and to continue to grow". Nevertheless, in the recent high speed and evolutional times, the expansion of business, deregulation and globalization of financial activities generated new financial products and increased level of competition even more. That made necessary an effective and structured risk management process in financial institutions.

A bank's ability to measure, monitor, and steer risks comprehensively is becoming a decisive parameter for its strategic positioning. The risk management framework, experience on the process, and internal controls, used to manage risks, depends on the nature, size and complexity of bank's activities. Nevertheless, there are some basic principles that apply to all financial institutions irrespective of their size and complexity of business and are reflective of the strength of an individual bank's risk management practices.

2.2 ANALYSIS OF THE GREEK BANKING INDUSTRY ENVIRONMENT

Concerning the Greek banking industry environment, it is another market where the fierce competition takes place (Panigyrakis et al, 2002). More specifically, the Greek leading banks are aggressively managed so as to have the opportunity not only to survive but to succeed as well in a very competitive environment. Moreover, the Greek banks have increased their capital and in this way they are able to expand their services and to offer new products and services to

their customers. That makes the Greek banking industry "represent one of the most sophisticated and modern sectors of the Greek economy" (ELKE, 2004).

The past decade was very important for the Greek banking system. It met an impressive growth in combination with a credit expansion of the Greek economy which came from the liberalization of the capital account in the 90s. That meant that Greek enterprises and households could borrow in beneficial foreign currencies. In addition, the forthcoming adoption of the Euro and the significant decline of interest rates (both nominal and real) contributed to the increasing demand for credit. The above new conditions, the removal of the old regulatory credit constraints and the increased competition amongst financial institutions, gave to the Greek credit institutions a position at the top countries with the highest rates of lending growth, significantly above the Eurozone average.

Although, these opportunities for development gave the Greek banking industry a boost, simultaneously brought more risks and obligations that had to be adapted according to the European and International rules. That meant significant economic and human resources, essential for the new more risky conditions and vital for a healthy financial environment. It would not be feasible for the new financial products to be offered without the application of risk management models. It is the only way to be priced properly so as the bank preserve a margin of profit and continue to offer them as much as possible while satisfying the customers they choose them. Of course the public supervision authority (Bank of Greece) made its presence more intensive and posed more restrictive rules in order to secure stability in the financial environment, a sector with broader significance for the economic life of the country.

Finally, accordingly to the [1]BSI indicator, the Greek banking system is the only EU-12 Banking system that has been assigned a "C" rating - which corresponds to "adequate" credit quality - and stands below the EU-25 average.[2] Yet, this rating does not imply that Greek banks lack in terms of capital. Their ratio of banks' capital to assets stands at 5%, above the EU-12 average.

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[1] The credit quality of banking systems across countries is examined based on the Bank System Indicator (BSI), calculated by FITCH Ratings and is an aggregation of the credit ratings of major banking groups in each country.

[2] According to FITCH Ratings, the interpretation of the BSI rating scale is as follows: "A" stands for very high quality, "B" for high quality, "C" for adequate quality, "D" for low quality and "E" for very low quality. In its report, FITCH clarifies that the "C" rating of the Greek banking system is due to the adverse impact of one particular bank, without which the Greek banking sector would have been assigned a "B" rating.

Instead, the rating of Greek banks is affected by a number of other factors such as their smaller size and the lower sovereign rating of Greece (compared to the ratings assigned to other EU-12 countries), which poses a constraint for the credit ratings of the Greek banking sector.

2.3 SUMMARY OF THE CHAPTER

In this chapter some general information about the banking industry environment and the Greek banking industry environment is provided. More specifically, the globalizing economy and the intensive competition is the main reason for the creation of new more complex and risky products. Moreover, the banks' need to control the risk they take and reduce the costs so as to make profits and that demands a well-organized specified department to deal with. In this way, Greek banks, under the new more demanding environment, have invested in modern methodologies and developments of risk management. The next chapter is about the literature review which is the main body of this project. In this chapter the analysis of the Risk Management theory in Banking will take place.

CHAPTER 3: LITERATURE REVIEW

3.1 BANKING RISKS

3.1.1 Definition of Risk

In order to study and understand the term 'risk management', risk alone, and especially in case of banking, has to be defined first.

Risk can be defined as the combination of the probability of an event and its consequences (ISO/IEC Guide 73). In business industry, risks are invisible and intangible uncertainties which might materialize into adverse variations of profitability or in future losses.

More specifically, financial risk in a banking organization is the possibility that the outcome of an action or event could bring up adverse impacts on profitability of several distinct sources of uncertainty. These outcomes could either result in a direct loss of earnings / capital or may result in creating difficulties on bank's ability to meet its business objectives. These kinds of difficulties increase the potential that the bank could not manage its ongoing business or take benefit of opportunities to enhance its business.

Banks often classify the losses connected with the banking risks into expected or traditional and unexpected or non-traditional losses. Expected/ traditional losses are those that the bank knows with reasonable certainty will occur and arise from the basic functions of banks (e.g. the expected default rate of corporate loan portfolio or credit card portfolio). Unexpected/ non-traditional losses are those associated with unforeseen events and arise from the developments in banking environment –domestically or globally- (e.g. regulation, losses due to a sudden down turn in economy or falling interest rates). Usually banks use their capital to deal with these kinds of losses.

The types and degree of risks a bank may be exposed depend upon a number of parameters such as its size, complexity business activities, volume etc. Generally the banks face Credit, Market, Liquidity, Operational, Compliance / Legal / Regulatory and Reputation risks which will be analyzed below.

In all types of risks, there is the possibility to have opportunities for benefit or threats to success. Risk Management is widely considered to deal with both positive and negative aspects of risk. Therefore this attitude faces risk from both perspectives. On the other hand, conservatives support that consequences are only

negative and therefore the management of safety risk is focused on prevention and elimination of losses.

