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BASSEL III: How we reach in this point

Factors that affecting capital adequacy

Case of Greek Banks

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attribute the sources according to the Regulations set in the Student's Handbook.

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Abstract

This dissertation was written as part of MSc in Banking and Finance at the International Hellenic University

This dissertation he specific work consists of 6 modules.

The first section reviews the financial crisis and its consequences on the financial system.

In the second section there is an approximation of the capital adequacy ratio, a definition of calculation and the risks it contains.

The third section refers to the Basel Committee as well as the development from Basil I to Basil II and end to Basel III for the safeguarding of the financial system.

The fourth section includes the analysis of the main financial indicators of the Greek banks of the published financial statements of each bank.

The fifth section analyzes the capital adequacy ratio as it is presented in the published statements of each bank.

Lastly, the regression analysis is made in order to find any correlations between the financial ratios of the Greek banks and the capital adequacy ratio, as well as the conclusions.

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INTRODUCTION

In a traditional financial intermediation, banks provide liquidity to the overall economy through transactions on their balance sheets, creating a situation of non-affiliation of their assets and liabilities. This activity of maturity transformation is possible because the banks are supposed to be better able than their depositors to make the selection and monitoring of loans and borrowers and the diversification of their asset portfolio and because of this, banks are able to reduce information asymmetries in credit markets.

Before the financial crisis of 2007 banks are performing nicely showing higher profitability and lend at cheaper costs to customers but soon this reduction in liquidity created trouble for many governments and financial institutions because regulatory bodies and governments provides huge bailout packages to financial institutions to overcome shortage of liquidity. The changing conditions of markets shows a challenge to regulatory bodies that how to manage liquidity and credit allocation.

In times of debt crisis, as is the case today, the question arises whether Greek banks are capitalized enough to withstand the effects of the crisis. The above is defined as the existence of sufficient own funds by the banks, in order to be able to respond to the economic crisis, without requiring the intervention of the Financial Stability Fund by offering state funds to support them.

The purpose of the work is to review the financial situation of the domestic and global financial system and to analyze the factors that led to the need for regulatory intervention measures with the creation of regulatory frameworks of Basel I, Basel II and Basel III, with a view to addressing systemically the risks of the financial system by imposing minimum capital adequacy requirements to prevent large banks from taking risks and to protect both depositors and themselves.

In addition, this work aims at analyzing the method of calculating the capital adequacy of banking institutions and the financial analysis of the main Greek banks to detect the financial factors affecting the capital adequacy of banking institutions.

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Chapter 1

The financial crisis and its consequences for the Greek banks

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1.1 Review of the Financial Crisis

Paul Krugman in his book, The Return of Depression Economics (2009) supports the view that the global economic crisis started by America in 2008 was an almost-anticipated and to a great extend predictable. This would, of course, be the case if the signs were not ignored omen of the past. In modern economic history there have been several cases countries which have suffered a slowdown in their economic activity, and have reached (or have passed) the threshold of recession. The most characteristic examples of countries were Mexico (1995), Japan (1996) and Argentina (2002).
The current economic crisis seems to have largely paid off reputable economists and analysts, on the one hand because it happened abruptly after one seven years of growth and development and why it took place in America while everyone expected a slowdown in the global economy started from emerging markets. But before we look at why, how and how what went wrong, let's take a look at the events that preceded it. After 2001 the US and most advanced economies have been characterized by a period of intense expansionary economic policy to ward off recession. The Federal Reserve, for example, reduced the discount rate almost 27 times between 2001 and 2003 (Lin, 2008). The low interest rates, facilitated by the huge commercial one's surpluses that China and other countries used for the market US government bonds, encouraged rapid credit expansion. The simultaneous increases in property prices have encouraged further credit expansion, in particular through mortgages. In the US, the mortgage market loans with greater risk to households without the basic means to repay the loans took enormous dimensions. The American lenders, above all the Fanny Mae and Freddie Mac foundations, securitized these loans high risk, which they then sold to the entire financial sector system as assets. And this because of a combination of insufficient regulation and financial innovation. The second made it difficult for other financial institutions to assess the risks of these loans, which led to an increase in high-risk housing loans (Naudé, Wim 2009). Until the summer of 2007 the ever-increasing breach of the obligations on mortgages and the increasing number of seizures in the US, pointed out that the high-risk loan market was in crisis. The house and stock prices began to plummet, which reduced the value of household wealth in the US by trillions. OR solvency of Fanny Mae and Freddie Mac as well as some well-known international financial institutions, was threatened by these price falls of houses and shares.
On September 7, 2008, the US government nationalized Fanny Mae and Freddie Mac. A year later, on September 15, 2008, Lehman Brothers declared bankruptcy, the largest in the history of the United States[1]. This led to a broad financial panic, with a large-scale sale of shares. Central to the sudden decline in the availability of credit, mainly in the interbank market, which has spurred the collapse of many businesses, is that which Taylor (2009) describes as "the problem of Queen of Spades problem. This refers to the fact that the titles they contained high risk housing loans have been

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[1] http://www.fmancialpost.com/news/storv.html?id=790965

scattered throughout the spectrum the financial system and the various institutions did not know where they were.

Banks in Europe were immediately affected by their exposure to US financial markets. On October 8, the United Kingdom government again capitalized eight banks in the country, while on October 15th followed an agreement between the eurozone countries to finance further troubled banks and provide interbank guarantees loans (Naude,2009). It is obvious that the causes that led to this situation and helped to keep it going and swelling was deeper and bigger degree was due to market rigidities and of a structural nature omissions and oversights.

1.2 The Causes of Financial Crisis

There is generally agreement among analysts that four are the main categories of factors considered to be contributed to the creation of the Finance Crisis 2008:

A) Global macroeconomic imbalances:

Over the last thirty years, China has achieved one excellent economic growth through the exports of industrial goods in the US. These exports have led to huge China's trade surpluses, surpluses which, however, did not feed the domestic demand, but placed in bonds US and other US dollar securities kept the dollar at relatively high levels on the contrary, US lending rates in relatively low levels. This development has led in strengthening liquidity and lending in the United States but also in its containment inflation. For their own reasons neither the European Union (problems competitiveness), nor Japan (low domestic demand) were able to intervene dissuasive.

B) Excessive Credit Expansion and Leverage:

The last fifteen years of credit expansion in the US and most developed economies has been impressive, not only from the relatively large increase of the monetary base, but also by the incredible leverage inside and outside of balance sheets of credit institutions and notably investment banks and hedge funds. This leverage, as in others financial crises, he mortgaged financial stability and left it system exposed to systemic risks.

Annex 1: Deficit/Surplus of Current Accounts Transactions % of GDP

Defict/Surplus of Current Accounts Transactions % of GDP					
	2007	2008	2009	2010	2014
Development Economies	-0,90%	-1,30%	-0,70%	-0,40%	-0,30%
U.S.A	5,20%	-4,90%	-2,60%	-2,20%	-2,70%
Eurozone	0,30%	-0,70%	-0,70%	-0,30%	0,50%
E.U	-0,50%	-1,10%	-0,80%	-0,50%	n.a
Brazil	0,10%	-1,80%	-1,30%	-1,90%	-0,80%
Russia	5,90%	6,10%	3,60%	4,50%	2,90%
India	-1,00%	-2,20%	-2,20%	-2,50%	-1,80%
China	11,00%	9,80%	7,80%	8,60%	8,40%
Japan	4,80%	3,20%	1,90%	2,00%	1,50%
Greece	-14,20%	-14,40%	-10,00%	-9,00%	-6,80%
Sources	IMF, World Economic Outlook Oct. 09/ E.U: European Commision: European Economic Forecast Nov 09				

C) Asymmetric Information and Problems Authorizing officer:

The existence of asymmetry information on structured products (CDOs - Collateralized Debt Obligations, CDSs Credit Default Swaps, etc.) provided the opportunity their publishers to undertake excessive risk in an opaque way, risk which was not invoiced properly nor was adequately compensate At the same time, their pay systems commercial banks, investment banks, insurance companies and hedge funds were not characterized by compatibility incentives between the strains and them shareholders of their companies, as a result also to take excessive risks by people who would not have the costs of their failed choices.

D)Regulatory gaps and incomplete supervision:

From 1999 onwards, both in the US and other countries was an aversion, which he had political-ideological background, in the implementation (mainly by the Fed and SEC) regulators measures with regard to its risk uncontrolled credit expansion and leverage. At the same time, the financial innovations, among them including those mentioned above, quickly created new markets without but be accompanied by the appropriate one's accounting rules and the corresponding regulatory and supervisory framework.

Now we know the coexistence of these four reasons was something like the story of the well-known work "The Perfect Storm ". Undoubtedly, its consequences coexistence has had multiple effects of those that would have each cause alone. So, the result of this coexistence was a series of huge bubbles in various natural and financial capital (real estate, commodities, shares, derivatives).

"Bubble" in the market of a real or financial capital is one a situation where the price of that good is not explained by rational economic forces. Although the economists cannot predict when it breaks a bubble, it is lawful, that all the bubbles Sometimes they break.

1.3 Financial Crisis and Financial System

Financial institutions play a decisive role in the economy, contributing to its smooth functioning. This is due to the fact that they help address the problems of reverse choice and moral hazard in the financial market. More specifically, the banking system ensures minimization of the phenomenon of Free Rider through:

- The acquisition of information and their exploitation to make profits.
- The choice of borrowing after evaluating the best businesses.
- The supervision of borrowing companies.

Financial institutions are indissolubly linked to the course of the economy as a whole, making them liable to a significant extent for the economic course, but at the same time vulnerable to times of crisis due to specific features (Gavin, Hausmann,1998)

- The high leverage of banks as a result of their activity.
- The reduced liquidity. due to large discrepancies in lending and deposits and inadequate matching of their likelihood.

- The creditworthiness and confidence enjoyed by a banking organization and the whole sector in the market.
- The risk of the mass withdrawal of capital from the banking system in times of crisis and the coverage of deposits by the state.
- The regulatory framework to which banking institutions are subject and the weaknesses of the supervisory bodies.

Recent financial crisis of 2001 reduces the liquidity of major financial institutions and central banks support public sector banks by injecting the liquidity in the system. However, this strategy did not increase growth in the credit, but it increases hoarding of cash by financial institutions for covering their huge losses such as Federal reserve inject in the financial system, but it did not lead towards stimulation of credit in the economy (Cornett et al. 2010)

1.4 The impact of financial crisis in the Greek banking sector

For the Greek economy, the global financial crisis has been the cause of the debt crisis. Although the world economy showed the first signs of recovery in the first quarters of 2010, the Greek market is still suffering from negative growth rates, rising interest rates borrowing and declining economic activity that led to it Greek State in its membership of the International Support Facility Monetary Fund.

In this unfavorable environment, Greek banks could not remain unaffected by this crisis. In particular, banks are invited to operate in an environment with major challenges, such as the further reduction in growth rates, the possibility of raising loans to delays and difficulties in the money and capital markets. The above require concerted efforts by international organizations, governments and governments central banks to deal with the crisis. The organizations most affected by the crisis were concerned real estate exploitation, without missing problems in banking or insurance services. The real problems of the crisis broke into Greek economy, with rising interest rates and conservatism financial system to affect borrowers, small and medium-sized enterprises, consumer buying behavior and other aspects of the market, with direct impact on the economy.

To ensure the stability of the banking system and the to prevent crises, it is necessary to adopt a series of preventive measures, as well as intrusive and protective

mechanisms. Total of these measures and mechanisms constitute the "Protective net banking system » [2]

The Greek banks, despite being indifferent to their initial stages crisis, on the one hand, due to their low exposure to toxic products, and on the other due to the comparatively smaller financial exposure to the European one average as a result of the lower loan-to-deposit ratio, ultimately have entered a long period of exclusion from the international capital markets. This unprecedented development has had a negative consequence in their operation and even threatened their survival after five years (2002-2007) where the Greek banks were developing rapidly, both at a geographic level with the mainly in Southeastern Europe, as well as in a product level with their entry into new markets for financial products.[3]

One of the factors that influenced their success was the wholesale financing. It is a fact that the funding of the Greek banks from the markets followed a positive course, starting from 1999, they set a convergence path with the average of European sizes banks. The possibilities for raising medium-term liquidity were strengthened as the markets knew Greek credit risk. [4]

Another qualitative feature of the form of funding of Greek banks was their access to easy, fast and cheap lending from other banks at 60% and from Central and North investors Europe accounts for 70% of their wholesale funding. Their success at a particular investment audience has thrown them to almost all of them investors with similar characteristics.

With a delay, all major Greek banks took over initiatives to diversify their investment base towards new markets and new products. More specifically, they began to examine international proposals businesses to enter the American market, to attract certified investors. The initial hesitation of the banks for the activating themselves as foreign publishers to more rigorous, controlled and accurate borrowing markets outside Europe declined when European markets appeared signs of saturation, defining the absorption capacity of Greek state and bank bonds and expanding their credit margins in 2007. [5]

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[2] Gortzos,Ch, Bank environment: Bank Law, Patra, Greek Open University

[3] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011

[4] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011

[5] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011

However, in the autumn of 2007 with the diffusion of market problems of US mortgage loans on the capital markets, markets showed signs of introversion, as investors' confidence hit with to avoid taking credit outside the borders of their country. A consequence of the collapse of the structured market financing was the postponement of all securitizations, resulting in discourage self-financing of assets.[6]

In early 2008, in their attempt to return to traditional financing markets, Greek banks faced difficulties, since confidence among credit institutions was at a low level due to of the uncertainty about their robustness. The interbank market was almost, and the only available short-term sources of funding were borrowing repos and trading notes. In the medium term, private placements could not make up for the funding gap, with banks are turning to debt issues in the form of loans. He innovation prevailed because investors ranked them in the category "Loans and requirements "and therefore avoided valuing them at a time with increased volatility in securities.

The expansive policy of Greek banks in Southeastern Europe continued at the same pace and absorbed much of the stock of their cash to serve needs such as

- Asset pooling of subsidiaries' banks and the allocation of mandatory reserves to local central banks,
- Regular capital support, and
- The ongoing coverage of operating costs.

This triptych was sometimes accompanied by a forced conversion of euro to local currency of each country, resulting in a liquidity commitment in countries with several problems in the functioning of the financial markets. Therefore, 65% of their assets were, on average, financed by the parent bank in Greece through a fully centralized process that focused to traditional investors in Europe.

Then is Lehman Brothers bankruptcy in September 2008, reversing data in markets. This accelerates action by the supervisory authorities, which up to that point seemed to believe in process of self-regulation and avoided interference with capital markets. Interest rates on interbank markets incorporate credit risk counterparty, departing from the European interest rate Central Bank. Gradually the interbank market becomes inactive, while the bond issues are postponed[7].

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[6] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011
[7] Union of Greek Banks "Greek Bank System 2010" June

Amid these developments, depositors-investors are losing out confidence in the banking system. Banks are defending deposits with a significant increase in their margins amid continuous releases of the key interest rate of the European Central Bank, which aims at alleviating borrowed from the basic cost of financing. All over Europe looking for ways to secure retail deposits. [8]

Initially the problem is handled with state guarantees of a certain amount per depositor, in order to avoid mass evasion of deposits. After all it is decided to establish programs to support and strengthen the economies liquidity of banks by governments, which take the form of government guarantees to banks, both in terms of capital and funding.

Banks incorporate guarantees in new versions in order to remove investors' doubts and reduce borrowing costs. Against Consequently, structured bond markets (such as securitizations), such as unsecured bond markets and high-risk bond markets remain inactive until 2009. Then, with the successful announcement of results from banks globally, expectations for lifting it uncertainty and normalization are renewed.

Greek banks are stepping up their efforts for her attracting deposits as the only credible source of funding. The new deposit margins range for the first time at levels above 1.50%. At the same time, they accelerate their securitization of assets in order to present them as a pledge to the European Central Bank and freeze any development and investment plans. In its field wholesale markets, markets become inhospitable for Greek banks despite the guarantees of the state, due to low credit rating. Thus, we have a significant increase in credit risk [9].

Meanwhile the European Central Bank, trying to revive the interbank market, launches a supply period liquidity up to one year in mid-2009. Surprisingly, its strong appeal confirms pessimistic estimates of poor performance financial markets and the expectation that margins will not deviate further. In order to facilitate the lending of banks, European Central Bank promotes the relaxation of eligibility criteria of the pledges to allow a number of low pledges credit ratings are accepted in its tanks.

The borrowing of European banks by the European Central Bank has been declining since the end of 2009, as its lending rate European Central Bank is no longer so attractive compared to the benchmark rates on the interbank market, while at the same time, it is observed easing their obligations due to deletion of their balance sheet. By contrast, Greek banks' lending is rising due to the need refinancing of older maturing bonds as well as

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[8] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011
[9] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011

investment choices resulting from their increased participation in its publications of the Greek State.

The fact is that the Greek banks depend on the ECB at the beginning of 2010 exceeds the tolerable limits compared to their size, receives reviews from analysts, supervisors and credit houses assessment. At the same time, the Greek economy is entering new adventures with revealing a huge fiscal problem. This fact was the beginning of a series of unfavorable developments for Greek banks, dictating the redesign of provisions. The final one Liquidity cuts in the Greek banking system are leading to strong growth competition to attract client deposits. The majority of them of liabilities of Greek banks (balances of accounts, futures, repos and interbank lending) is adversely affected, proving that the tanks are linked. Foreign banks they close the funding lines, but also the credit limits for the whole of financial products with Greek banks and require a lot high collateral for maintaining their exposure in Greece. Even the ones liquidity reserves in Southeast Europe is not feasible to repatriated due to commitments to local governments and the International Monetary Fund.

The international community is concerned about the viability of the bank system in Greece, since it is characterized by particularly high costs financing, such as deposits, and inherent inability to de-leverage. This fact, coupled with a series of downgrades from the houses credit rating, leads investors to flee. The plans of Greek banks are overthrown and led to full dependence on the Greek banks European Central Bank for the entire financing, by vehicle Greek State guarantees for which there is favorable treatment from the European Central Bank. Liquidation of assets is only possible in highly diversified loan portfolios and if not have a correlation with Greece. Traditionally, however, they occupy little share in the balance sheet of Greek banks. The situation seems to be is out of control when it comes to bankruptcy or restructuring public debt of the country, resulting in the definitive escape of deposits to the external and the decline of deposits in the subsidiary banks of Greek groups in Southeastern Europe.

Now, the course of Greek banks is in line with developments the economic and financial issues that plague Greece. The Greek banks are now able to turn only to the Europeans Central Bank, which is increasingly burdened with funding banks from the weak economies of Europe. Establishing one a series of measures to save the economies of Europe in mid-2010 slows the surge of capital flight. For Greece, the measures put it on country in indirect protection from creditors, but they also raise doubts about it if the grace

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period and fiscal measures can help the Greek economy and help restore it to the markets. The escalation of these measures through the acceptance of Greek government bonds by the European Central Bank independently credit rating, ensures the sufficiency of the Greek pledges banking system. Greek banks are increasing their dependence on the European Central Bank and the ominous predictions of analysts for failure to finance outside the European Central Bank is evolving in self-fulfilling prophecy.

This trend is prevailing to date and does not seem to change directly. Indicative is that the total borrowing of Greek banks by the European Central Bank reaches 95 billion euros in early 2011 versus EUR 50 billion at the end of 2009. Dependence on the European Central Bank now covers 18% of the Greek banks' assets compared with 3% for all banks in Europe. The situation is still happening more difficult with the ranking of Greece and, by extension, Greek banks, in the category of unclassified junk most credit rating agencies. Downgrades have impact and funding through the European Central Bank with two ways. Firstly, the valuation of Greek pledges in the European Central Bank worsens and secondly, haircuts stagger. This one reality presses further their balance sheets, because it leads to a significant financing gap and, on the other hand, exacerbates the tactical problem replenishing the amount of pledges required to be reserved for adequate coverage of the nominal amount of borrowing by the European Central Bank [10]

1.5 Ways of Central Crisis Response to the World Financial System

The international community, in the 2008 crisis, reacted in a coordinated fashion intervention that have sought to mitigate and reduce the shocks adverse effects on the real economy[11]

Almost all countries reacted with a reduction in interest rates and efforts to do so increased liquidity, through guarantees given to banks, for strengthening their capital base and removing them devaluated assets. At the same time, measures have been implemented expansionary fiscal policy to boost business. The crisis has highlighted, among other things, its inadequate management procedures liquidity and bank exposures worldwide. The danger liquidity has fled the regulatory framework

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[10] Michalopoulos,G "Financing Greek Banks during crisis" Alpha Bank,2011

[11] Provopoulos,G 2009 "The two Global Crisis and The Greek Economy" presentation at the Conference of the Hellenic Parliament Foundation for the Parliamentary and Democracy 12/11/2009

internationally, unlike the market risk and credit risk under strict supervision. They are indicating that operational and potential liquidity ratios as well medium-term finance for assets were rarely announced and were analyzed by the banks because, in any case, they considered the retention liquidity surplus constitutes a premium that significantly net interest margin. At the same time, international regulators have provided particular flexibility in credit institutions in terms of the asset structure; and liabilities, as the perception that large banks were fairly well established mature to protect themselves. This fact is one a major failure of the financial system to detect, yes process, measure and address liquidity risks; and financing. Indeed, the crisis taught that the range of risks in financing of banks, which may result from combinations of events and developments, was largely underestimated. The stability of the international financial system has come under questioning at the peak of the crisis.[12]

More in particular, there was a serious risk of its collapse. One way of surveillance under the current global crisis, solutions are being sought at national and international level, which will be the trigger for it reverse the unfavorable climate and help the economy get into developmental trajectory. The initiatives taken so far at international level since the bankruptcy of Lehman Brothers, include rescue packages, warranty and banking system security, undervalued redemption programs bank balance sheet data, as well as corporate purchase bonds from state governments in an attempt to come back confidence and a smooth flow of capital into the market. The new rules are aimed at strengthening the world financial system and its more efficient operation. Many argue that greater control will mean an increase in functionality costs for banks and limiting their ability to provide loans in businesses and households. The initiatives to date have been to provide liquidity to the market, facilities to financial institutions, as well as state and local markets corporate bonds while balancing the pressures that it is taking financing of states and large enterprises. It is also worth to it is reported that over the last few years many governments have recruited government intervention in order to protect their domestic products and preserve jobs.

In order to strengthen the banking system, we need the Community institutions to take forward international initiatives to strengthen the regulatory environment frame. These initiatives are particularly relevant[13]

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[12] Chardouvelis, G.A 2009, "The financial crisis and the future of world economy", Eurobank EFG Economic Research: The crisis 2007-2009: The Causes, Treatment and Perspectives, Vol. 4, No. 8, pp. 19-43.
[13] Hellenic Bank Association, (2010), "The Greek banking system in 2009" Athens

- Strengthening the regulatory framework governing capital, the adequacy of credit institutions, such as the Covenant of the Basle Committee (Basel III).

- The revision of the remuneration of directors of listed companies,

- The revision of the regulatory framework for its misuse market, with the main aim of extending their scope its provisions and in unregulated markets until now,

- The assignment of Rating Bodies to a specific regulatory body; and supervisory framework,

- Strengthening the regulatory framework governing their transparency capital market and risk management; and

- The reform of the European supervision framework financial system.