3.1.2 Banking Risks

Figure 3.1.2-1: Types of Risk

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                                    Ris
                                     k
          ┌──────────┬──────────┬──────────┬──────────┐
       Market      Legal    Operational  Liquidity    Credit
        Risk        Risk       Risk         Risk        Risk
          │
    ┌─────┬────────┬────────┐
 Interest Rate  Equity   Commodity   Currency
    Risk         Risk       Risk        Risk
    │
  ┌─────┬────────┐
 Basis   Yield    Yield
 Risk    curve    curve
         shape    level
         Risk     Risk
```
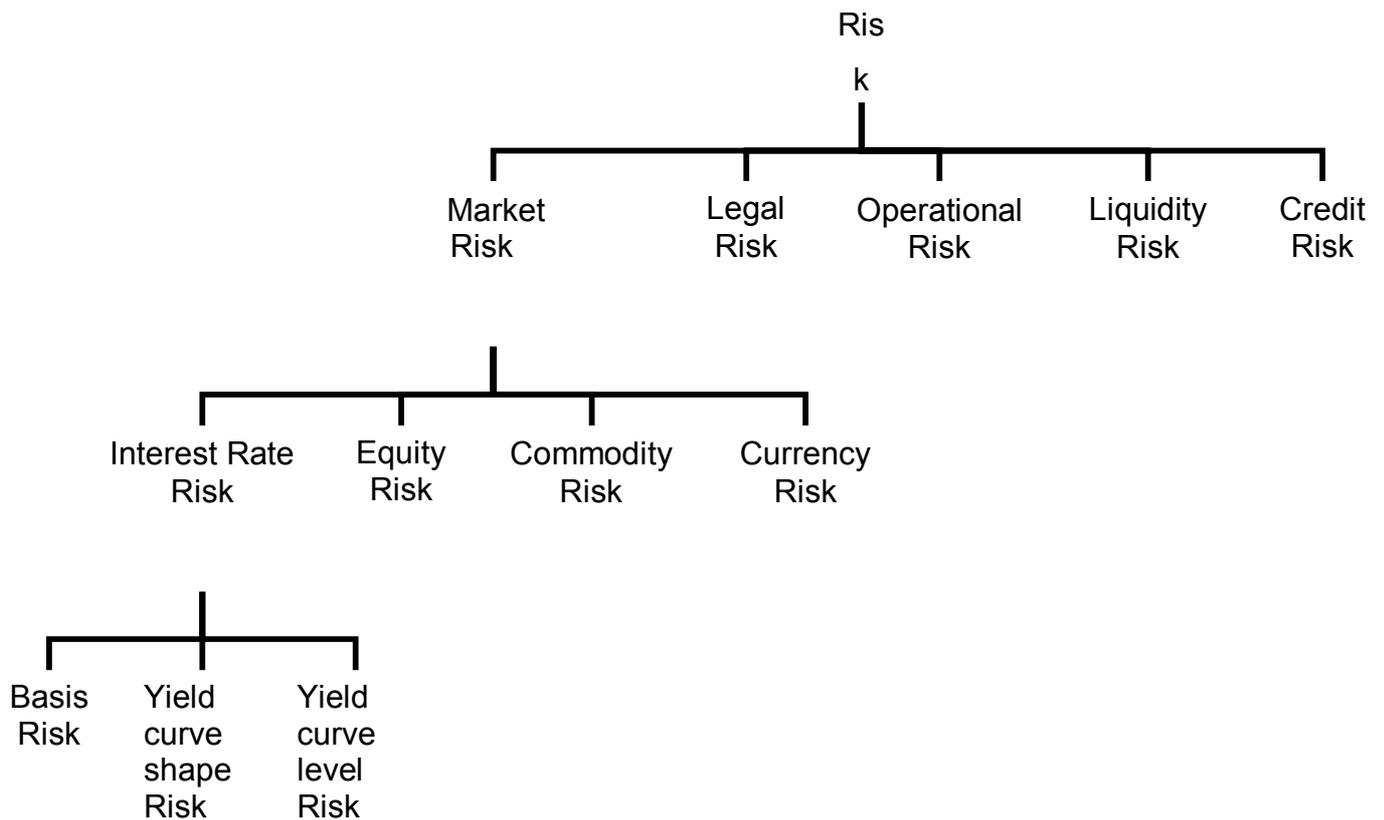
Source: Matthews K. and Thompson J. et al., p. 210

Banking risks are called the challenges a bank takes for several decisions and are usually used to define the losses of several distinct sources of uncertainty. The key to face and limit the impact of risks in banking is to find the source of the uncertainty and the magnitude of its potential adverse effect on profitability. Profitability refers to both accounting and mark-to-market measures. The different risks need different approach so a clear definition helps better for the quantitative measures of risk and their management.

Therefore, the techniques of risk management employed by the commercial banking sector are based on the enumerating of the risks which the banking industry has chosen to manage and illustrate how the procedure to manage them is applied

in each area. The risks associated with the revenues of banking services differ by the type of service rendered. For the sector as a whole, however the risks can be broken into six general types: systemic risk, market risk, interest rate risk, foreign exchange risk, credit risk, liquidity risk, operational risk, and legal risk. Here, we will discuss each of the risks facing the banking institution, and below we will indicate how they are managed.

3.1.2.1. Systemic Risk

Systemic risk refers to the possibility that a failure at a firm, in a market segment, or to a settlement system could cause a "domino effect" throughout the financial markets affecting one financial institution after another or a "crisis of confidence" among investors, creating illiquid conditions in the marketplace. The ''domino effect'' refers to the risk hidden under the interconnection of several sectors in market and begins when the disorder of one firm or one segment of the market can affect and cause failure in segments of or throughout the entire financial system. The interconnection of obligations among the same institutions and with the cash markets exacerbates that risk.

Another aspect of systemic risk refers to the possibility that some systemic factors can affect and change the asset value. By its nature, this risk can be hedged, but cannot be diversified completely away and that drops it in the category of the undiversifiable risks. All investors assume this type of risk, whenever assets owned or claims issued can change in value as a result of broad economic factors meaning that systemic risk comes in many different forms. For the banking sector, however, two are of greatest concern, namely variations in the general level of interest rates and the relative value of currencies (risks examined below).

In a similar manner, some institutions with significant investments in one commodity such as oil, through their lending activity or geographical franchise, concern themselves with commodity price risk. Risks associated with unexpected commodity price fluctuations that may have a direct or indirect negative effect on a bank's net income and net worth. Others with high single-industry concentrations may monitor specific industry concentration risk as well as the forces that affect the fortunes of the industry involved.

3.1.2.2. Market Risk

Market risks are risks arising from changes in financial market conditions and affect negatively the value of financial products, and, therefore, the net income and net worth of banking institutions. It is critical here the liquidation of transactions' period, especially in assessing such adverse deviations from the current market value.

Market risk involves the risk that prices or rates will adversely change due to economic forces and contains the movements in equity and interest rate markets, currency exchange rates, and commodity prices (factors that also affect systemic risk). Market risk can also include the risks associated with the cost of borrowing securities, dividend risk, correlation risk and liquidation risk.

3.1.2.3. Interest Rate Risk

Interest rate risk is the risk of a reduction in profits due to unexpected and unfavourable fluctuations in interest rates that may negatively affect both the price of the bank assets and the income derived from them. The main sources of interest risk are volatility of interest rates and mismatch in the timing of interest on assets and liabilities.

The magnitude of interest rate risk depends on the asset and liability mismatch, the gap between the interest rate – sensitive assets and the interest rate – sensitive liabilities (net income risk) and the direction and the percentage in the change of interest rate (position risk).

To conclude, the impact of unexpected interest rate fluctuations on bank income and net worth depends on the structure of its balance sheet, and more specifically on the relation of interest-sensitive assets and liabilities and their maturity length.

3.1.2.4. Foreign Exchange Risk

Foreign exchange risk is referred to the unexpected and unfavourable fluctuations of foreign currency exchange rates which affect negatively the value of financial flows and the net worth of the assets and liabilities of banking institutions that rely on foreign currency.

Foreign exchange risk is divided into the conversion or position foreign exchange risk which is associated with open foreign currency-denominated asset or liability positions and the transaction or net income risk which is associated with the

conversion of certain consolidated balance sheet contents for banks that are engaged in overseas operations.

The total gains or losses depend on the short or long position (open position) in each foreign currency and the size of the movement of the specific currency. For market transactions, foreign exchange rates are a subset of market parameters, so that techniques applying to other market parameters apply as well.

3.1.2.5. Liquidity Risk

In general, liquidity risk is referred to the bank's inability to make its daily money transactions. More specific, liquidity risk is the probability that a bank can not meet its obligations and commitments to its depositors and borrowers. Furthermore, this probability depends on other, further factors, like industry and economy-wide factors (systemic risk), and bank specific risks.

Liquidity risk arises on both sides of the balance bank sheet. On the liability side, liquidity risk represents the inability of banks to satisfy their depositors, especially in period of panic and loss of trust to the banks which leads to massive deposit withdrawals. On the asset side, liquidity risk represents the bank's inability to have the appropriate assets to contract new loans, advances or facilities, and make new investments in opportunities. So, the perfect combination for a bank's viability and the elimination of liquidity risk is the simultaneous maturity of its assets and liabilities.

Liquidity risk refers to multiple dimensions: inability to raise funds at normal cost, market liquidity risk and asset liquidity risk. When the credit ability of a bank becomes difficult, the cost of funding becomes expensive, so the problem extends beyond pure liquidity issues while the cost of funding is critical for bank's profitability. And the problem is bigger when is spread to the whole market where the cost of funding is much higher because of the general unwillingness to transact. Finally, is very important how liquid the assets are; the more they are, the best serve the current obligations without external funding.

Liquidity risk might become a major risk for the banking portfolio and maybe end up as the risk of a funding crisis. That results from unexpected events: a large charge off, loss of confidence, or a crisis of national proportion such as a currency crisis. Extreme lack of liquidity results in bankruptcy and that makes liquidity risk a fatal risk. However, extreme conditions are often the outcome of other risks.

Finally, liquidity risk also exists when a party to a securities instrument may not be able to sell or transfer that instrument quickly and at a reasonable price, and as a result, incur a loss. So, liquidity risk includes the possibility that a firm will not be able to unwind or hedge a position.

3.1.2.6. Credit Risk

Credit risk is considered as the most important of all risks. It is referred to the customers' inability or unwillingness to serve their debts, and constitutes a major source of loss not only on bank's profitability but also on the initial asset; the loss could be as much partial as total of any amount lent to the counterparty. Not performing the obligations of a contract is usually appeared to loans, swaps, options, and during settlement. Securities firms are faced with credit risk whenever they enter into a loan agreement, an OTC contract, or extend credit.

Credit risk is also the risk of a decline in the credit standing of an obligor of the issuer of a bond or stock. Such a possibility does not mean default, but it means that the probability of default increases because an upward move is needed of the required market yield to compensate the higher risk which brings a value decline.

The real risk from credit is the deviation of portfolio performance from its expected value. Accordingly, credit risk is diversifiable, but difficult to eliminate completely and that because it depends on a number of borrower-specific factors and of systemic risk outlined above. Credit risk is not easily transferred, and accurate estimates of loss are difficult to obtain.

3.1.2.7 Counterparty Risk

Counterparty risk comes from non-performance of a trading partner. The non-performance may arise from counterparty's refusal to perform due to an adverse price movement caused by systemic factors, or from some other political or legal constraint that was not anticipated by the principals. Counterparty risk is like credit risk, but it is generally viewed as a more transient financial risk associated with trading than standard creditor default risk.

3.1.2.8 Operational Risk

Operational risk is 'the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events' (New Basel Accord of January 2001). Operational risk is associated with day-to-day

banking operations and contains malfunctions of the information or reporting systems (record keeping), of internal risk-monitoring rules and internal procedures applied in situations where immediate corrective actions have to be taken (settling), and no application of internal risk policy rules. Therefore, this risk refers to people, processes, technical and IT.

'People' is referred to inexperienced personnel, fraud in trading and human errors in back office functions (inadequate books and records), 'processes' to inadequate procedures and controls to identify limit excesses, unauthorized trading, 'technical' to model errors and to lack for basic internal tools for accounting controls and measuring risks, and 'IT' to unstable and easily accessed computer systems. Therefore, operational risk stems from improper operation of trade processing or management systems which may result in financial loss.

3.1.2.9 Legal Risk

Legal risks are risks associated with changes in legal banking environment. New regulation, new statutes, tax legislation and court opinions can convert previous well-performed transactions into struggles even when both sides have previously cooperated adequately and are fully able to perform in the future.

Additionally, legal risk can arise from the activities of an institution's management or employees. Fraud, violations of regulations or laws, and other actions can result in big and danger losses. Moreover, exists possible risk of loss due to an unenforceable contract or a total aversion of a counterparty. Finally, there is also the possibility the contract to be illegal or one of the parties who entered into the contract not to have the proper authority.