At the end of 2010, the European Parliament and the Council adopted three Regulations with which the three so called "European Supervisory Authorities" for the enhancing the effectiveness of micro-prudential oversight of operator's financial services in the European Union [14]. The European Banking Authority (EBA) under Regulation (EC) 1093/20102

- The European Insurance and Occupational Pensions Authority ("European Insurance and Occupational Pensions Authority "or" EIOPA "), under the Of Regulation (EC) 1094/20103 and

- the European Securities and Markets Authority ("European Securities and Markets") Markets Authority "or" ESMA ") under Regulation (EC) 1095/2010.

In recent years, banks have been granted state guarantees, and in particular government bonds for the purpose of raising liquidity from the European Central Bank Bank. At the same time, the State has strengthened its capital adequacy banks with issuance and delivery to special bond banks against the State has preferential shares of banks at an annual cost of 10% for banks. The capital adequacy of Greek banks is satisfactory, despite the important predictions they have already made to deal with the unavoidable increase in bad and non-performing loans. This because the shareholders of the banks contributed decisively to the capital payments made since 2009.

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[14] Association of Greek Banks, (2011), "The Greek banking system in 2010" June

On top of all this, Greece's debt, even under the International Monetary Fund's mild assumptions, is on a non-convergent path even with the perceived "austerity" measures. Bubble math is easy. Hide all the names and just look at the numbers. If debt looks as if it will explode as a percent of G.D.P., then a spectacular collapse is in the cards. (Boone P.-Johnson S. 2010)

CHAPTER 2

CAPITAL ADEQUANCY OF BANKS

2.1 Definition of capital adequacy

The prices of financial instruments have fluctuated significantly resulting in the volatility of the market value of bank capital. As a result, the need for a commonly agreed capital adequacy framework that would weaken the capital base and facilitate comparability at international level. The "Basle Committee" (centered in the Bank for International Settlements), which was originally established in 1974, is a committee that represents central banks and financial supervisory authorities of the major industrialized countries (the G10 countries). The committee concerns itself with ensuring the effective supervision of banks on a global basis by setting and promoting international standards. Its principal interest has been in the area of capital adequacy ratios. In 1988 the committee issued a statement of principles dealing with capital adequacy ratios. This statement is known as the "Basle Capital Accord". It contains a recommended approach for calculating capital adequacy ratios and recommended minimum capital adequacy ratios for international banks. The Accord was developed in order to improve capital adequacy ratios (which were considered to be too low in some banks) and to help standardize international regulatory practice. It has been adopted by the OECD countries and many developing countries

2.2 Banking Capital Basis

In general, we can distinguish three different concepts of capital:

• Accounting funds: funds that are shown in the balance sheet and based on internationally accepted accounting rules.

• Supervisory capital: the funds the same as under the prudential rules.

• Capital at risk or financial funds: the funds needed to absorb unexpected losses per the risks it faces bank.

The multiple concepts of capital that in the banking sector are due to the heterogeneity of the factors financial data of a bank (stakeholders). We can discern five groups of factors: bond- the depositors, the shareholders, the rating and supervisory authorities. Each group focuses on different points of analysis, as it has preferences and aspirations

that differ their behavior in relation to them other groups as well as the ability influencing the bank's decisions.

Bondholders and rating companies, which theoretically represent possible bondholders, are mainly interested in it probability of bankruptcy of the bank, so evaluate any new information with this prism. Applicants, to the extent that their positions are protected by a system guarantee schemes have little incentive diversifying their behavior and usually their actions are modeled with based on the liquidity incentive. Shareholders from the other side focuses their attention wealth creation and secondarily the probability of bankruptcy. They are interested taking greater risk, as long as it is rewarded for it. Their behavior is made possible by the possibility of profitability, that is to maximize them cash flows of the bank under no circumstances bankruptcy. Finally, the actions of supervisor's authorities shall be guided by the maximum of social well-being. These principles have the potential to gather information from on-the-spot checks and which it is required to submit banks, as well as the possibility disciplinary sanctions. The key risk factor which making their decisions is the possibility bankruptcy which creates systemic missile. Preventive intervention is targeted to reduce the likelihood of bankruptcy, while suppressive intervention to prevent it crisis transmission to robust banks. Co- how, the aspirations of the supervisors are closer to bondholders and to depositors rather than shareholders.

2.3 ACCOUNTING CAPITAL

Accounting chapters are important factor in managing a bank, because they signify its robustness as well and the degree of protection of its depositors. The accounting chapters are drawn up with International Financial Reporting Standards. Information System (IFRS), where three basic elements of the the share capital, the various thematic and winnings. The equity capital consists of the paid share capital and the difference from issuance of shares above par. The stock- are formed based on the profits of the in order to deal with the various assets, mainly lending and investment inn securities. The accounting of them reserves depends on the way in which of the balance sheet items, which must be included in one of them next categories[15]:

(a) held to maturity maturity - HTM)

(b) Loans and receivables - L & R)

(c) Valued at fair value through profit or loss fair value through profit and loss -FVTPL)

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[15] The bulk of the capital adequacy of the banks" Financial Report Bank of Greece, Issue 36, April 2012, pages 47-95

(d) Available for sale - AFS).

Each category reflects the different the purpose of holding each item and different valuation. The information the bank intends to hold until maturity is sorted in the HTM portfolio, while the loans, the deposits, etc. in the L & R portfolio. And the two portfolios are valued at the cost, that is, the cost of acquisition minus accumulated depreciation less any impairments. Value impairments (provisions) mainly concern portfolio credit facility.

The category "Valued at fair value Through Results "(FVTPL) has two sub- categories, items for sale in a short period of exploitation price fluctuations (held for trading - HFT) and the data that the bank has say at the time of initial recognition to be valued at fair value.8 In both adjustments from valuation the results of the bank. Finally, the portfolio "Available to sale "(AFS) contains items that predefined as available to sale and are measured at fair value, but the adjustment from the valuation is directly attributable to equity, changes in the reserve available-for-sale securities. This continues until the sale of the items, so the accumulated profit or loss has been recognized in equity is recorded in a profit and loss account.

2.4 SUSTAINABILITY OF SUPERVISORY CAPITAL

To understand the supervisory dimension of the funds, we must distinguish between available capital (available capital) and required funds capital). The funds available are funds that a bank is based on prudential rules, while the required funds are the funds that should be to have a bank based on the risk- mindsets and entrepreneurship of the plan. If the funds available are larger than required, the bank is considered sufficiently capitalized. The cross- the available funds and funds required funds also identifies form that management has to take funds in a bank. Let's look at it each form of funds separately:

A) CAPITAL AVAILABLE

In order to include a financial, the available funds, it must meet the following properties:

• Permanence, i.e. the funds provided from the financial instrument to be permanently and available when needed. This is in principle intertwined with the if it is one

average, the more time a bank may be based on the relevant chapters. At the same time, there must be none (whether contractual or otherwise) of the issuer's liability for early repayment (e.g. clause), but even if it exists, that should not provide a strong incentive

to payment. Based on the above, the equity capital, which extends to perpetuity, is better quality than a time limit. subordinated debt.

• Flexibility, i.e. issuer of the financial instrument to has the ability to cancel payments (interest or dividends) based on current financial conditions. Or this feature is usually given in dividends of shares or preference shares, as it is at the discretion of the the decision to distribute a dividend, but flexibility is mitigated if the privileges shares have a cumulative right dividend. On the contrary, for bonds reduced guaranteeing the possibility of coupon is much more limited.

• Ability to absorb losses, i.e. Coverage capability losses to keep the bank in going concern or to protect the depositors in case of entry in divestiture proceedings. With based on the loss absorption criterion, share capital is the first in the in terms of quality, since it can directly absorb losses without anyone restriction. On the contrary, bonds decreased collateral is lower in ranking, since they do not have much capacity to absorb damage in operating conditions, while possibility is improved in after the holders are satisfied before the common shareholders.

Based on the degree of satisfaction of the three above characteristics, supervisor funds are divided into three categories of quality, Tier 1, Tier 2 and Tier 3. Each category is further divided into upper and lower chapters.

a) Equity Funds

The main Equity Funds are in compliance with IFRS funds and include the share capital, reserves and minority rights. All the above is recognized in the banking sector system is clearly reflected in the public available balance sheets are significant impact on efficiency and cover the three characteristics of the funds. Therefore, the Equity Funds are considered to be the best quality.

Core Equity Funding in many cases is difficult or expensive, and the supervisory authorities have broadened the definition of Basic Equity by including hybrid securities, called "Additional Basic Capital". Hybrid securities are titles that share some common features with stocks (for example, they extend into perpetuity) certain common features with bonds (e.g. payment of fixed interest). Essentially the holder of a hybrid title exchanges claims on him capital with fixed payments from the bank's profits. There are three forms of hybrid securities, innovative titles, non-innovative securities and preferred stocks.

Hybrids are often issued through a special purpose vehicle and used as a means of raising capital, but the framework puts down some quantitative restrictions, for example, they must not exceed 15% of the Basic Capital. During the credit crisis 2007-08 many hybrid securities have been downgraded by rating agencies and have significantly lost their ability to absorb losses.

b) Supplementary Funds

Supplementary Equity includes preference shares with equity cumulative dividend, subordinated debt and positive difference

accounting estimates and expected loss. For the latter it is noted that if the amount of the provisions exceeds the expected loss, then the difference must be regarded as available capital and is classified in the Supplementary Funds, with a limit not exceeding 0.6% of the weighted assets. Of course, this possibility is only available to banks that apply the Basel II Internal Ratings Based Approach (IRB), as they are considered to have a credible way of calculating expected loss.

c) Removals

In order to arrive at the total available funds, some are deducted which do not meet the criteria set. From Basic Equity the intangible assets are deducted, as they cannot be converted to tangible to absorb losses, as well as own shares, because with purchase the bank transferred the loss absorption capacity from the original buyer of the shares in the same. Also, fair value revaluation reserves do not include positive or negative differences in value of non-interest-bearing products (e.g. shares). The logic is that for non-interest-bearing products, which extend over time, the valuation loss must be assumed, and therefore deducted, from the Equity Funds. The same applies to gains from valuation, but this is included, by 45%, in Supplementary Funds. As for interest rate products (e.g. bonds), they have a specific maturity and any valuation loss is not a good approximation of the potential loss, hence remains in the reserves. Only in case of bankruptcy issuer, the damage must be assumed and deducted.

Furthermore, some of the necessary adjustments are made to total own funds, in order to deduct data that does not have a good absorption capacity.

Again, the analysis is not exhaustive, and we will refer to some typical cases:

- The negative difference between accounting forecasts and expected is deducted, loss of 50% of Basic Equity and 50% of Supplementary Equity.
- A Bank A's participation (shares or hybrids) in a B bank is deducted if the holding exceeds 10% of B's capital, 50% of Basic Equity and 50% of Supplementary Equity. The logic is to avoid double gearing, since if the deduction was not applicable, banks A and B could help each other to increase their capital base without a real inflow of capital.
- A bank's total holding capital is deducted from participation in an insurance company if the holding exceeds 20% of the capital of the insurance company.

B) REQUIRED CAPITAL

For the total available funds, the Capital Adequacy Ratio (CAR) as:

$$CAR = \frac{AC}{Credit\ Risk + Market\ Risk + Operational\ Risk} > 8\%$$

Where:
CAR: Capital Adequacy Ratio
AC: Available Capital

If the CAR ≥ 8%, the bank is considered to be sufficiently capitalized, 15 in the sense that its available capital covers the possible losses that may arise from the credit risk, the market risk and the operational risk it has assumed.