3.1.2.10 Country Risk

Country risk is the risk of a general crisis in a country stemming from other, more specific, risks. Such risk is the risk of default (mainly in country debt) of sovereign issuers, such as central banks or government sponsored banks. Additionally, deterioration of the economic conditions and of the value of the local foreign currency in terms of the bank's base currency, legal restrictions, stop of currency convertibility and a market crisis are the most popular risks that lead to a country's unstable and risky economic life.

3.1.3 The Importance of Banking Risks

It is obvious that depending on the source they arise from, banking risks are diversified. Some stem from the banks' traditional functions as financial intermediaries, and other from their more complex functions, such as deals for developed financial products and investment management services or from external factors.

All financial institutions face all these kind of risks to some extent. But especially for banks when they participate in businesses as a principal (an intermediary) the risks are meaningful. When the banks do not own the appropriate assets in which they trade, operational, systemic and credit risk are generated automatically to the asset holder. If the latter experiences a financial loss, however, legal procedures against the bank are often enforced. Therefore, banks engaged in only agency transactions face some legal risk, if only indirectly.

Although banking risks presented separately, they are interdependent. An increase in market risk, for instance, can increase the size of non-performing loans, which in turn will raise liquidity risk. An increase in the market risk, like a sharp increase in exchange rates or interest rates can, in turn, depress real estate values and raise the risk of default of real estate borrowers meaning an increase in credit risks, which complicates risk measurement .

To conclude, while banks make profits from financial activities have to decide how much business to originate, how much to finance, how much to sell, and how much to contract to clients. Therefore, both the return and the risk embedded in the portfolio have to be weighted well. Banks must measure the expected profit and evaluate the magnitude of the various risks enumerated to be sure that the result achieves the stated goal of maximizing shareholder value. They must be prepared for the impossible; defaults of unprecedented nature and magnitude could occur in the event of heavy volatility across capital markets, such as currency and equity crashes.

3.2 RISK MANAGEMENT

3.2.1 The philosophical and operational approach

According to Angelopoulos and Mourdoukoutas et al (2001) there are two different ways to approach the risk management; the philosophical and operational one. The philosophical one deals with the 'risk-return profile', meaning the relationship that exists between risk and payoff. The operational is about the

identification and classification of banking risks, methods and procedures to measure, monitor, and control them. It is obvious that the one approach is successor of the other, and interacts. Once you know how much risk are you available to take, there is the corresponding method and process to manage and counteract it.

As philosophical approach supports, the direct relationship that exists between risks and rewards creates diverse options for decision makers toward risks. Accordingly to the magnitude of risk the risk-takers are prepared to take, are mainly divided in three categories: risk lovers, risk-neutrals and risk- averse. The 'risk-return profiles' that characterize the transactions and portfolios are centrepiece of the entire system and processes. All risk models and measures converge to provide these profiles at the transaction, the business lines and the global portfolio levels.

As a consequence, the diversity in decision-makers' attitudes toward risks creates diverse strategies toward risk-management. That is defining for the banking environment and industry structure. How much risk a bank is willing to accept will be influenced by the financial situation, time horizon and even the nature of its organization and accordingly its risk management strategy will be shaped. So, in crisis period like the one that exists now, the bankers choose a risk-averse attitude toward liquidity, and especially credit risk, which are managed through close monitoring of deposits and loans, and close relations with corporate clients and central bankers. Once it is clear what the bank wants to achieve and its risk profile, it can construct a portfolio with the right mix of products so as to have the preferable outcomes.

The operational approach to risk management is referred to the identification of key risks, to the obtaining of consistent, understandable, operational risk measures, to the choice of which risks to reduce and which to increase and by what means and to the establishment of procedures to monitor the resulting risk position. Identifying and aggregating risks across multiple independent lines of business became a major issue for top management, since in the evolving organizational structure they themselves were no longer engaged in the day-to-day management of the business units but were dependent upon formal reporting mechanisms for operating information (Kimball1997, 24).

In conclusion, the two approaches are connected in a direct way, and are both indispensable for the drawing of an effective risk management strategy. Not independent from one another means that the attitudes toward risk define and shape up the guidelines for risk measurement, monitoring and control.

3.2.2 Definition of Risk Management

Risk Management is a systematic method of identifying, analysing, assessing, rating, monitoring, controlling and communicating risks associated with any bank's activity, function or process so as to avoid or minimise losses and maximise opportunities. It should address methodically all the risks surrounding the organisation's activities past, present and in particular, future.

The acceptance and management of financial risk is inherent to the business of banking and banks' roles as financial intermediaries. It constitutes a central part and a discipline at the core of every bank's strategic management, and encompasses all the activities and the portfolio of them that affect its risk profile.

All employees of different hierarchy levels (strategic or operational) need to be aware of possible outcomes and take appropriate steps to control their impact. More specifically, at strategic level (senior management and BOD) all the strategies and policies for managing risks are taken and the overall risk is controlled to stay within acceptable level with the appropriate reward. At macro level (middle management or units devoted to risk reviews) risk management is applied within a business area or across business lines. Finally, at micro level (employees at 'front office') where risks are actually created, operational procedures and guidelines set by management are followed.

The better knowledge of risks and their impacts, the better decision-making for the bank's activities is done. The understanding of the potential reaction of all those factors which can affect the organisation increases the probability of success, and reduces both the probability of failure and the uncertainty of achieving the organisation's overall objectives.

3.2.3 The utility of Risk Management

Risk management is an essential element of corporate governance, needed to balance risk and reward – threat and opportunity – strategy and operations. Sound and effective risk management and controls promote both bank and industry stability making the investors and counterparties feel rather confident to involve in financial deals. Banks have economic and commercial incentives to employ strong risk management internal control systems. Without such controls, a bank is vulnerable to risk. The importance of risk management and controls in protecting

against serious and unanticipated loss is best illustrated by some recent cases where risk management and controls broke down or were not properly implemented.

To continue with, in a business world developed under globalization, banks and financial agencies are the most multinational and world-widely interdependent organizations. Therefore, the implementation of strong and effective risk management and controls within banks promotes stability not only to the organization's viability but also to the entire financial system. Specifically, internal risk management controls provide serious work in order to protect the firm against market, credit, liquidity, operational, and legal risks, the financial industry from systemic risk, the bank's customers from large non-market related losses (e.g., bank failure, misappropriation, fraud, etc.), and the bank, its mergers and acquisitions from suffering adversely from reputational risk.

Moreover, risk management protects and adds value to the bank as an organisation and to its shareholders as an investment through supporting the organisation's objectives. And that is feasible by providing a framework for an organisation that enables future activity to take place in a consistent and controlled manner, by improving decision making, planning and prioritisation by comprehensive and structured understanding of business activity, volatility and project opportunity/threat, by contributing to more efficient use/allocation of capital and resources within the organisation, by reducing volatility in the non essential areas of the business, by protecting and enhancing assets and company image, by developing and supporting people and the organisation's knowledge base and by optimising operational efficiency.

3.2.4 The model of Risk Management process

Figure 3.2.4-1: The model of Risk Management process
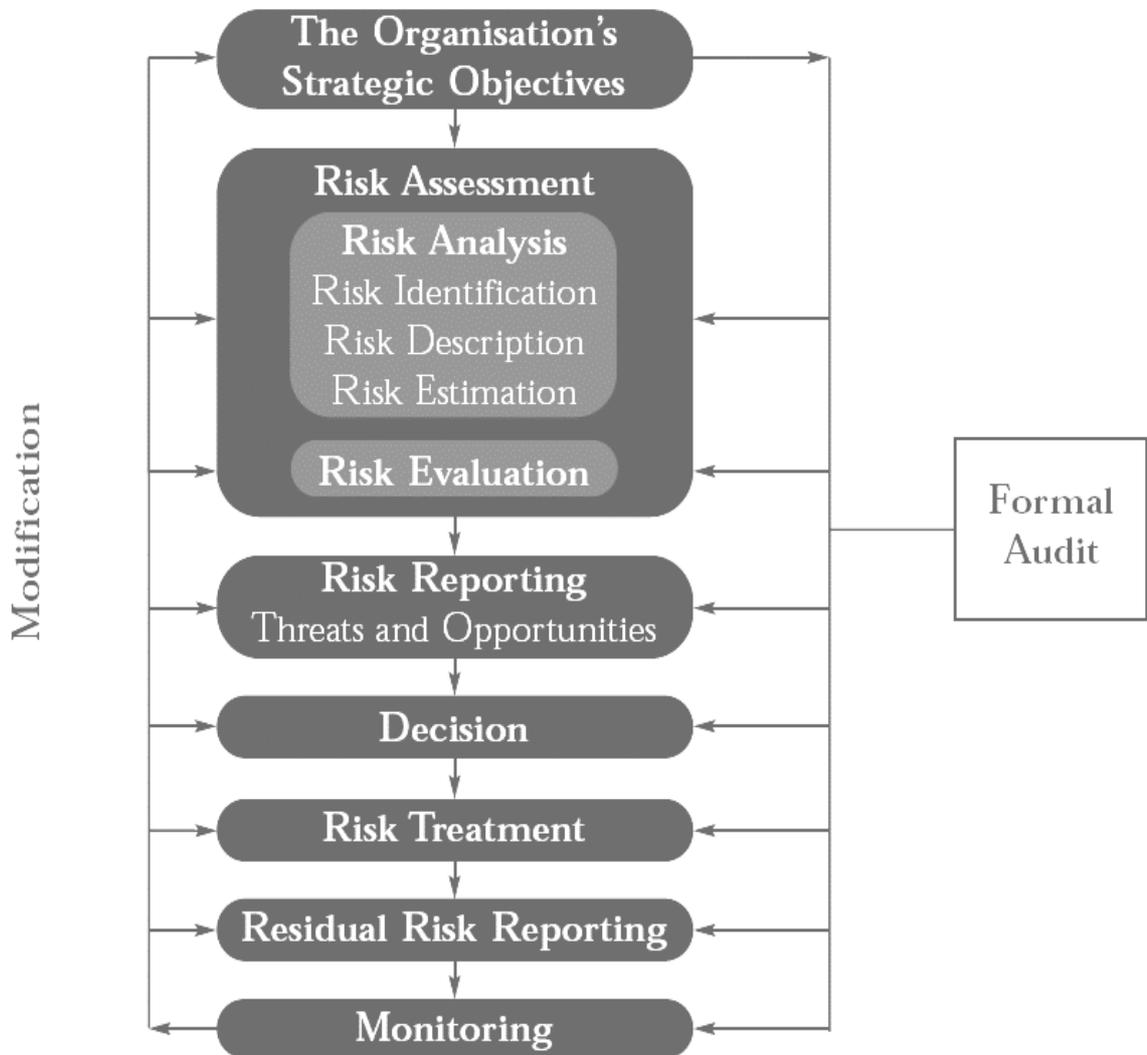
Source: AIRMIC, ALARM, IRM: 2002

Concerning the model of risk management process, it embraces all the factors that are needed so as the risk management approach to be effective and successful. In other words, the risk management concept evolves with the gradual emergence of new risk measures and involves the combination of some basic steps.

Although the most simplified and basic procedure is the one that is presented at the figure above, the risk management process for different banks varied because of the different risk profiles they adopt. Therefore, it is important at first, to be defined the bank's strategic objectives which better suit to its risk profile.

Once the organizations strategic objectives have been defined, risk assessment has to follow. Risk assessment is defined as the overall process of risk analysis and risk evaluation (ISO/ IEC Guide 73).

Risk analysis begins with risk identification; an evaluation of the bank's exposure to uncertainty. This requires a detailed view, not only of the bank's philosophy and operation but also of the market and of the general environment in which it operates and exists. Additionally, it has to be clearly defined its strategic and operational objectives, including factors critical to its success and the threats and opportunities related to the achievement of these objectives. Risk identification should be approached methodically to ensure that were found all the risks that are stemming from the bank's significant activities.

Risk description is part of risk analysis and has as objective to display the identified risks in a structured manner so as to ensure a comprehensive risk identification, description and assessment process. After evaluating the consequence and probability of each of the risks, key risks should be categorized (strategic, project/ tactical, operational) and analysed in more detail. It is important to apply risk management the same at first stage of projects and throughout the life of a specific project.

Risk estimation is the final step of risk analysis and can be quantitative, semi quantitative or qualitative in terms of the probability of occurrence and the possible consequence. For example, consequences both in terms of threats (downside risks) and opportunities (upside risks) may be high, medium or low but with different definitions for each term. Different organisations will find that different measures of consequence and probability will suit their needs best.