However, in specific circumstances, for example in periods crisis, the additional funds do not significantly absorb the losses, with capital adequacy is mainly based on core capital. In these are the Baseline Indicators:

$$Tier1\ ratio = \frac{Tier1\ capital}{Credit\ Risk + Market\ Risk + Operational\ Risk} > 4\%$$

It is noted that under the current supervisory framework its threshold above is set at 4%. However, with Basel III the few rates are being adjusted.
For the calculation of the denominator of the two fractions is followed risk weighting technique, through its calculation risk-weighted assets (RWA):

$$RWA = RWAcredit + RWAmarket + RWAopwrational = A = RW + 12.5 = (ACmarket + ACoperational)$$

Where:
AC: Available Capital
A: value of assets
RW: credit risk weight.
So, to calculate the required funds - RC - with sufficient at least 8%, we have:

$$\frac{RC}{RWA} = 8\% \rightarrow RC = A = RW = 8\%$$

Fully phased-in Basel III capital ratios continue to increase

Consistent sample of Group 1 banks   Graph 1
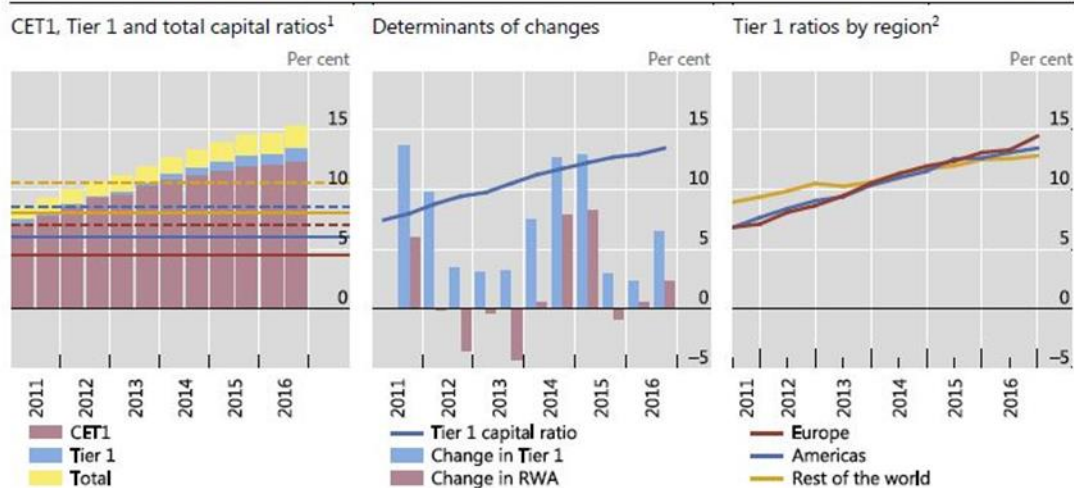
[1] The solid lines depict the relevant minimums, the dotted lines the minimums plus the capital conservation buffer. See Table A.2 for the relevant levels.   [2] See Table B.1 for the composition of the regions.

Source: Basel Committee on Banking Supervision. See Table C.5, Table C.6 and Table C.7 for underlying data and sample size.

Annex 2-Capital Ratios

2.5. Financial Capital

The supervisory funds we have just mentioned concern the minimum funds that need to be available to cover credit, operational and market risks as defined and calculated under some supervisory rules. However, a financial institution faces a wider range of risks, which is required to map, analyze ways of estimating them, levels of acceptance, timing, and estimate the funds needed to cover them. These are the financial funds of the bank.

A portfolio of exposures breaks down the losses based on two factors:

- The frequency of the damage
- Their intensity when they take place.
  It is important to distinguish the damage in three categories:
- In the expected, referring to losses of its daily operation bank when exposed to normal foreign conditions environment and to normal and expected risks,
- The unexpected, resulting from his unexpected events financial environment that may arise lead to damage and
- In extreme damage, resulting from extreme events that cannot be predicted on the basis of known risk assessment models.

The distribution resulting from the combination of the above parameters presents all future losses weighted by the probability of occurrence depending on the characteristics of each risk. The combination of all of them of the possible losses of any type of damage constitutes the total loss for a credit institution. It is noted that it is particularly difficult calculation of the combination of individual risks into a single allocation. It should also be mentioned that the expected loss is determined by the means of distribution, while the unexpected loss and stressed loss are determined by the variance and the confidence interval. The calculation of the total loss allocation of the financial capital is made using the Value at Risk (VaR) model

Line at -0.82 means 5% Value-at-Risk is 0.82.

The curve represents a hypothetical Profit-and-Loss probability density function. It has mean one and standard deviation one, but fatter tails than a Normal distribution. The 5% VaR point is 1.82 standard deviations below the mean, versus 1.64 for a Normal distribution.

Blue area to the right of the line represents 95% of the total area under the curve.

Red area to the left of the line represents 5% of the total area under the curve.

Annex 3-Value at Risk

2.6 Analysis of risks contributing to the calculation of capital adequacy
2.6.1 Credit Risk

Credit risk is defined as the probable or expected loss resulting from the inability of borrowers to repay the funds and / or interest on the borrowed funds, that is, the inability to meet their contractual obligations. Credit risk exists in any form of placement or investment of the bank, be it some type of finance or purchase of securities and financial instruments. Because of credit risk or credit risk loss, as is the case with any other risk, it is the change in the net equity of the bank or the value of the portfolio. The Bank's mediation in the process contributes both to the ease of the transfer of funds and to the reduction of the overall credit risk. If the transfer of funds was carried out directly from the surplus to the deficit, the former would also take on the risk of the latter being unable to fulfill their obligations and mainly by the inability to repay the funds they had raised. With the intervention of the bank, the process changes and the risk varies. Surplus units deposit their capital with the bank, minimizing the risk of non-repayment, as banks are organizations operating under certain capital adequacy rules, constantly controlled by the supervisory authorities in many ways, and follow in the process of financing specific rules, such as rules for big ones

exposures, exposures, and so on. Banks, in turn, investing depositors' funds, themselves take the risk of not returning the funds they transfer to the final borrowers through their investments, i.e. through loans, loans of all kinds or the purchase of securities and securities. Since the bank is an organized and specialized financial institution, it can assess the solvency of the borrowers and take appropriate measures such as collateral or monitoring measures, resulting in overall credit risk being significantly reduced in relation to risk for the very same investment in direct capital transfer.

    In Summary:

- The bank assumes the risk that the depositors or holders of the funds would take if it did not intervene.
- With the mediation process, the overall credit risk decreases, i.e. if:
  Cr1 = Credit risk of direct financing
  Cr2 = Credit risk of depositors or creditors of the bank
  Cr3 = Credit risk of a bank
  Then: (Cr2 + Cr3) <Cr1
- Credit risk exists both in loans (financing) and in other investments. (As elsewhere, both the investment portfolio and the trading portfolio involve other risks.)
  The basic methods for measuring credit risk are two:
- The Credit Scoring method for financing individuals, professionals and small businesses.
- The Credit Rating method for large business financing or placements in business titles.

2.6.2 Market Risk

Market risk refers to the risk that an investment may face due to fluctuations in the market. The risk is that the investment's value will decrease. Also known as systematic risk, the term may also refer to a specific currency or commodity.

Market risk is generally expresses in annualized terms. Either as fraction of the initial value (e.g. 6%) or an absolute number (e.g. $6).

Market risk contrasts with specific risk, also known as business risk or unsystematic risk, which is tied directly with a market sector or the performance of a particular company. In other words, market risk refers to the overall economy or securities markets, while specific risk involves only a part.

There are several standard market risk factors, including:

– *Equity Risk:* the risk that share prices will change.

– *Commodity Risk:* the likelihood that a commodity price, such as that of a metal or grain, will change.

– *Currency Risk:* the probability that foreign exchange rates will change.

– *Interest Rate Risk:* the risk that interest rates will go up or down.

– *Inflation Risk:* the risk that overall rises in prices of goods and services will undermine the value of money, and probably adversely impact the value of investments.

According to the Bank of England, the relevant variables are "primarily interest rates, exchange rates, and the spreads between the yields of securities issued by sovereigns and by other types of issuer."

Diversification and market risk

Risk can be reduced to some extent if you diversify your investments, i.e. widen your portfolio. However, it is impossible to eliminate all risks.

Some market risks are not possible to prevent or foresee. Natural disasters, such as hurricanes, volcanic eruptions and earthquakes can strike at any time and may affect the value of your investments.

Other sources of market risk include terrorist attacks, political instability, recessions, and trade embargoes.

According to the Board of Governors of the Federal Reserve System (America's central bank):

"Market risk encompasses the risk of financial loss resulting from movements in market prices."

The European Banking Authority (EBA) defines market risk as the risk of losses on- and-off balance sheet positions that occur as a result of adverse movements in market prices. "From a regulatory perspective, market risk stems from all the positions included in banks' trading book as well as from commodity and foreign exchange risk positions in the whole balance sheet," the EBA adds.

The majority of investors know that investing comes with risks as well as rewards, and that, overall, the greater the risk, the bigger the potential reward.

While it is vital to consider the risks in the context of a specific market or investment class, it is also just as important to consider marker risk.
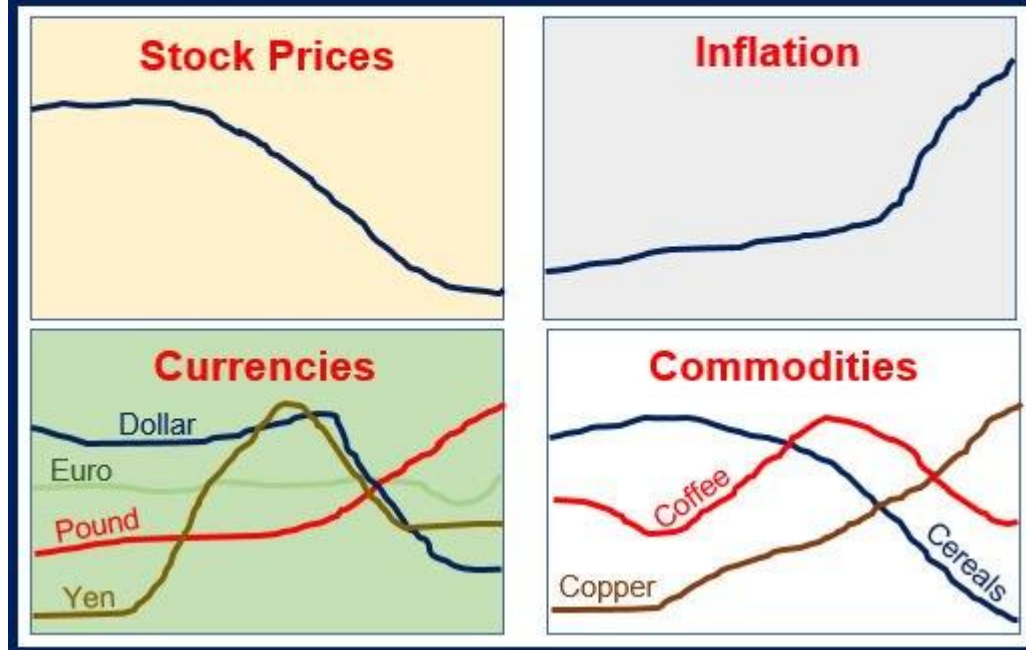
Annex 4- Several economic factors contribute to market risk.

The Financial Industry Regulatory Authority, a private corporation in the US that acts as a self-regulatory organization, has the following advice for investors:
"Investments involve varying levels and types of risks. These risks can be associated with the specific investment, or with the marketplace as a whole. As you build and maintain your portfolio, remember that global events and other factors you cannot control can impact the value of your investments. And be sure to take both business risks and market risks into account."