When the risk analysis process has been completed, it is necessary to compare the estimated risks against risk criteria which the organisation has established. The risk criteria may include associated costs and benefits, legal requirements, socioeconomic and environmental factors, concerns of stakeholders, etc. Risk evaluation therefore, is used to make decisions about the significance of risks to the organisation and whether each specific risk should be accepted or treated. Therefore, the different management levels within the bank should be informed accordingly from the risk management process, so as the appropriate decisions to be made.

After the decisions are taken, the risk treatment follows in order to cure the risks; it is the process of selecting and implementing measures to modify them. Risk

treatment mainly includes risk control/mitigation, but also extends further to functions like risk avoidance, risk transfer, risk financing, etc. No matter of risk treatment system is used, should provide the effective and efficient operation of the organisation, effective internal controls and compliance with laws and regulations.

A reporting and review procedure follows in order to ensure that risks are effectively identified and assessed and that appropriate controls and responses developed. Regular audits of policy and standards compliance should be carried out and standards performance reviewed to identify opportunities for improvement. Furthermore, because banks are dynamic and operate in dynamic environments, changes in the bank and the environment in which it operates must be identified and immediate, applicable modifications to systems should be made.

Finally, the monitoring process should reassure that the controls for the bank's activities are appropriate and the procedures are understood and followed. Any monitoring and review process should also prove that the measures adopted resulted in what was intended, the procedures and the information resulted from the risk assessment were appropriate, the improved knowledge helped to reach better decisions and today's mistakes can be used for future assessments and management of risks.

The above model requires the risk management processes to develop and be innovated in fields like the creation of risk-based practices to meet better the risk-based capital requirements, the bankers' preventing acts against the forthcoming risks, the gradual implementation of regulator guidelines for imposing risk-based techniques and the reassuring of a general safety for the financial system, the methods of recognizing risks and the techniques for managing them in order to enhance the risk-return profile and the creation of new organizational processes for better applying of these advances.

Without risk models, such innovations would remain limited. Risk estimation helps risk models to have a more balanced view of income and risks and to control better the adverse expecting consequences before they materialize into losses. By connecting the activities with the risk makes the risk management tools, models and processes more effective and by feeding risk processes with adequate risk-return measures, risk management develops in new levels.

3.2.5 Risk Management on Banking Risks

Although, the risk management process is mainly the one presented above, each banking risk has to be managed separately with the methods and models that are exclusively designed for each one. The study of bank risk management process is essentially an investigation of how to manage these risks. In each case, the procedure outlined above is adapted to the risk considered so as to standardize, measure, constrain and manage each of these risks. In the paragraphs that follow, the most popular risk management controls for the risks that are frequently faced, are presented.

a) **Market Risk**

In the case of market risk management, the most efficient and widely used approaches to risk measurement are scenario analysis and value-at-risk (VaR) analysis.

In scenario analysis, the analyst makes hypothetical changes in the basic determinants of portfolio value (e.g. interest rates, exchange rates, equity prices, and commodity prices) and revalues the portfolio. The resulting change in value is the loss estimate. A typical procedure, called stress testing, is to use a scenario based on a historically adverse market move having the advantage that distributional assumption for the risk calculation is not required. On the other hand, it is subjective and considers that future financial upsets will strongly resemble those of the past. Stress testing can provide regulators with the desired lower tail estimates, but is of limited utility in day-to-day risk management and scenario analysis is dependent on having valuation models that are accurate over a wide range of input parameters, a characteristic found also in VaR models.

VaR is a generally accepted and widely used tool for measuring market risk that exists in trading portfolios. It follows the concept that reasonable expectation of loss on its whole trading book can be deduced by evaluating market rates, prices observed volatility and correlation. VaR is the maximum loss that a bank can be confident it would lose over a target horizon within a given confidence level. Its statistical definition is that VaR is an estimate of the value of losses that cannot be exceeded, with confidence level a% over a specific time horizon.

Generally there are three ways of computing VaR: the parametric or variance-covariance method, the historical simulation, which allows for all types of

dependency between portfolio value and risk factors, and Monte Carlo simulation, which uses randomly generated risk factor returns. Although this appears to give greater flexibility in estimating VaR, the three methods give different risk estimates for different holding periods, confidence intervals and data windows.

b) Credit Risk

One element that is widely affects the riskiness of credit in a bank is the asymmetric information or information asymmetry. It is defined as the situation where the one part of a transaction does not have the same or even has better information than the other and this may lead the transaction to fail. Asymmetric information generates two problems: adverse selection and moral hazard. Adverse selection in banking refers to a situation where individuals in a selection process have hidden economically undesirable characteristics and the final selection results in default and moral hazard describes the situation where one party to a contract takes a hidden action that benefits him or her but hurts the another party.

It is obvious that solving asymmetric information problems in banking is a way to manage credit risk. The most usual methods is screening (collection of financial information about potential borrowers before the transaction), specialization (knowledge of particular credit markets and particular potential borrowers), monitoring the activities of the borrower, enforcing the covenants in the loan contract, having long term relationships, collaterals and compensating balances (ex. mortgages where home is collateral) and finally credit or loan rationing (refusal lending to borrowers even though they are willing to borrow).

To continue with credit risk management tools, credit scoring and RAROC (risk-adjusted return on capital) method help to decide whether a loan is accepted, rejected or requires more attention. Credit scoring is a popular one, and is a technical method of assigning a score that classifies potential borrowers into risk classes according to their economic, or other, characteristics and RAROC is a technique that is used extensively as a management performance tool to evaluate the economic profit generated mainly from a loan. RAROC is compared with a benchmark rate in order the final decision to be made. Additionally, Creditmetrics model (JP Morgan's Creditmetrics[TM], 1997) which is based on a transition matrix of probabilities that measures the probability that the credit rating of a loan or any dept security will change over the term of the loan or maturity of credit instrument, is widely used.

Another approach to credit risk management is by credit risk mitigation tools. Securitization is one of the more visible forms and involves selling registered, rated securities in the capital markets. The aim is to transfer the credit risk which is involved in a specified loan portfolio to the institutional investors and insurance companies while bank is gaining liquidity (loans decrease by the same amount). An alternative to the process of securitization is to insure the bank asset by a credit default swap (CDS). The party buying credit protection pays a periodic fee to another party who agrees to reimburse the purchaser of credit protection in the event of failure to repay either the capital value of the debt or related interest within a specified time period. Proportionally, counterparty risk takes place.

Ideally, every bank should institute a Credit Risk Management Department in order to monitor and implement all the appropriate functions that immune the organization from a daily and unavoidable risk like the credit risk.

c) Interest Rate Risk

In fact, the interest rate risk cannot be avoided completely. Interest rate fluctuations can be managed only by simulating a number of interest rate scenarios to arrive at a distribution of potential loss and then developing a strategy to deal with the low likelihood of extreme cases.

The main tools that are used to deal with that risk are duration-matching of assets and liabilities, interest rate futures, options and forward rate agreements and interest rate swaps.

The duration-matching of assets and liabilities is also called gap analysis and evaluates the exposure of the banking book to interest rate changes. The 'gap' is the difference between interest-rate-sensitive assets and liabilities for a given time interval. If interest-sensitive liabilities are more than interest-sensitive assets there is negative gap, and if are less there is positive gap. The gap will provide a measure of overall balance sheet mismatches. The greater the mismatch of duration between assets and liabilities, the greater will be the duration gap. The basic point of gap is to evaluate the impact of a change in the interest rate on the net interest margin.

All the rest hedging tools are parts of a wider category called financial derivatives and are defined as instruments whose price is derived from an underlying financial security. The bank is a hedger and buys insurance from a speculator. The purpose of hedging is to reduce volatility and thereby reduce the volatility of the bank's value.

To specify, an interest rate future is a transaction where the price is agreed now but delivery takes place at a latter date. If the bank is adversely affected by falling interest rates it should purchase futures. If the bank is adversely affected by rising rates of interest, it should sell future. Also, futures markets can also be used to reduce duration. Interest rate futures are conducted through an organized market, which stands behind the contract.

Forward Rate Agreements (FRAs) are in the respect of an interest rate due in the future. They are based on a notional principal, which serves as a reference for the calculation of interest rate payments. The principal is not exchanged, just the interest payment at the end of the contract. FRAs are OTC contracts and therefore they hide counterparty risk.

Swaps can be used to adjust the interest rate sensitivity of specified assets or liabilities or the portfolio as a whole. Reductions can be obtained by swapping floating rates for fixed rates and, conversely, to increase interest rate sensitivity, fixed rates can be swapped for floating rates. On the other hand, swaps entail some danger; a large change in the level of rate makes a fixed rate obligation undesirable.

An option gives the right to purchase a security (a 'call' option) or to sell a security (a 'put' option), but not an obligation to do so at a fixed rate (called the 'strike' price) in return for a fee called a 'premium' and is bought/ sold for a fixed period. The risks/ benefits in option trading are not symmetrical between the buyer and the seller (termed the 'writer').

Options and interest rate futures provide the same opportunities for risk management. Although two differences appear; the purchaser benefits from any gain if the option moves into the money and in return for this benefit, the purchaser pays a fee (ex. an option premium).

d) Foreign Exchange Risk

In managing foreign exchange risk, there are not particular methods that are used in practice. Banks mainly use rather ad hoc approaches in setting foreign exchange and other trading limits and these are mostly considered as the most effective. Limits are the key elements of the risk management systems in foreign exchange trading as they are for all trading businesses.

Additionally, because foreign exchange risk is part of market risk as we saw in 3.1.2.-1 Figure, VaR approach is also used. Even for banks that do not use a VaR system, stress tests are done instead to evaluate the potential loss associated with

changes in the exchange rate for small deviations in exchange rates. Although it also may be investigated for historical maximum movements and that can be done in two ways. In the one, historical events are captured and worse-case scenario simulated. In the other, the historical events are used to estimate a distribution from which the disturbances are drawn.

e) Liquidity Risk

The most effective way to manage liquidity risk is to define well the price of illiquidity and built into illiquid positions.

In any case, risk management here centers on liquidity facilities and portfolio structure. Recognizing liquidity risk leads the bank to recognize liquidity itself as an asset, and portfolio design in the face of illiquidity concerns as a challenge.

An analysis of funding demands under a series of "worst case" scenarios is usually followed. These include the liquidity needs associated with a bank-specific shock, such as a severe loss, and a crisis that is system-wide. In each case, the bank examines the extent to which it can be self-supporting in the event of a crisis, and tries to estimate the speed with which the shock will result in a funding crisis.

Other institutions attempt to measure the speed with which assets can be liquidated to respond to the situation using a report that indicates the speed with which the bank can acquire needed liquidity in a crisis. Both methods of response strategies include the extent to which the bank can manage substantial balance sheet losses and estimates are made of the sources of funds that will remain available to the institution in a time of crisis. Results of such simulated crises are usually expressed in days of exposure, or days to funding crisis.

f) Operational Risk

According to Matthews and Thompson et al (2008), operational risk can be separated into high-frequency low-severity (HFLS) events, which occur regularly and for which data can be found and low-frequency high-severity (LFHS) events, which are rare. Measuring operational risk will need to account for both types.

LFHS are quite rare and individual banks use case experiences from other banks, whereas HFLS are quite frequent and each bank will have experienced some such events. Subjective probabilities can be assigned to each of the events on the basis of educated guesses and scenario analysis. Unexpected losses can then be modelled using VaR methodology.

In general, proper management procedures including adequate books and records and basic internal accounting controls, a strong internal audit function which is independent of the trading and revenue side of the business, clear limits on personnel, and risk management and control policies could really eliminate the operational risk.

3.3 CONCLUSION

Above were examined the most popular risks and their remedies as some bibliography presents. Certainly, there are some other managing tools and methods that banking institutions use and that is up to the organization's policy and philosophy. It is also true, that banks face and other risks while they move more off balance sheet and the implied risk of these activities could be better integrated into overall risk management and strategic decision making.

RAROC and VaR methodologies have been considered as capable to capture total risk management. Both aggregate risk methodologies presume that the time dimensions of all risks can be viewed as equivalent which, in practice, is hard to happen. Operating such a complex management system requires a significant knowledge of the risks considered and the approaches used to measure them. BOD or senior managers rarely have the level of expertise necessary to operate this kind of system.

To conclude, modern risk management methods have further margins to develop and should be seen as complements to and not substitutes for good judgement, experience and technical knowledge. Advanced systems in computers will never replace the meaning of physical appearance of loan officer or risk manager.

3.4 SUMMARY OF THE CHAPTER

In this chapter the basic data and specifically the theory of banking risks and risk management, are analysed as they are presented in journals, books, online and library sources. More to the point, banking risks are categorized and the most important are defined. Knowing better each banking risk helps the risk management process to face the source of the problems or even to prevent the consequences stemming from the risks' interdependence. At the following, the philosophical and operational approach is explained and the risk management concept is defined. A model of risk management process is analyzed and the most widely accepted and

used methods and tools against risks are presented separately for each one. These methods and tools can not provide total insurance while physical appearance in association with good judgement, experience and technical knowledge are irreplaceable. The next chapter is about the research methodology that this study will follow in order the main objective to be achieved.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

At this chapter it will be presented and analysed the marketing research that will be conducted so as to come to conclusions.

The steps that have to be followed so as the research to be successful are 6:

- ➢ Problem definition
- ➢ Research question and objectives
- ➢ Research design
- ➢ Research method
- ➢ Data collection method
- ➢ Sampling design

Source: Malhorta and Birks, (2003).

4.2 PROBLEM DEFINITION

The problem in this particular case is that the banks are willing to improve their ability to face successfully the banking risks through variable techniques and for this reason they are trying to identify the most effective method. To continue with the risk management is associated with the attitude the banks adopt against banking risks since defines the whole philosophy and the tools that are going to be used.

It is important to say that in the Greek banking industry, risk management is not quite developed and most of the Greek banks are willing to follow the innovations and technical knowledge of foreign, successful financial institutions. Moreover, most Greek banks have created numerous risk management units with specialized staff, IT systems and systemic procedures, especially after the economic crisis burst. But the most important reason is the banks to be able to gather a lot of information about the banking risks and in this way, to identify easily their remedies and to satisfy the needs for a healthy organization.

4.3 RESEARCH OBJECTIVES

The overall aim of this research and more specifically the research question is:

➤ Whether the modern risk management procedures and tools used worldwide benefit the Greek banking industry in order to face and deal with the banking risks and what is the general attitude towards them.

4.3.1 Hypothesis statement

By the time a company has identified the problem and the research objectives it can proceed to the hypothesis statement which according to Ghauri et al (1995) is a formulation of a statement in a particular phenomenon. In a hypothesis statement there are two hypotheses the null (H_0) which states that there is no relationship between the two variables and the alternative hypothesis (H_1) that states that there is a relationship between the two variables (Sekaran, 2003).

To proceed with, the literature review of this study explains and analyses the banking risks and how they can be treated sufficiently with the risk management concept. In this way, the literature review aids at the formulation of the hypotheses which are the following:

H_{01}: *Risk management methods used by the Greek banks is not associated with the elimination of banking risks*

H_1: *Risk management methods used by the Greek banks is associated with the elimination of banking risks*

H_{02}: *Risk management process used by the Greek banks is not associated with the company's revenues*

H_2: *Risk management process used by the Greek banks is associated with the company's revenues*

At the first hypothesis the independent variable is the risk management methods that are used by the Greek banks and the dependent variable is the banking risks which are affected by the use of the risk management methods. At the second hypothesis the independent variable is the risk management process and the dependent one is the company's revenues which are affected by the risk management process that the Greek banks use. The terms dependent and independent variable are used mostly for the experimental research where some variables are manipulated, and they are "independent" from the initial reaction of the subjects, and some other variables are "dependent" on the manipulation or experimental conditions. In other words, they depend on "what the subject will do" in response (http://www.statsoft.com/textbook/stathome.html).

4.4 RESEARCH DESIGN

Once the variables in a problem situation or opportunity have been identified, the next stage is the design of the research "in a way that the requisite data can be gathered and analyzed to arrive at a solution" (Sekaran 2003, p117). A research design is about the specific structure that will be used in order the marketing research to attain its objectives and there are three types of it, the exploratory, the descriptive and the causal one (Aaker et al, 1995). For the marketing research about the relation between the risk management process and its results in the Greek banking industry the appropriate research is the exploratory one because, according to Weiers (1988), an exploratory study is so powerful that, even alone, it can yield the desired information for the problem which is under investigation. Moreover, without an exploratory research, a probability of a misdirected and lengthy research effort as well as a probability of a higher research cost exists (Weiers, 1988).

4.5 RESEARCH METHOD

At this stage the primary objective is to have a quantitative research. The reason for this choice is the fact that the specific research is about the relationship between the risk management and its effectiveness for the Greek banking industry which is irrelevant with the identification, critically discussing, for the better risk management methods and tools. Besides, the study is about the identification of the relationship between the two variables. Moreover, the quantitative research is about a statistical analysis and experiment which can prove whether a concept or idea is better than the alternatives (McCullough, 2004).

To continue with, since the best research is the quantitative one it has to be defined which quantitative technique will be used. There are a lot of quantitative techniques but the most common way for collecting primary data and large quantities of information is the survey one and specifically the questionnaire (Pallant, 2001). Moreover, the questionnaire enables the researcher to study relationships between variables holding in the population (Saunders et al, 2003) which is what exactly this project has as a main objective. Furthermore, the type of questionnaire will be the mail one. This type of survey was chosen because there is a high level of anonymity, it is very inexpensive, there is fast delivery and the respondents can answer the questions at their convenience (Sekaran 2003).