2.6.3 Operational Risk
Operational risk summarizes the risks a company undertakes when it attempts to operate within a given field or industry. Operational risk is the risk not inherent in financial, systematic or market-wide risk. It is the risk remaining after determining financing and systematic risk, and includes risks resulting from breakdowns in internal procedures, people and systems.

Operational risk can be summarized as human risk; it is the risk of business operations failing due to human error. It changes from industry to industry, and is an important consideration to make when looking at potential investment decisions. Industries with lower human interaction are likely to have lower operational risk.

Operational risk focuses on how things are accomplished within an organization and not necessarily what is produced or inherent within an industry. These risks are often associated with active decisions relating to how the organization functions and what it prioritizes. While the risks are not guaranteed to result in failure, lower production or higher overall costs, they are seen as higher or lower depending on various internal management decisions.

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<u>Examples of Operational Risks</u>

One area that may involve operational risk is the maintenance of necessary systems and equipment. If two maintenance activities are required, but it is determined only one can be afforded at the time, making the choice to perform one over the other alters the operational risk depending on which system is left in disrepair. If a system fails, the negative impact is associated directly with the operational risk.

Other areas that qualify as operational risk tend to involve the human element within the organization. If a sales-oriented business chooses to maintain a subpar sales staff, due to its lower salary costs or any other factor, this is considered an operational risk. The same can be said for failing to properly staff to avoid certain risks. In manufacturing, choosing not to have a qualified mechanic on staff, and having to rely on third parties for that work, can be classified as an operational risk. Not only does this impact a system's operation, it also involves additional time delays as it relates to the third party.

Willing participating in fraudulent activity may also be seen as operational risk. In this case, the risk involves the possibility of repercussions if the activity is uncovered. Since the decision is active, it is considered a risk relating to how the business operates.

CHAPTER 3

BASEL COMMITTEE

3.1 Basel Committee

The Basel Committee on Banking Supervision (BCBS) was founded in Basel at the end of 1974 and is located at the Bank for International Settlements (BIS). The Committee is made up of representatives of the central banks and banking supervisory authorities of 28 jurisdictions. (see Annex A for a presentation of all members). Switzerland is represented on the Committee by FINMA and the Swiss National Bank (the SNB). The Basel Committee is the world's most important standard-setting body for banking regulation and acts as a forum for collaboration to discuss banking supervision. Its main objective is to enhance banking supervision, thereby promoting financial stability.

Annex 5

BCBS activities focus on exchanging information on national, banking-related supervisory issues, approaches and techniques. Based on that information, the BCBS develops banking guidelines and supervisory standards. The BCBS does not have any formal authority, and its decisions are not backed by legal force.

The Basel Committee on Banking Supervision's work is organized under four main subcommittees:

- **The Standards Implementation Group** was originally established to share information on, and promote consistency in, the implementation of the Basel II Framework. In 2009, the Standards Implementation Group's goals were broadened to concentrate on implementation of general Basel Committee guidance and standards.

- **The Policy Development Group** identifies and reviews emerging supervisory issues. The Policy Development Group also proposes and develops policies designed to create sound banking systems and supervisory standards.

- **The Accounting Task Force** helps ensure that international accounting and auditing standards and practices promote risk management at banks. The Accounting Task Force also develops reporting guidance and takes an active role in the development of these international accounting and auditing standards.

- **The Basel Consultative Group** facilitates supervisory dialogue with non-member countries on new committee initiatives by engaging senior representatives from

various countries, international institutions and regional groups of banking supervisors that are not members of the committee.

In 1988, the Commission introduced a capital measurement system called Basel Capital Accord. The supervisory framework of the international banking system, Basel I, was adopted in 1998. The objective was to address credit risk through the introduction of minimum capital requirements.

At the beginning of the 2000s, the Basel II framework, which replaced Basel I, aimed at providing a more complete picture of the risks borne by credit institutions and linking the capital requirements to those risks. Finally, under Basel III, regulatory standards are presented regarding the capital adequacy and liquidity of banks

3.2 Basel I: the Basel Capital Accord

With the foundations for supervision of internationally active banks laid, capital adequacy soon became the main focus of the Committee's activities. In the early 1980s, the onset of the Latin American debt crisis heightened the Committee's concerns that the capital ratios of the main international banks were deteriorating at a time of growing international risks. Backed by the G10 Governors, Committee members resolved to halt the erosion of capital standards in their banking systems and to work towards greater convergence in the measurement of capital adequacy. This resulted in a broad consensus on a weighted approach to the measurement of risk, both on and off banks' balance sheets. There was strong recognition within the Committee of the overriding need for a multinational accord to strengthen the stability of the international banking system and to remove a source of competitive inequality arising from differences in national capital requirements. Following comments on a consultative paper published in December 1987, a capital measurement system commonly referred to as the Basel Capital Accord (1988 Accord) was approved by the G10 Governors and released to banks in July 1988. The 1988 Accord called for a minimum capital ratio of capital to risk-weighted assets of 8% to be implemented by the end of 1992. Ultimately, this framework was introduced not only in member countries but also in virtually all other countries with active international banks. In September 1993, the Committee issued a statement confirming that G10 countries' banks with material international banking business were meeting the minimum requirements set out in the Accord. The Accord was always intended to evolve over time. It was amended first in November 1991. The 1991 amendment gave greater

precision to the definition of general provisions or general loan-loss reserves that could be included in the capital adequacy calculation. In April 1995, the Committee issued an amendment, to take effect at end-1995, to recognize the effects of bilateral netting of banks' credit exposures in derivative products and to expand the matrix of add-on factors. In April 1996, another document was issued explaining how Committee members intended to recognize the effects of multilateral netting. The Committee also refined the framework to address risks other than credit risk, which was the focus of the 1988 Accord. In January 1996, following two consultative processes, the Committee issued the so-called Market Risk Amendment to the Capital Accord (or Market Risk Amendment), to take effect at the end of 1997. This was designed to incorporate within the Accord a capital requirement for the market risks arising from banks' exposures to foreign exchange, traded debt securities, equities, commodities and options. An important aspect of the Market Risk Amendment was that banks were, for the first time, allowed to use internal models (value-at-risk models) as a basis for measuring their market risk capital requirements, subject to strict quantitative and qualitative standards. Much of the preparatory work for the market risk package was undertaken jointly with securities regulators.

Why Basel 1 was needed?

The reason was to create a level playing field for "internationally active banks"

Banks from different countries competing for the same loans would have to set aside roughly the same amount of capital on the loans

The purpose was:
1) To prevent international banks from building business volume without adequate capital backing
2) The focus was on credit risk
3) Set minimum capital standards for banks
4) Became effective at the end of 1992

Basel-I was hailed for incorporating risk into the calculation of capital requirements

The Cooke ratio:

Named after Peter Cooke (Bank of England), the chairman of the Basel committee)

Cooke Ratio=Capital/ Risk Weighted Assets≥8%

Definition of Capital:
Capital= Core Capital + Supplementary Capital – Deductions

Basel 1-Capital Requirments:
- Capital was set at 8% and was adjusted by a loan's credit risk weight
- Credit risk was divided into 5 categories: 0%, 10%, 20%, 50%, and 100%
  - Commercial loans, for example, were assigned to the 100% risk weight category

Calculation Of Required Capital
- To calculate required capital, a bank would multiply the assets in each risk category by the category's risk weight and then multiply the result by 8%
  - Thus a $100 commercial loan would be multiplied by 100% and then by 8%, resulting in a capital requirement of $8

Core and Supplementary Capital

1) **Core Capital (Tier I Capital)**
   - i) Paid Up Capital
   - ii) Disclosed Reserves (General and Legal Reserves)
2) **Supplementary Capital (Tier II Capital)**
   - i) General Loan-loss Provisions
   - ii) Undisclosed Reserves (other provisions against probable losses)
   - iii) Asset Revaluation Reserves
   - iv) Subordinated Term Debt (5+ years maturity)
   - v) Hybrid (debt/equity) instruments

DEDUCTIONS FROM THE CAPITAL
- Investments in unconsolidated banking and financial subsidiary companies and investments in the capital of other banks & financial institutions
- Goodwill

DEFINITION OF CAPITAL IN BASEL-I
TIER 1
- Paid-up share capital/common stock
- Disclosed reserves (legal reserves, surplus and/or retained profits)

TIER 2
- Undisclosed reserves (bank has made a profit, but this has not appeared in normal retained profits or in general reserves of the bank.)
- Asset revaluation reserves (when a company has an asset revalued and an increase in value is brought to account)
- General Provisions (created when a company is aware that a loss may have occurred but is not sure of the exact nature of that loss) /General loan-loss reserves
- Hybrid debt/equity instruments (such as preferred stock)
- Subordinated debt

RISK WEIGHT CATEGORIES IN BASEL-I
0% Risk Weight:
- Cash,
- Claims on central governments and central banks denominated in national currency and funded in that currency
- Other claims on OECD countries, central governments and central banks

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- Claims collateralized by cash of OECD government securities or guaranteed by OECD Governments
  20% Risk Weight
- Claims on multilateral development banks and claims guaranteed or collateralized by securities issued by such banks
- Claims on, or guaranteed by, banks incorporated in the OECD
- Claims on, or guaranteed by, banks incorporated in countries outside the OECD with residual maturity of up to one year
- Claims on non-domestic OECD public-sector entities, excluding central government, and claims on guaranteed securities issued by such entities
  Cash items in the process of collection
  50 % Risk Weight
- Loans fully securitized by mortgage on residential property that is or will be occupied by the borrower or that is rented.
  100% Risk Weight
- Claims on the private sector
- Claims on banks incorporated outside the OECD with residual maturity of over one year
- Claims on central governments outside the OECD (unless denominated and funded in national currency)
- Claims on commercial companies owned by the public sector
- Premises, plant and equipment, and other fixed assets
- Real estate and other investments
- Capital instruments issued by other banks (unless deducted from capital)
- All other assets
  At National Discretion (0,10,20 or 50%)
- Claims on domestic public-sector entities, excluding central governments, and loans guaranteed by securities issued by such entities

Risk weight (%)	Asset category
0	Cash, gold bullion, claims on OECD governments such as Treasury bonds or insured residential mortgages
20	Claims on OECD banks and OECD public sector; up to an including one year claims on other countries.
50	Uninsured residential mortgage loans
100	All other claims

Source: BIS [1988]

Annex 6: Risk Weights

<u>CRITIQUE OF BASEL-I</u>

Basel-I accord was criticized

- For taking a too simplistic approach to setting credit risk weights

and

- For ignoring other types of risk

- Risk weights were based on what the parties to the Accord negotiated rather than on the actual risk of each asset
  - Risk weights did not flow from any particular insolvency probability standard, and were for the most part, arbitrary.