4.6 DATA COLLECTION METHOD

The collection of the data is mandatory in order for the research to be completed. The data are divided into two types, the primary and the secondary ones. The secondary data are "data that already have been collected for purposes other than the problem at hand" (Malhotra and Birks 2003, p85). Concerning the primary data, "they are originated by a researcher for the specific purpose of addressing the problem at hand" (Malhotra and Birks 2003, p85). These data are collected by the researchers individually and the procedure of their collection is more expensive and time consuming compared to the secondary ones (Sekaran, 2003). One of the best methods to collect the primary data is the questionnaire, which is the chosen method for this particular study. It is the best instrument since it is the less expensive and the less time consuming. Moreover, the use of a questionnaire can not lead to biased interviewers (Malhotra and Birks, 2003). Besides, there is the possibility for the respondents to answer the questionnaire in convenience and discretion (Gill & Johnson, 1997).

The research questionnaire of this study includes 15 questions that are divided into two parts. The part A of the questionnaire consists of 7 questions that deal with the risk management methods or tools so as to identify if the banks use them, which risk management methods or tools they use and for which reason. In this way, it will be identified if the Greek banks follow the new technological developments and what are the benefits that can derive from the use of them. Concerning the part B, it consists of 8 questions which deal with the general attitude the banks have against risk management and how much importance the banks attach to the process.

To continue with, the questionnaire includes closed questions and questions with the form of Likert scale in order to examine how strongly the participants agree or disagree with these questions and also in order to avoid deviation in their answers that can lead to misunderstandings. In this way, the respondents can answer the questions without any difficulty and without devoting a lot of time. Moreover, this form of questionnaire can be easily transformed into numerical design which is appropriate for the statistical analysis that this study needs. Besides, the Likert scale can easily lead the researchers to the calculation of the means and standard deviations of the answers (Pallant 2001).

4.7 SAMPLING DESIGN

To study the properties of some populations we often have recourse to a sample drawn from the population. This is a subgroup of the individuals in the population, usually proportionately few in number, selected so as to be, to some degree, representative of the population (Pallant 2001). In most situations the sample will not be fully representative. Something is lost by the process of sampling. Any sample is likely to differ in some respect from any other sample which might have been chosen and there will be some risk in taking a sample as representative for a population (Saunders et al, 2003). However, much may be gained by making relatively few observations. If a national census is conducted by interviewing, say, only 1 in 100 rather than the whole population, it may be possible to devote more resources to train the interviewers, who will be fewer in number, and thereby to obtain more accurate records (Armitage and Berry, 1994).

After having achieved all the above tasks, the next step in a marketing research is "to obtain a sample of respondents that is representative of the target population of interest" (Proctor 2003, p99). There are two types of sampling, the probability where all the elements have equal probability to be selected and the non-probability sampling where the elements do not have equal probability to be selected (Sekaran, 2003).

According to Lethonen & Pahkinen (1996), simple random sampling is considered a basic form of probability sampling appropriate for situations where no previous information existed for the population structure. For the specific research the whole population is all the branches of the Greek banks in Thessaloniki, the second biggest city in Greece. The total number of the branches is 473 and the appropriate sampling design for this research is the simple random sampling. The reason for the choice of this design is that with the simple random sampling all the elements of the population have equal chance of being selected (Sekaran, 2003) and therefore, the sample is a clear representation of the population.

The author accosted to the headquarters of each bank in Thessaloniki, and requested their collaboration. In order to ensure randomness, each unit in the population of the 473 branches was numbered and each 3rd branch was drawn in order to make up the sample, which consists of 155 bank branches. Afterwards the questionnaire was mailed at all these bank branches.

4.8 SUMMARY OF THE CHAPTER

In this chapter the analysis of research methodology takes place. Specifically, the problem of the study is defined and the research question and objectives are explained. A quantitative research approach, and particularly a posted questionnaire, is chosen for testing the two formulated hypotheses and a sampling design has led to a sample of 155 bank branches where the questionnaire will be mailed so as the appropriate primary data to be gathered.

5.1 SAMPLE PROFILE

After having contacted with the headquarters of each bank in Thessaloniki, the survey questionnaire was mailed to 155 branches of Greek Banks where a 75% response rate was achieved, that is, 115 responses. The questionnaires were coded and the responses were processed in the Statistical Package for Social Sciences (SPSS) in order to analyse them further and reach conclusions. The first section of the questionnaire presents descriptive statistics of the methods that were used by the Greek banks and of the benefits they offer them.

All the banks that participate in the survey consider that Credit Risk is the most important risk that they should focus on. 80% of the responders consider the liquidity risk, 87.8% consider market risk, 67% consider the operational risk and 41.7% consider the interest rate risk for the same reason. Foreign exchange risk is considered as the less important risk with only 12.2% positive responses.

Table 5.1.1: Importance of Risks for Greek banks

	FREQUENCY	PERCENT (100%)
CREDIT RISK	115	100
LIQUIDITY RISK	92	80.0
MARKET RISK	101	87.8
OPERATIONAL RISK	77	67.0
FOREIGN EXCHANGE RISK	14	12.2
INTEREST RATE RISK	48	41.7
0 missing cases; 115 valid cases		

According to Table 5.1.2, all branches (100%) believe that risk management should be a primary function for the banks in order to protect the organization even from bankruptcy.

Table 5.1.2: Risk Management as a primary function

	FREQUENCY	PERCENT (100%)
PRIMARY FUNCTION	115	100.0
0 missing cases; 115 valid cases		

Table 5.1.3 shows which methods and techniques each bank use in order to make risk analysis before and after a risk occurred. All the banks invest a lot on research and development method in order to find more effective ways to face the banking risks. 71.3% of the banks use business impact and threat analysis and 23.5% of them use the method of prospecting where the risk is left to be developed. The 84.3% of banks use the widely used method of SWOT analysis, 25.2% the dependency modelling, 71.3% the decision taking under conditions of risk and uncertainty and Real Option Modelling and 64.3% the event tree analysis. Moreover 56.5% of the banks use BPEST (Business, Political, Economic, Social, Technological) analysis, 43.5% the PESTLE (Political Economic Social Technical Legal Environmental) analysis, 70.4% the market survey, and finally 58.3% use the statistical inference method.

Table 5.1.3: Methods and techniques used for risk analysis before and after a risk occurred

	FREQUENC
Research and Development	115
Business impact and threat analysis	82
Prospecting	27
SWOT analysis	97
Dependency modelling	29
Decision taking under conditions of risk and uncertainty and Real Option Modelling	82
Event tree analysis	74
BPEST (Business, Political, Economic, Social, Technological) analysis	65
PESTLE (Political Economic Social Technical Legal Environmental) analysis	50
Market survey	81
Statistical inference	67

0 missing cases; 115 valid cases		

In table 5.1.4 are presented the benefits that the banks can gain from the management of liquidity risk. 80.9% of the responders consider that the bank can satisfy its obligations in case of crisis, 53.0% consider that the bank can meet its requirements to Central Bank for liquidity, 83.5% replied that it can borrow with low interest rates, 33.9% believe that the bank is able to unwind and hedge a position and finally 73.9% feel that the bank has the ability to contract new loans and other investments for profitability.

Table 5.1.4: Benefits that can be obtained from liquidity risk management

	FREQUENCIES	PERCENT (%)
Can satisfy its obligations in case of crisis	93	80.9
Meet its requirements to Central Bank for liquidity	61	53.0
Borrows with low interest rates	96	83.5
Is able to unwind and hedge a position	39	33.9
Ability to contract new loans and other investments for profitability	85	73.9
0 missing cases; 85 valid cases		

According to table 5.1.5, 82.6% of the responders think that the most widely used technique is business studies which look at each business process and describe both the internal processes and external factors which can influence those processes. 40.9% use auditing and inspection, 62.6% risk assessment workshops, 54.8% scenario analysis, 38.3% use industry benchmarking and 47.8% use incident investigation. Finally, according to the responders, the less used technique from the banks is the brainstorming with only 33% and the method of questionnaires with 35.7%.

Table 5.1.5: Techniques used in order to identify the banking risks

Business studies which look at each business process and describe both the internal processes
Auditing and inspection

| Risk assessment workshops |
| Scenario analysis |
| Industry benchmarking |
| Brainstorming |
| Incident investigation |
| Questionnaires |
| 0 missing cases; 115 valid cases |

Table 5.1.6 shows the benefits, according to the responders, from management of operational risk. Almost all of the them (93%) mentioned that effective operational risk management can lead to limited frauds due to customers and personnel, a fact that is faced in every day function. 55.7% of the respondents believe that the adequate function of systems and IT is important to operational risk, 81.7% think that it provides reduced internal wrongs which affect the net income and for the 60% of the responders it leads in more effective restriction on violation of duties. The smallest benefits of operational risk management are that it restricts the obstacles to other bank activities (33%) and that there is no linkage of confidential information (42.6%).

Table 5.1.6: Benefits that can be obtained from the management of operational risk

	FREQUENCIES	PERCENT (%)
Limited frauds due to customers and personnel	107	93.0
Adequate function of systems and IT	64	55.7
Reduced internal wrongs which affect the net income	94	81.7
No obstacles to other bank activities	38	33.0
No linkage of confidential information	49	42.6
No violation of duties	69	60.0
0 missing cases; 115 valid cases		

Table 5.1.7 exhibits the benefits that can be obtained from management of market risk. For all the responders, the management of market risk limits the risks of

other associated risks such as interest rate, foreign exchange or liquidation risks. For the 76.5%, the benefit for the bank is that is immune against adverse economic forces and for the 68.7% is that is protected from high cost of borrowing financial products.

Table 5.1.7: Benefits that can be obtained from the management of market risk

Limit the risks of other associated risks such as interest rate, foreign exchange or liquidation risk
Be immunized against adverse economic forces
Be protected from high cost of borrowing financial products
0 missing cases; 115 valid cases