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- The requirements did not explicitly account for operating and other forms of risk that may also be important
- Except for trading account activities, the capital standards did not account for hedging, diversification, and differences in risk management techniques

<u>1993 PROPOSAL: STANDARD MODEL</u>
- Total Risk= Credit Risk+ Market Risk
- Market Risk= General Market Risk+ Specific Risk
- General Market Risk= Interest Rate Risk+ Currency Risk+ Equity Price Risk + Commodity Price Risk
- Specific Risk= Instruments Exposed to Interest Rate Risk and Equity Price Risk

<u>1996 MODIFICATION: INTERNAL MODEL</u>

- Internal Model → Value at Risk Methodology
- Tier III Capital (Only for Market Risk)
    - i) Long Term subordinated debt
    - ii) Option not to pay if minimum required capital is <8%

Advances in technology and finance allowed banks to develop their own capital allocation (internal) models in the 1990s. This resulted in more accurate calculations of bank capital than possible under Basel-I. These X models allowed banks to align the amount of risk they undertook on a loan with the overall goals of the bank
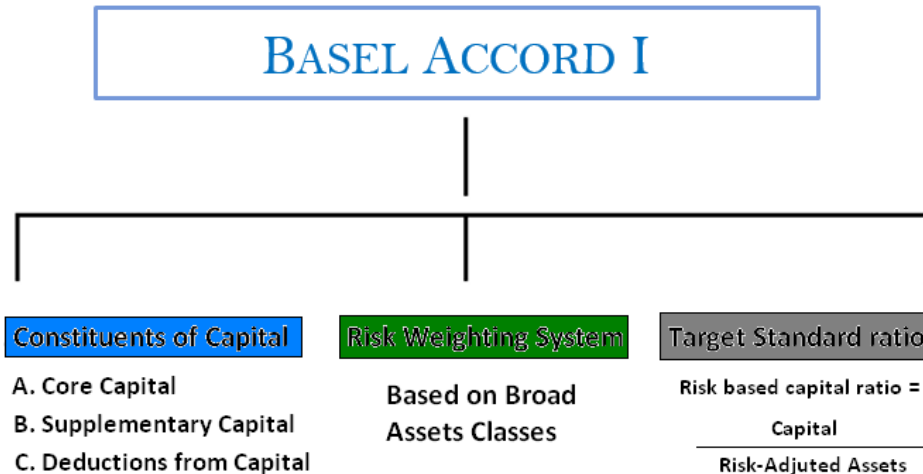
Annex 7-Basel Accord I

3.3 Basel 2 Committee

Awareness of the weaknesses of the Basle I pact, but also the pressure of the market led to the start of work on its review by the Basel Committee on Banking Supervision and the European Commission, which revise the capital adequacy guidelines, which, unlike the recommendations of the Basel Committee are mandatory. In 2001, the Basel Committee issued a new document, in which the revised proposals are presented in more detail, with a foreseen implementation time in 2004. The European Union, in turn, issued an annotated text which basically supported the Basel document

but it focused more on matters relating exclusively to Monetary Union and formed a basis for the alignment of the Basle within the Eurozone.

Thus, on 26 June 2004, the revised supervisory framework was adopted Capital Adequacy, known as Basel II, and is due to be fully implemented by 2015. It focuses on three main areas, including minimum capital requirements, supervisory oversight and discipline market, which are known as three pillars. The aim is to strengthen and to supervise international banking requirements. The main objectives of the new Pact consist of the following:[16]

- Emphasize the supervisory review process and its transparency market.
- Adequate coverage of all financial and non-financial risks.
- The gradual convergence of the level of regulatory own funds towards financial capital of banks through recognition by the supervisory authorities
  of the risk assessment carried out by the banks themselves.

The new framework was designed to improve the way regulatory capital requirements reflect underlying risks and to better address the financial innovation that had occurred in recent years. The changes aimed at rewarding and encouraging continued improvements in risk measurement and control. The framework's publication in June 2004 followed almost six years of intensive preparation. During this period, the Basel Committee consulted extensively with banking sector representatives, supervisory agencies, central banks and outside observers in an attempt to develop significantly more risk-sensitive capital requirements. Following the June 2004 release, which focused primarily on the banking book, the Committee turned its attention to the trading book. In close cooperation with the International Organization of Securities Commissions (IOSCO), the international body of securities regulators, the Committee published in July 2005 a consensus document governing the treatment of banks' trading books under the new framework. For ease of reference, this new text was integrated with the June 2004 text in a comprehensive document released in June 2006: Basel II: International convergence of capital measurement and capital standards: a revised framework - comprehensive version. Committee member countries and several non-member countries agreed to adopt the new rules, albeit on varying timescales. Thereafter, consistent implementation of the new framework across borders became a more challenging task for the Committee. One challenge that supervisors worldwide faced under Basel II was the need to approve the use of certain approaches to risk measurement in multiple jurisdictions. While this is not a new concept for the supervisory community – the Market Risk Amendment of 1996 involved a similar requirement – Basel II extended the scope of such approvals and demanded an even greater degree of cooperation between home and host supervisors. To help address this issue, the Committee issued guidance on information-sharing in 2006. In the following year, it followed up with advice on supervisory cooperation and allocation mechanisms in the context of the advanced measurement approaches for operational risk.

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[16] Zagorianos, N. & Marinos, G. (December 2006). "Securitization of Basel II Requirements". Available at: http://www.economia.gr

The new Basel Accord consists of three pillars:[17]
I. The first pillar concerns the definition of capital requirements for coverage
of credit and operational risk.
II. The second pillar concerns the definition of the purpose to which it is intended
process of assessing the capital adequacy of banks by supervisory authorities
authorities, as well as the establishment of the general principles and criteria
governing it
this process.
III. The third pillar concerns the strengthening of market discipline through the
disclosure of specific qualitative and quantitative data.
These three pillars of the new Pact are mutually reinforcing.
Undoubtedly, the effectiveness of the first pillar rules depends
the ability of supervisors to control their proper implementation through the powers of
the second pillar. Also, the increased reporting obligations of the 3rd pillar provide
the appropriate incentives to improve the risk management processes developed by
the banks.
The bank's capital adequacy ratio represents the ratio between the bank's own funds
and the assets (on and off-balance sheet) that have been hedged according to the risk
determined to match them.
According to the new Basel II accord, it is calculated as follows:

$$\frac{CA}{Credit\ Risk + Market\ Risk + Operational\ Risk}$$

3.3.1 Pillar 1

Minimum capital requirements Pillar 1 constitutes the most substantial part of Basel
II. Its primary objectives are to increase the risk sensitivity of capital requirements
and align them more closely to the core risks that banks face. These risks include:

- credit risk, which refers to the risk of loss arising from a borrower defaulting on their obligations
- operational risk, which is the risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events
- traded market risk, which refers to the risk of loss from holding financial instruments for trading purposes and arises due to movements in market prices, such as interest rates, exchange rates, and equity values and
- securitization risk, which refers to the risk of loss associated with buying or selling asset-backed securities.

In addressing each of these core risks, Basel II recognizes that financial institutions
differ significantly. As a result, Basel II moves away from the 'one-size-fits-all'
approach in Basel I and provides banks with the opportunity to apply approaches that
correspond to the different business and risk management practices that they employ.
For each of the core risks that banks face, Basel II provides 'standardized' and
'internal model' approaches to determine minimum capital requirements. None of the
approaches are viewed as necessarily superior or inferior for all institutions. However,
a major objective of Basel II is to promote improvements in banks' risk management
processes by encouraging banks to develop more sophisticated risk measurement

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[17] Zopounidis, K. & Liadaki, A. (January 2006). "Capital adequacy and the new banking supervision framework". Available at: http://www.morax.gr

systems and practices where it is cost effective for them to do so. Improvements in banks' risk management processes will, in some cases, lead to lower minimum capital requirements. The following sections discuss the Basel II approaches to determining the capital required to meet the core risks faced by banks[18].

<u>Credit risk</u>

Credit risk is the major risk that most banks must manage during the normal course of lending and credit underwriting. Within Basel II, there are two approaches to credit risk measurement: the standardized approach and the internal ratings based (IRB) approach. <u>Standardized approach</u>

The standardized approach builds on the Basel I approach and is the default option for determining minimum capital requirements. The standardized approach retains the relative simplicity of Basel I while increasing the risk sensitivity of regulatory capital requirements.

As with Basel I, the value of a bank's on-and-off balance sheet assets are adjusted by risk weights that are applied according to the riskiness of the underlying assets. To increase the risk sensitivity of the capital requirement, credit ratings from eligible rating agencies (such as Fitch or Standard and Poor's), are used to increase the number of risk weight categories applied to the underlying assets, relative to Basel I. In this way the standardized approach differentiates riskiness within asset classes as well as across different asset classes.

Annex 8:
Basel I and Basel II standardized approach to measuring the credit risk of a corporate loan

	Basel II					Basel i
Credit Rating	AAA to AA-	A+ to A-	BBB to BB-	Below BB-	Unrated	All Loans
Asset Value	$100M	$100m	$100m	$100m	$100m	$100m
Risk Weight	20%	50%	100%	150%	100%	100%
Risk Weight Asset	$20m	$50m	$100m	$100m	$100m	$100m
Capital Requirment	$1.6m	$4m	$8m	$12	$8m	$8m

Erratum: Original cited $6.25m in column 2 last line. Corrected in the online edition 21 February 2012 to figure shown

Annex 8 compares the capital required under Basel II for a corporate loan with varying credit ratings with the capital required for the same loan under Basel I. As can be seen the standardized approach implies a range of capital requirements depending on the riskiness of the loan, as proxied by the credit rating. Higher rated loans have lower capital requirements under Basel II than lower rated loans. The Basel I approach treats all corporate loans the same regardless of rating.

The Basel II standardized approach also allows for additional methods of mitigating credit risks. It provides for improved methods of measuring the risks that are mitigated by collateral and allows netting of assets and liabilities in some cases. It also allows credit risks to be mitigated by instruments such as credit derivatives, the markets for which have evolved dramatically over the past 10 to 20 years, and are now commonly used by banks to reduce credit risk.

<u>Internal-ratings based (IRB) approaches</u>

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[18] Reserve Bank of New Zealand: Bulletin, Vol. 68, No. 3

The Internal Ratings Based (IRB) approaches represent the major development from Basel I in calculating minimum capital requirements. Over the past decade banks have invested heavily in economic capital models and systems that can better help them identify, measure, and manage the key risks that they face. The capability of modelling techniques has improved to the point that banks use them increasingly to determine internal capital targets, feed in to pricing strategies, assess risks, determine economic value added, and contribute to executive remuneration. The Basel Committee has recognized this development and looked to promote the development and use of these methods, where appropriate, by offering the IRB approaches to determine minimum capital requirements. Banks that apply the IRB approaches will base their minimum capital requirements on their own economic-capital models and systems.

Modelling the risk of loss Annex 9, overleaf, provides a stylized version of how banks model the probability of loss in their portfolio of exposures. The area under the distribution represents the probability
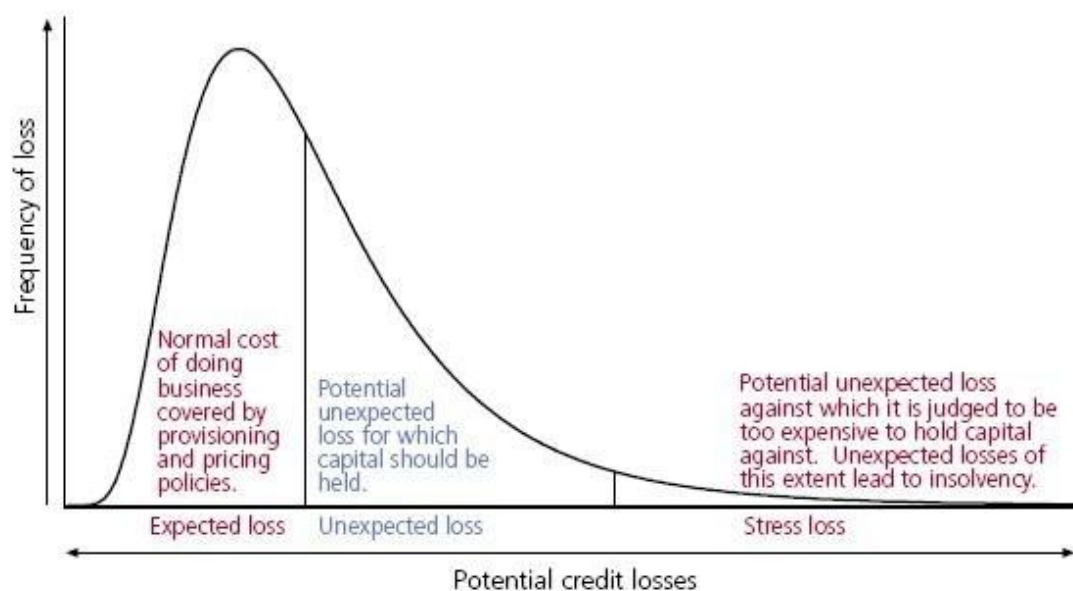
Annex 9-Risk of Losses

of loss for a given period and loss size. The distribution is negatively skewed as most credit losses tend to be small, with few very large losses. Two main types of loss are illustrated. Expected loss refers to the normal losses from doing business and is either taken into account in banks' pricing or met through specific provisions held on banks' balance sheets. Unexpected loss refers to the losses not covered by pricing or provisioning. These losses must be absorbed by capital to avoid insolvency and are therefore the losses considered by capital requirements. It would be unreasonable and overly expensive for banks to hold enough capital to meet all unexpected loss events. Rather, banks hold enough capital to meet unexpected losses up to a given level. Unexpected losses over and above this level are referred to as stress losses and lead to bank insolvency. For Basel II regulatory purposes, banks are required to hold enough capital to meet unexpected losses with a probability of 0.999 over one year. Beyond this minimum required level, the amount of capital a bank will actually hold will depend on its internal risk appetite and market expectations. Risk parameters help

determine the shape and skewness of the density function depicted in Annex 9. There are four key risk parameters in Basel II:

• Probability of default (PD) refers to the likelihood of a borrower defaulting on a contractual obligation.

• Loss given default (LGD) is the proportion of the obligation that the bank expects to lose, in the event of a default.

• Exposure at default (EAD) refers to the maximum amount of loss in the event of a default.

• Maturity (M) refers to the remaining age of the obligation.

As each parameter increases, the capital required to meet that loss increases. To determine minimum capital requirements to meet credit risk, banks must categories the asset side of their balance sheet into five major groups – sovereign, corporate, bank, retail, and equity. Banks apply an internal rating to every exposure within each of these groups, using an array of information such as historical information and borrower characteristics. Ratings are then grouped into 'buckets' and banks use historical default information to assign exposures within each rating bucket with forward-looking cyclically adjusted estimates of the key risk parameters. Basel II recognizes that there are some difficulties in forecasting future events and the influence they will have on a particular borrower's financial condition. As a result, banks must take conservative views of projected information and adopt a conservative bias where data limitations exist. A bank applying the IRB approach feeds their forward-looking estimates of these risk parameters into the IRB equation (which include the 99.9% probability referred to above) to determine its pillar 1 minimum capital requirements.[19] The IRB equation is based on the conditional probability of default of a single borrower with normally distributed asset returns. Based on Annex 9, this is obviously not the ideal theoretical construct. However, it does reflect the realities of estimating capital requirements for regulatory purposes across many different banks[20]. Any risks associated with the assumptions underlying the IRB equation are considered as part of the supervisory review process outlined in pillar 2.[21]

Validation and accreditation requirements The Basel II framework recognizes that banks using advanced credit risk measurement techniques apply a variety of internally-developed or 'off-the-shelf' models and processes to determine their key risk parameters. Consequently, given the potential for differences across banks and the importance of estimating adequate minimum capital requirements, banks wishing to implement the IRB approach must first apply to regulators for accreditation to do so. To be accredited to use the IRB approaches, banks' internal risk measurement methodologies must meet a number of strict quantitative and qualitative requirements. These include:

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[19] Basel II offers two IRB approaches. The foundation IRB approach requires banks to provide PD estimates only (the other risk parameters are provided by the framework), while the advanced IRB approach requires bank estimates of all the risk parameters.

[20] See Thomas and Wang (2005) for a discussion on the theoretical and institutional background to the IRB equation.

[21] Reserve Bank of New Zealand: Bulletin, Vol. 68, No. 3

• an appropriately risk-sensitive internal rating system, which comprises the methods, processes, controls, data collection, and IT systems that support the assessment of credit risk and the quantification of default and loss estimates;
• facilities that capture borrower characteristics and sufficient default information to determine the estimates of the key risk parameters to within statistical confidence levels;
• appropriate corporate governance and internal controls
• a modelling and capital estimation process that is embedded into the day -to-day operations of the bank and
• a validation and testing procedure that ensures the bank is confident that their approach produces the appropriate PD, LGD, EAD and capital estimates to address their credit risks.

Operational risk

Operational risk is the risk of loss resulting from inadequate internal processes, people, and systems, or from external events. A good example of an operational loss event could be the collapse of Barings Bank in 1995 as a result of internal control failures and massive speculative trading losses. Operational risk itself is not a new concept, and well-run organizations have been addressing it in their internal controls and corporate governance structures. However, applying an explicit regulatory capital charge against operational risk is a relatively new and evolving idea. Basel II requires banks to hold capital against the risk of unexpected loss that could arise from the failure of operational systems. As for credit risk, the framework provides simple and complex approaches to determine operational risk capital requirements.

The standardized approaches

There are a number of standardized approaches that calculate operational risk capital as a proportion of bank income (the basic indicator approach and the standardized approach), bank assets, or a combination of both (the alternative standardized approach). The rationale behind the simple approaches is that as a bank increases in size (represented by balance sheet or income growth), operational risk increases and therefore operational risk capital should increase proportionately. The main advantage in applying these approaches to determine operational risk capital is their simplicity, and they are therefore targeted at banks applying the standardized approach to credit risk.

The advanced measurement approach

Similarly, to the IRB approaches to credit risk, the advanced measurement approach (AMA) measures capital charges for operational risk based upon risk parameters from a bank's internal operational risk measurement system. Under this approach, minimum capital requirements depend on a bank's internal loss estimates. As with the internal model approaches to credit risk, banks must fulfil qualitative and quantitative requirements before they are eligible to use the AMA. The Basel Committee and most regulators view that the estimation of operational risk capital using the AMA is still undergoing significant development. Indeed, a few regulators have not made the AMA available to banks operating within their jurisdiction, preferring to wait until there is evidence that statistical techniques will produce the appropriate loss estimates. In jurisdictions where the AMA is being made available to banks, it is typically being restricted to those banks applying the IRB approaches to credit risk.

Traded market risk

Traded market risk refers to the risk of loss from holding financial instruments for trading purposes, and arises due to movements in market prices, such as interest rates, exchange rates, and equity values. In 1996 the Basel Committee released the Market Risk Amendment, which expanded Basel I to set minimum capital requirements for the various market risks that banks face. The Market Risk Amendment was in response to the increased trading activity by banks and the additional risk that this introduced.[22].

Basel II does not depart substantially from the Market Risk Amendment. Banks can use a standardized approach, which applies risk weights to open positions, or their own internal models[23] to determine the minimum capital requirement. The main focus of Basel II is on ensuring that open positions in banks' trading books can be valued appropriately. In particular, financial products should be marked to market or, where necessary, to demonstrably prudent models.

Securitization risk

Securitization is a process whereby a pool of similar loans (e.g., residential mortgages) or other financial assets is packaged and sold in the form of marketable securities. Securitization risk may arise from any of the following sources:

• the risk from holding a security where the return is related to credit risk of the underlying assets that back the security

• any residual credit risk that is not transferred off the originating bank's balance sheet, or that could be reinstated as a result of insufficient legal protection from the default of the underlying assets.

Treatment of securitization exposures

As with the other pillar 1 risks, Basel II provides two broad approaches to measuring securitization exposures: the standardized and ratings based approaches.

 Banks that apply the standardized approach to measuring credit risk must also apply the standardized approach to measuring securitization risk. The approach is similar to the standardized approach, whereby the minimum capital requirement is determined by risk weights that are applied to the held securities depending on the credit rating of the securitization issue.

Under the internal-ratings based approach, banks use a similar but slightly more complex approach than the standardized approach for securities that have external or inferred ratings. Where these ratings are not available, banks can use their own internal assessments of the credit quality of the underlying exposures. Only banks that have received supervisory approval to use the IRB approach to credit risk can apply the internal models based approach to determine the credit risk associated with the exposure to a security.

Recognizing risk transference

Basel II specifies a number of conditions that a bank must meet before it can transfer credit risk from its balance sheet as a result of selling securities. These include

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[22] The Reserve Bank does not currently require capital to be held against traded market risk. Rather, banks must disclose information about their market risk exposures in their quarterly disclosure statements.

[23] Under the internal models approach, 'value-at-risk' must be computed on a daily basis using a 99th percentile, one tailed confidence interval. In calculating value-at-risk, an instantaneous price shock equivalent to a 10 day movement in prices is used.

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evidence of the transference of significant credit risk to third parties, and that the bank does not maintain effective or indirect control over the transferred exposures

3.3.2 Pillar 2: Supervisory review process

Whereas pillar 1 of Basel II addresses the core risks (credit, operational, traded market, and securitization) that a bank faces, the main intention of the supervisory review process is to ensure that banks have adequate capital to support all of the material risks in their business.

Pillar 2 recognizes that bank management is ultimately responsible for the business decisions that they make, and for ensuring that the bank is adequately capitalized to support its risks beyond the core minimum requirements covered in pillar 1. Consequently, the first stage of pillar 2 is for banks to develop a process that sets internal capital targets that are commensurate with their entire risk profile (including those identified as pillar 1 risks) and their control environment.

Pillar 2 also recognizes that supervisors monitor individual bank capital adequacy because of the wider implications of a bank failure. As a result, supervisors may want to evaluate how banks assess their capital needs relative to their risks, and to intervene where appropriate. This interaction is intended to foster an active dialogue between banks and supervisors such that when deficiencies are identified, banks take prompt and decisive action to reduce risk or restore capital.

Basel II sets out four guiding principles that provide the framework for the supervisory review process:

i.   Banks must have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

ii.   ii. Supervisors should review and evaluate banks' internal risk assessments and strategies and should take appropriate action if the results of this process are not satisfactory.

iii.   iii. Supervisors should expect banks to operate above the minimum regulatory capital ratios

iv.   iv. Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the bank's risk characteristics.

Implicit in the first principle is that all material risks faced by a bank should be addressed by the bank. The supervisor acts when capital is clearly below the minimum levels required to support all of the material risk characteristics of the bank. Three material risk characteristics that supervisors will pay particular attention, and that will be particularly suited to treatment under pillar 2 are considered below.

<u>Risks considered under pillar 1 that are not fully captured by the pillar 1 process</u>
There are likely to be residual pillar 1 risks resulting from the measurement methods used by banks. A good example is credit-concentration risk, which refers to the risk of loss due to the exposures in a portfolio being closely related or positively correlated. There are two main risks associated with credit concentration. The first is that borrowers in a concentrated portfolio tend to survive and fall together resulting in PDs and LGDs that cannot be considered independently. The second risk is that a portfolio

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with similar types of assets may not possess the characteristics for modelling techniques to work adequately.

Supervisors will also be interested in the approach taken by banks to meet model risks – those risks due to the underlying assumptions made by banks' own models as well as the underlying assumptions made in the construct of the IRB equation. Supervisors would expect banks to take a conservative approach to capital calculations where there were concerns about the robustness of model assumptions.

<u>Bank risks that are not taken into account by the pillar 1 process</u>

Whereas interest rate risk in the trading book is considered under pillar 1, in many cases interest rate risk in the banking book (IRRBB) is just as important. IRRBB is included within the supervisory review process as the Basel Committee believes that the variation of methods used by banks to model IRRBB makes it too difficult to include alongside other pillar 1 risks. However, Basel II does provide guidance to banks and supervisors that relate to the ability of bank models to include all material interest rate positions and to consider all relevant repricing and maturity data.