The second part of the questionnaire (Section B) describes the general attitude the banks have against risk management. More specifically, questions 8, 9, 10, 12 are associated with the elimination of banking risks, which is investigated in the first hypothesis. The range of these 4 questions are between 1 (strong disagree) to 5 (strong agree). By Adding these statements (variables V8, V9, V10, V12 in appendix A) we generate a new variable elimination of risks with range between 4 (strong disagree) to 20 (strong agree). As shown in table 5.1.8 the mean of the new variable is 17.46, with minimum value 11 and maximum value 20. Hence, most responders either agree or strongly agree with the usefulness of the risk management due to the elimination of banking risks.

Table 5.1.8: Elimination of banking risks

ELIMINATION OF BANKING RISKS	
MEAN	17.46
STANDARD DEVIATION	2.04
MINIMUM	11
MAXIMUM	20

In the same way, questions 14 and 15 of the survey refer to the second hypothesis that the research investigates and they are about the revenues of banks which are affected by the risk management process used by the Greek banks. By

adding the two variables, as it happens in the previous case, a new variable (bank's revenues) is created, necessary for the control of the second hypothesis. The range of these statements is between 1 (strong disagree) to 5 (strong agree), so the range of the new variable is between 2 (strong disagree) to 10 (strong agree). According to table 5.1.9, the mean is approximately 8.9, which means that most of the banks raise their revenues due to the use of risk management (increase the profitability of the bank). The frequency tables of these two variables (Elimination of banking risks and Bank's profitability) are displayed in appendix B.

Table 5.1.9: Bank's Revenues

BANK'S REVENUES	
MEAN	8.88
STANDARD DEVIATION	1.01
MINIMUM	6
MAXIMUM	10

5.2 DATA ANALYSIS

Correlations measure how variables or rank orders are related (Armitage and Colton, 1999). In a study of the relationship between two variables, the use of measures of correlation assumes that neither is dependent upon the other. A quantitative measure of the strength of the correlation is a correlation coefficient, which expresses how closely a change in the magnitude of one of the variables is accompanied by a change in the magnitude of the other variable (Armitage and Colton, 1999).

If the distributions underlying the two variables are far from bivariate normal, or if the data are ordinal, then nonparametric correlation techniques should be employed to test hypotheses about the relationship between variables or to set confidence limits around the correlation coefficients (Pallant 2001). Nonparametric correlation also is less sensitive to outliers than its parametric analog (Pallant 2001). The underlying assumptions for nonparametric correlation are that the n pairs of ratio, intervals, or ordinal data constitute a random sample and that the two members of each of the n pairs of data are measurements taken on the same subject (Pallant 2001).

The non parametric Spearman correlation coefficient (r_s) represents the level of correlation of two ordinal or quantitative variables, in contradistinction to Pearson correlation coefficient that is used only in quantitative variables and supposes that the two variables are normally distributed (Saunders et al, 2003). Pearson's correlation coefficient is a measure of linear association (Saunders et al, 2003). Two variables can be perfectly related, but if the relationship is not linear, Pearson's correlation coefficient is not an appropriate statistic for measuring their association (Trichopoulos et al, 2000).

The first hypothesis that has been formulated for this survey seeks to test whether the risk management that each bank uses (independent variable) is associated with the elimination of banking risks (dependent variable). Spearman correlation coefficient is used to test this hypothesis because the variable that describes the "the risk management used by the banks", as the one that describes the "elimination of banking risks" are ordinal. SPSS statistical software will be used to explore the magnitude of correlation between the two variables.

Table 5.2.1 shows the results of the correlation. The value of Spearman Correlation Coefficient is r_s=0.228, and its p-value is $0.014 < 0.05$, which indicate a strong positive relationship. The p-value is statistical significant at the 0.05 level. That means that the more risk management used by Greek banks in Thessaloniki the more the benefits from the elimination of banking risks. So the null hypothesis H_0 is rejected and the alternative hypothesis H_1 that indicates that "Risk management methods used by the Greek banks is associated with the elimination of banking risks", is accepted. Although Spearman Coefficient is more appropriate for this hypothesis, the parametric Pearson Correlation Coefficient apposed suggestively in table 5.2.2. Its value is also statistically significant at 0.01 level.

Table 5.2.1 Spearman Correlation Coefficient

Correlations

			RMM	EBR
Spearman's rho	RMM	Correlation Coefficient	1,000	,228*
		Sig. (2-tailed)	,	,014
		N	115	115
	EBR	Correlation Coefficient	,228*	1,000
		Sig. (2-tailed)	,014	,
		N	115	115

*. Correlation is significant at the .05 level (2-tailed).

RMM = Risk management methods

EBR = Elimination of banking risks

Table 5.2.2 Pearson Correlation Coefficient

Correlations

		RMM	EBR
RMM	Pearson Correlation	1	,358**
	Sig. (2-tailed)	,	,000
	N	115	115
EBR	Pearson Correlation	,358**	1
	Sig. (2-tailed)	,000	,
	N	115	115

**. Correlation is significant at the 0.01 level

Concerning the second hypothesis that has been built for this survey is about to examine whether the Risk management process that each bank uses (independent variable) is associated with the company's revenues (dependent variable). Spearman Correlation Coefficient is also appropriate to test this hypothesis. According to table 5.2.3 its value is $r_s=0.224$ and p-value = 0.016. That also indicates a strong (p-value < 0.05) positive relationship. So the null hypothesis H_0 is not accepted and the alternative hypothesis H_1 is accepted. Thus, the more the risk management used by the Greek banks leads in improvement of company's revenues. Table 5.2.4 apposed only suggestively the parametric Pearson correlation coefficient which has the same direction and is also statistically significant in the more strict 0.01 level but is not appropriate in this case.

Table 5.2.3 Spearman Correlation Coefficient

Correlations

			RMP	CR
Spearman's rho	RMP	Correlation Coefficient	1,000	,224*
		Sig. (2-tailed)	,	,016
		N	115	115
	CR	Correlation Coefficient	,224*	1,000
		Sig. (2-tailed)	,016	,
		N	115	115

*. Correlation is significant at the .05 level (2-tailed).

RMP= Risk management process

CR = Company's revenues

Table 5.2.4 Pearson Correlation Coefficient

Correlations

		RMP	CR
RMP	Pearson Correlation	1	,253**
	Sig. (2-tailed)	,	,006
	N	115	115
CR	Pearson Correlation	,253**	1
	Sig. (2-tailed)	,006	,
	N	115	115

**. Correlation is significant at the 0.01 level

5.3 SUMMARY OF THE CHAPTER

This chapter discloses the results that derive from the survey and estimates the findings. At the beginning of this chapter an analysis of the descriptive statistics of the risk management methods and tools that the Greek banks use takes place. Moreover, the benefits that the utilization of these risk management tools offers to the banks are described and analysed in the same way too. Furthermore, the correlation among the dependent and independent variables that test the formulated hypotheses are presented and it is proved that both alternative hypotheses are accepted. This means that the use of risk management by the Greek banks is positively associated by a statistically significant level with the elimination of banking risks and the improvement of company's revenues correspondingly.

CHAPTER 6: CONCLUSION

6.1 CONCLUSION

Banks can not function without taking risk on the one hand, and on the other no organization is immune to risk. Risk management involves the maintenance of losses and the value of the bank to within accepted margins. Types of risk, in general, include: market risk, legal risk, operational risk, liquidity risk and credit risk.

Moreover, each organization's risk changes constantly. While reaction is sometimes necessary, detecting and reacting are insufficient as ways of managing risk. Every organization must learn to anticipate and prevent by implementing effective processes throughout the company so that it proactively identifies, measures, and controls business risk (A. Andersen, 1995).

As is the case with management in general, banking risk management is an ever changing process shaped by general factors, such as the institution objectives, financial trends, and government regulation; and by special factors, such as the structure and cost of liabilities, the structure and returns of assets, the maturity structure of assets and liabilities, and the size and source of the risk assumed by each asset and liability item.

In short, banking risk management will continue to grow from a minor to a major factor in banking management, turning from a ''defensive weapon to an important part of the offense'', to use Meadows's and Mc Clave's words (1996). This means that the bankers must set aside the resources to acquire and use this weapon efficiently and effectively to compete in the globalizing economy.

6.2 MANAGERIAL IMPLICATIONS

The risk management methods and tools that is used by the Greek banks in order to be protected from the potential risks are various and different. It is important to apply each method and tool to the suitable risk because each one is created from different reasons and situations. Risk management is an ever changing process and its evolution tends to be even greatest in the future.

To proceed with, the managers have to train the personnel so as the company to occupy people that are experts and skilful with experiences for management and implementation (Sophron Partners, 2000). These people have to

be capable of thinking and practicing the risk management strategy so as to protect the organization in a developing environment like the one of banking.

6.3 LIMITATIONS OF THE RESEARCH

As far as the design of questionnaire is concerned, due to the lack of experience, it was difficult to ensure that the questionnaires were effectively designed. There might be some misunderstandings in the questions or in the structure of the questionnaire. Another limitation can be the inadequate time in order to conduct the research and to analyse the findings. A research in order to be successful needs a lot of time so as to have a lot of findings and to draw a lot of conclusions.

Moreover, the reduced number of responses from 155 to 115 was another important limitation because it may led to insufficient information gathered and consequently to ambiguous findings and conclusions.

REFERENCE

- ❖ (http://www.geniki.gr/thebank/bank.asp?c=25&m=2).
- ❖ (http://www.eurobank.gr/thebank/bank.asp?c=25&m=2)
- ❖ (http://www.greece.gr/BUSINESS/OnCourseForEMU/GreekBanking.stm).
- ❖ (http://www.statsoft.com/textbook/stathome.html
- ❖ http://www.eede.gr/pdf/risk_pr.pdf
- ❖ http://www.capital.gr/news.asp?Details=578844
- ❖ http://news.kathimerini.gr/4dcgi/_w_articles_economyepix_1_12/05/01_I7064071%3DI7064071%3D%7C01%2601-0501!cod120501$29192.html
- ❖ Andersen A. (1995) ''Managing Business Risks: An integrated approach'', New York: The Economist Intelligence Unit.
- ❖ Angelopoulos P. and Mourdoukoutas P., (2001) ''Banking Risk Management in a Globalizing Economy'', London, Quorum Books Westport, Connecticut
- ❖ Armitage, P. and Berry, G. (1994) *"Statistical Methods in Medical Research",* 3rd ed., Oxford, Blackwell Science.
- ❖ Armitage, P. and Colton, T. (1999*) "Encyclopedia of Biostatistics",* vol. 5, Chichester, John Wiley & Sons
- ❖ Cochran, D. and Dolan, J. (1984) "Qualitative Research: An Alternative to Quantitative Research in Communication", *Journal of Business Communication,* 21(4), p25.
- ❖ ELKE, 2004, "Banking: An Industry Comes of Age", http://www.elke.gr/newsletter/newsletter.asp?nid=181&id=226&lang=1.
- ❖ Ghauri, P., Gronhaug, K. and Kristianslund, I. (1995) "*Research Methods in Business Studies",* United Kingdom, Prentice Hall.
- ❖ Gordon, W. and Langmaid, R. (1988) "*Qualitative Market Research: A Practitioner's and Buyer's Guide",* England, Gower Publishing Company Limited.
- ❖ Hardouvelis G., Lekkos I. and Simintzi E. (2006) ''Greek Banking Review; Annual Report on the Greek Banking Sector'' http://www.eurobank.gr/newsletter/newsletter.asp?nid=181&id=226&lang=1.
- ❖ Houndmills, Basingstoke, Hants (1993) ''Credit risk of financial instruments'', Macmillan
- ❖ Joël Bessis. (2002) "Risk Management in Banking", 2nd ed. , London, John Wiley & Sons, LTD

- Kimball R., (1997) ''Innovations in Performance: Measurement in Banking''. New England Economic Review (May-June), p.23-38.

- Lehtonen, R. and Pahkinen, E. (2004) "Practical Methods for Design and Analysis of Complex Surveys (Statistics in Practice)", 2nd ed., London, John Wiley & Sons.

- Malhorta, N. and Birks, D. (2003) *Marketing Research: An Applied Approach",* 2nd ed., New York, Prentice-Hall Inc

- Mariampolski, H. (2001) "Qualitative Market Research: A Comprehensive guide", London, Sage.

- McCullough, D. (2004) "Quantitative vs. Qualitative Marketing Research: Position Paper", http://www.macroinc.com/html/art/s_qua.html.

- Matthews K. and Thompson J., (2008) ''The Economics of Banking'', 2nd ed., John Wiley & Sons, LTD, pp. 210-241

- Eales B., (1995) ''Financial Risk Management'', McGraw-Hill Book Co. Europe

- Pallant, J. (2001) *"SPSS Survival Manual",* 2nd ed., Open University Press, Great Britain.

- Panigyrakis, G., Theodoridis, P. and Veloutsou, C. (2002) "All Customers are not Treated Equally: Financial Exclusion in Isolated Greek Islands", *Journal of Financial Services Marketing,* 7(1), p54-66.

- Proctor, T. (2003) *"Essentials of Marketing Research",* 3rd ed., United Kingdom, Pearson Education Limited.

- Pyle H. David, (1997) Research Program in Finance, Working Paper RPF-272 '' Bank Risk Management: Theory'', University of California, Berkeley http://haas.berkeley.edu/finance/WP/rpflist/html

- Sekaran, U. (2003) *"Research Methods for Business: A Skill Building Approach",* 4th ed., United States, John Wiley & Sons Inc.

- Russell Sage Foundation, (1995) ''Risk taking: a managerial perspective'', New York

- Saunders, M., Lewis, P. and Thornhill, A. (2003) *"Research Methods for Business Students",* 3rd ed., England, Pearson Education Limited

- State Bank of Pakistan. (2007) Risk Management; Guidelines for Commercial Banks & DFIs.

APPENDIX A

<u>**QUESTIONNAIRE**</u>

Dear participant,

My name is Karaviti Stavroula and I am a postgraduate student at the University of Macedonia. I am conducting a research about the risk management for the Greek banking industry. The main objective of this research is to identify whether Greek banks are applying risk management effectively and in which tools they are use. I would like you to help me accomplish this research by answering this questionnaire.

Thank you for your time.

Please answer the following questions by ticking ☑ the appropriate box/boxes.

1. What are the banking risks that your bank consider are the most important to focus on in order to protect the organization from adverse consequences?

     ☐ Credit Risk
     ☐ Liquidity Risk
     ☐ Market Risk
     ☐ Operational Risk
     ☐ Foreign Exchange Risk
     ☐ Interest Rate Risk

2. Does your bank believe that risk management should be a primary or a secondary function of a banking organization?

     ☐ Primary
     ☐ Secondary

3. Which methods and techniques does your bank use in order to make risk analysis before and after a risk occurred?

     ☐ Market survey
     ☐ Prospecting

- ☐ Research and Development
- ☐ Business impact and threat analysis
- ☐ PESTLE (Political Economic Social Technical Legal Environmental)
- ☐ BPEST (Business, Political, Economic, Social, Technological) analysis
- ☐ Decision taking under conditions of risk and uncertainty and Real Option Modelling
- ☐ SWOT analysis (Strengths, Weaknesses, Opportunities, Threats)
- ☐ Statistical inference
- ☐ Dependency modelling
- ☐ Event tree analysis
- ☐ Business continuity planning

4. How does your bank benefit from the management of liquidity risk?

- ☐ Can satisfy its obligations in case of crisis
- ☐ Meet its requirements to Central Bank for liquidity
- ☐ Borrows with low interest rates
- ☐ Is able to unwind and hedge a position
- ☐ Ability to contract new loans and other investments for profitability

5. Which techniques does your bank use in order to identify its risks?

- ☐ Business studies which look at each business process and describe both the internal processes and external factors which can influence those processes
- ☐ Auditing and inspection
- ☐ Risk assessment workshops
- ☐ Scenario analysis
- ☐ Industry benchmarking
- ☐ Brainstorming
- ☐ Incident investigation
- ☐ Questionnaires

6. How does your bank benefit from the management of operational risk?

    ☐ Limited frauds due to customers and personnel

    ☐ Adequate function of systems and IT

    ☐ Reduced internal wrongs which affect the net income

    ☐ No obstacles to other bank activities

    ☐ No linkage of confidential information

    ☐ No violation of duties

7. How does your bank benefit from the management of market risk?

    ☐ Limit the risks of other associated risks such as interest rate, foreign exchange or liquidation risks

    ☐ Be immunized against adverse economic forces

    ☐ Be protected from high cost of borrowing financial products

Section B:

Please check ☑ the appropriate box concerning your agreement or disagreement for the following statements:

1= Strongly Disagree

2= Disagree

3= Neither agree or Disagree

4= Agree

5= Strongly Agree

8. Your bank follows a strict risk management process in order to be immunized from adverse consequences.

    1= Strongly Disagree
    2= Disagree
    3= Neither agree or Disagree
    4= Agree
    5= Strongly Agree

1	2	3	4	5

9. Retail banking (front office) should involve aggressively in the risk management process.

1	2	3	4	5

10. Specialized staff and new methods are used by the bank to enhance the risk management process.

1	2	3	4	5

11. The risk management process in your bank is handled by a specified sector.

1	2	3	4	5

12. Due to incident investigation (the previous experience of a risk) your bank has faced effectively the risks that after occurred.

1	2	3	4	5

13. Due to the use of advanced Risk Management, your bank has raised its revenues.

1	2	3	4	5

14. Banking risks affect the profitability of the bank.

1	2	3	4	5

15. Banking risks are in direct relationship with the viability of a bank.

1	2	3	4	5

APPENDIX B
THE RESULTS OF SPSS
FREQUENCY TABLE

V1_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1,00	115	100,0	100,0	100,0

V1_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	23	20,0	20,0	20,0
	1,00	92	80,0	80,0	100,0
	Total	115	100,0	100,0	

V1_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	14	12,2	12,2	12,2
	1,00	101	87,8	87,8	100,0
	Total	115	100,0	100,0	

V1_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	38	33,0	33,0	33,0
	1,00	77	67,0	67,0	100,0
	Total	115	100,0	100,0	

V1_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	101	87,8	87,8	87,8
	1,00	14	12,2	12,2	100,0
	Total	115	100,0	100,0	

V1_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	67	58,3	58,3	58,3
	1,00	48	41,7	41,7	100,0
	Total	115	100,0	100,0	

V2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	115	100,0	100,0	100,0

V3_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	115	100,0	100,0	100,0

V3_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	33	28,7	28,7	28,7
	1	82	71,3	71,3	100,0
	Total	115	100,0	100,0	

V3_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	88	76,5	76,5	76,5
	1	27	23,5	23,5	100,0
	Total	115	100,0	100,0	

V3_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	18	15,7	15,7	15,7
	1	97	84,3	84,3	100,0
	Total	115	100,0	100,0	

V3_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	86	74,8	74,8	74,8
	1	29	25,2	25,2	100,0
	Total	115	100,0	100,0	

V3_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	33	28,7	28,7	28,7
	1	82	71,3	71,3	100,0
	Total	115	100,0	100,0	

V3_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	41	35,7	35,7	35,7
	1	74	64,3	64,3	100,0
	Total	115	100,0	100,0	

V3_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	50	43,5	43,5	43,5
	1	65	56,5	56,5	100,0
	Total	115	100,0	100,0	

V3_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	65	56,5	56,5	56,5
	1	50	43,5	43,5	100,0
	Total	115	100,0	100,0	

V3_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	33	28,7	28,7	28,7
	1	82	71,3	71,3	100,0
	Total	115	100,0	100,0	

V3_11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	48	41,7	41,7	41,7
	1	67	58,3	58,3	100,0
	Total	115	100,0	100,0	

V4_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	22	19,1	19,1	19,1
	1	93	80,9	80,9	100,0
	Total	115	100,0	100,0	

V4_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	54	47,0	47,0	47,0
	1	61	53,0	53,0	100,0
	Total	115	100,0	100,0	

V4_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	19	16,5	16,5	16,5
	1	96	83,5	83,5	100,0
	Total	115	100,0	100,0	

V4_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	76	66,1	66,1	66,1
	1	39	33,9	33,9	100,0
	Total	115	100,0	100,0	

V4_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	30	26,1	26,1	26,1
	1	85	73,9	73,9	100,0
	Total	115	100,0	100,0	

V5_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	20	17,4	17,4	17,4
	1	95	82,6	82,6	100,0
	Total	115	100,0	100,0	

V5_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	68	59,1	59,1	59,1
	1	47	40,9	40,9	100,0
	Total	115	100,0	100,0	

V5_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	43	37,4	37,4	37,4
	1	72	62,6	62,6	100,0
	Total	115	100,0	100,0	

V5_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	52	45,2	45,2	45,2
	1	63	54,8	54,8	100,0
	Total	115	100,0	100,0	

V5_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	71	61,7	61,7	61,7
	1	44	38,3	38,3	100,0
	Total	115	100,0	100,0	

V5_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	77	67,0	67,0	67,0
	1	38	33,0	33,0	100,0
	Total	115	100,0	100,0	

V5_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	60	52,2	52,2	52,2
	1	55	47,8	47,8	100,0
	Total	115	100,0	100,0	

V5_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	74	64,3	64,3	64,3
	1	41	35,7	35,7	100,0
	Total	115	100,0	100,0	

V6_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	7,0	7,0	7,0
	1	107	93,0	93,0	100,0
	Total	115	100,0	100,0	

V6_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	51	44,3	44,3	44,3
	1	64	55,7	55,7	100,0
	Total	115	100,0	100,0	

V6_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	21	18,3	18,3	18,3
	1	94	81,7	81,7	100,0
	Total	115	100,0	100,0	

V6_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	77	67,0	67,0	67,0
	1	38	33,0	33,0	100,0
	Total	115	100,0	100,0	

V6_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	66	57,4	57,4	57,4
	1	49	42,6	42,6	100,0
	Total	115	100,0	100,0	

V6_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	46	40,0	40,0	40,0
	1	69	60,0	60,0	100,0
	Total	115	100,0	100,0	

V7_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	115	100,0	100,0	100,0

V7_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	27	23,5	23,5	23,5
	1	88	76,5	76,5	100,0
	Total	115	100,0	100,0	

V7_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	36	31,3	31,3	31,3
	1	79	68,7	68,7	100,0
	Total	115	100,0	100,0	

APPENDIX C

DESCRIPTIVE

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
RMM	115	2,00	7,00	4,8870	1,52618
EBR	115	11,00	20,00	17,4609	2,03602
CR	115	6,00	10,00	8,8783	1,01002
Valid N (listwise)	115				

ELIMINATION OF BANKING RISKS

Statistics

EBR

N	Valid	115
	Missing	0
Mean		17,4609
Std. Error of Mean		,18986
Median		18,0000
Mode		18,00
Std. Deviation		2,03602
Minimum		11,00
Maximum		20,00

EBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11,00	2	1,7	1,7	1,7
	12,00	4	3,5	3,5	5,2
	13,00	3	2,6	2,6	7,8
	14,00	2	1,7	1,7	9,6
	15,00	3	2,6	2,6	12,2
	16,00	11	9,6	9,6	21,7
	17,00	18	15,7	15,7	37,4
	18,00	34	29,6	29,6	67,0
	19,00	28	24,3	24,3	91,3
	20,00	10	8,7	8,7	100,0
	Total	115	100,0	100,0	

COMPANY'S REVENUES

Statistics

CR

N	Valid	115
	Missing	0
Mean		8,8783
Std. Error of Mean		,09418
Median		9,0000
Mode		9,00
Std. Deviation		1,01002
Minimum		6,00
Maximum		10,00

CR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6,00	3	2,6	2,6	2,6
	7,00	7	6,1	6,1	8,7
	8,00	27	23,5	23,5	32,2
	9,00	42	36,5	36,5	68,7
	10,00	36	31,3	31,3	100,0
	Total	115	100,0	100,0	