<u>Risk factors that are external to the bank</u>

The business cycle can have a number of effects on banks' capital requirements. Firstly, Basel II requires banks' estimates of the key risk factors to reflect the ability of borrowers to perform over an entire business cycle and not just the current or most recent economic period. Where risk factors are derived from historical information that does not contain at least one full cycle, minimum capital requirements will need to be adjusted accordingly. Similarly, banks should take into account the likelihood that recovery values for liquidated assets during an economic downturn are likely to be lower than normal and lead to higher or 'stressed' LGDs. Including a stressed LGD analysis through pillar 2 could potentially increase banks' capital requirements. The nature of the tail of the loss distribution shown in figure 1 could be considered under pillar 2. Supervisors are particularly interested in the types of events that could lead to unexpected losses over and above those covered by capital and that result in bank failure. A useful method of doing this is to stress-test banks' capital levels and the 0.999 confidence interval included in the IRB equation. The main goal of stress-testing is to investigate the ability of banks to absorb potential losses that may arise from a set of extreme but plausible shocks. Supervisors might require additional capital to be held if banks were not resilient to realistic macroeconomic stress events. While the pillar 1 framework for determining capital requirements is relatively advanced, regulators are still working hard to develop the supervisory review process and in particular how pillar 2 capital requirements will be determined. Ongoing work in the areas identified above will shed lighter as to how pillar 2 risks will be determined.

3.3.3 **Pillar 3: Market discipline**

Market participants have an interest in ensuring banks are adequately capitalized and through their actions can encourage the bank to behave prudently. This is often referred to as market discipline. In developing the Basel II framework, the Basel Committee decided to incorporate a greater role for market discipline by introducing capital adequacy-related public disclosure requirements for banks.

The objectives of market disciplines are reasonably straightforward. In a well-functioning market, financial institutions with poorly developed risk management structures tend to be penalized by the market through higher funding costs because the banks' counterparties assess the institution as more risky, while those with prudent risk management structures tend to be rewarded.

A key component in promoting market discipline in this context is ensuring that bank customers, institutions, and other market participants have ready access to the appropriate information that allows them to monitor bank performance and risk-taking. Pillar 3 achieves this by requiring banks to disclose, on a timely basis, relevant quantitative and qualitative information relating to the nature of their risks, their risk measurement processes, and their capital adequacy.[24]

3.4 The Transition from Basel II to Basel III

Implementation of the Basel II Accord coincided with financial crisis of 2007 - 2008, so it has not preceded it sufficient control over the Pact's ability to mitigate the effects of one economic crisis. Undoubtedly, Basle II has overestimated their potential banks to assess the risks they undertake. At the same time, it was done understands that certain categories of funds included in the supervisory framework are unable to cover potential losses, leading the Commission to revise the definitions of regulatory capital. For this reason, the Basel Committee announced on 12 September 2010 a new, undergoing framework, known as Basel III.

Thus, on 16/12/2010 the Basel Committee published two major one's reports, which formed the backbone of the Basel III Accord:

- Basel III: A global regulatory framework for more resilient banks and banking systems
- Basel III: International Framework for liquidity risk measurement, standards and monitoring.
  These reports, along with all the amendments that followed and will follow, are the Basel Committee 's response to
  recent financial crisis in an effort to strengthen the stability of the financial system through:
- Binary Regulatory Interventions for Shielding Banks in times of crisis
- Macro-regulatory regulatory interventions to protect the bank the systemic risk arising for the whole
  sector, both from its cross-sectoral and from the time perspective
  At this point it should be noted that the gravity in Basel II was given to assessing as far as possible the assets subject to risk,
  in the denominator of the fraction of the capital adequacy ratio, while with Basel III gives weight to the available funds, its numerator
  fraction of the capital adequacy ratio.

The graph below shows the differences between Basel II and Basel III:

[24] International Journal of New Technology and Research (IJNTR) ISSN:2454-4116, Volume-3, Issue-1, January 2017 Pages 66-70} {Basel II: A new capital framework Andrew Yeh, James Twaddle and Mike Frith, Financial Stability Department

Basel II vs Basel III

Comparison of Capital Requirement under Basel II & III

Capital Requirements	Under Basel II	Under Basel III
Minimum Ratio of Total Capital To RWAs	8.00%	10.50%
Minimum Ratio of Common Equity to RWAs	2.00%	4.50% to 7.00%
Tier I capital to RWAs	4.00%	6.00%
Core Tier I capital to RWAs	2.00%	5.00%
Capital Conservation Buffers to RWAs	None	2.50%
Leverage Ratio	None	3.00%
Countercyclical Buffer	None	0% to 2.50%
Minimum Liquidity Coverage Ratio	None	From 2015
Minimum Net Stable Funding Ratio	None	From 2018
Systemically Important Financial Institutions Charge	None	From 2011

Source:www.abhjeekdeshmukh.com
Annex 10: Differences between Basel II and Basel III

3.5 Basel III Accord

Basel III is the third and the latest advancement of the Basel Accords and is a global regulatory standard set by the BCBS on capital adequacy (including a new leverage ratio and capital buffers), market liquidity risk (with new short-term and long-term liquidity ratios) and stress testing focusing on stability. The Basel III reforms to global regulatory standards were agreed by the G-20 in November 2010 and were then issued by the Basel Committee on Banking Supervision in December 2010 (BCBS, 2010). The key aim of these reforms is to strengthen the capital adequacy requirements with regard to quality and quantity of capital which banks must hold in order to absorb losses The Basel III framework, whose main thrust has been enhancing the banking sector's safety and stability, emphasizes the need to improve the quality and quantity of capital components, leverage ratio, liquidity standards, and enhanced disclosures. Basel III is therefore an effort to control the causes of the most recent crisis. Regulation of this sort has been effective in the past (BCBS, 2010). Basel III introduces new and enhanced rules, these includes the introduction of a new and stricter definition of capital – designed to increase consistency, transparency and quality of the capital base – and the introduction of a global liquidity standard (BCBS, 2010). The two new liquidity ratios – the longer-term Net Stable Funding Ratio (NSFR) and the short-term Liquidity Coverage Ratio (LCR)–call on banks to raise high-quality liquid assets and acquire more stable sources of funding, ensuring that they are in agreement with the principles of liquidity risk management. In addition, Basel III introduces a new leverage ratio, a substitute to the risk-based Basel II framework. By setting 3 percent as the ratio of Tier 1 Capital to total exposure, the new leverage ratio may limit banks' scope of action (BCBS, 2010). Moreover, Basel III increases capital requirements for securities financing activities, repurchase agreements and counterparty credit risk arising from derivatives. Additionally, the new framework has formulated ways of reducing systemic risk and the cyclical effects

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of Basel II. For instance, it introduces a countercyclical capital buffer and capital conservation, and discusses "through the- cycle" provisioning. Basel III is poised to have a significant impact on the world's financial systems and economies. The implications for the banking industry from Basel III could be profound. According to BCBS (BCBS, 2010) new minimum capital standards changes combined with the higher capital charges for trading books make some business models less profitable or even unprofitable going forward and banks will need to rethink their strategy and business portfolio in the light of the changes. The potential impact of Basel III on the banking system is significant. Banks will experience increased pressure on their Return on Equity (RoE) due to increased liquidity and capital costs. In particular, Basel III creates incentives for banks to improve their operating processes – not only to meet requirements but also to increase efficiency and lower costs (BCBS, 2010). Banks are forced to improve their capital buffers through increased capital adequacy requirements, as well as the introduction of liquidity requirements and countercyclical macro prudential measures[25] (BCBS, 2010).

Regulatory bodies respond to this situation by introducing in Basel III capital accord such as they introduced leverage and buffer capital to facilitate efficient functioning of financial institutions and reduced any potential chances of credit crisis in the future. Basel III accord try to solve the puzzle about appropriate level of liquidity and capital. These complex regulations help financial institutions to maintain their financial position thus reducing the chance of bank run. In short, these regulations result in effective management of liquidity and capital (Diamond and Rajan 2009; King & Tarbert 2011)

Key Principles of Basel III

1. Minimum Capital Requirements
   The Basel III accord raised the minimum capital requirements for banks from 2% in Basel II to 4,5% of common equity, as a percentage of the risk-weighted assets. There is also an additional 2,5% buffer capital requirement that brings the total equity to 7%. Banks can use the buffer when faced with financial stress, but doing so can lead to even more financial constrains when paying dividends. As from 2015, the Tier 1 capital requirements increased from 4% in Basel II to 6% in Basel III. The 6% includes 4,5% of Common Equity Tier 1 and an extra 1,5% of additional Tier 1.The requirements were to be implemented starting 2012, but the implementation date has been postponed several times, and banks now have until March 31, 2019, to implement the changes.

2. Leverage Ratio
Basel III introduced a non-risk based leverage ratio to serve as a backstop to the risk-based capital requirements. Banks are required to hold a leverage ratio in excess of 3%. The non-risk based leverage ratio is calculated by dividing Tier 1 capital by the average total consolidated assets of a bank. To conform to the requirement, the Federal Reserve of the United States fixed the leverage ratio at 5% for insured bank holding companies, and 6% for Systematically Important Financial Institutions (SIFI).

$$Leverage\ Ratio = \frac{Tier\ Capital}{Total\ Exposure} > 3\%$$

The main advantages of this indicator are:
- Simplicity
- Small tracking costs
- Minimize monitoring risk
- Discourages supervisory arbitrage
- It is an anti-cyclical policy measure.
  However, this indicator also has some drawbacks, which are concentrated in the following:
- Absence of empirical studies
- Incorrect incentives
- Difficulty in harmonizing calculation at international level.
  3. Liquidity Requirements

Basel III introduced two liquidity ratios, i.e., Liquidity Coverage Ratio and Net Stable Funding Ratio. The Liquidity Coverage Ratio requires banks to hold sufficient high-liquid assets that can withstand 30-day stressed funding scenario as specified by the supervisors. The Liquidity Coverage Ratio was introduced in 2015 with 60% requirements and is expected to increase by 10% each year till 2019 when it takes full effects. On the other hand, the Net Stable Funding Ratio (NSFR) requires banks to maintain stable funding above the required amount of stable funding for a period of one year of extended stress. NSFR was designed to address liquidity mismatch and will start being operational in 2018.

$$LCR: \frac{Stock\ of\ High\ Quality\ Liquid\ Assets}{Net\ Cash\ Outflow\ Over\ 30\ days} > 100\%$$

$$NSFR: \frac{Available\ Stable\ Funding}{Required\ Stable\ Funding} > 100\%$$

Finally, Basel III provides for ways to monitor their liquidity banks through supervisory tools, using five monitoring tools:[26]
1.contractual maturity mismatch
2. Concentration of funding
3. Available unencumbered assets
4. LCR by significant currency
5. Market – related Monitoring Tools
Impact of Basel III

The requirement that banks must hold a minimum capital of 7% will make banks less profitable. Most banks will try to maintain a higher capital to cushion themselves from financial distress, even as they lower a number of loans issued to borrowers. They will be required to hold more capital against assets, which will reduce the size of their balance sheets. A study by the Organization for Economic Co-operation and Development (OECD) in 2011 revealed that the medium-term effect of Basel III on GDP would be -0.05% to -0.15% annually. To stay afloat, banks will be forced to increase their lending spreads as they pass the extra cost to their customers.

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[26] Gortzos,Ch "Basel III:" Revision of the Commission 's current regulatory framework Basel for Banking Supervision in order to strengthen the stability of the international banking system"March,2011

The introduction of new liquidity requirements, mainly Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), will affect the operations of the bond market. To satisfy LCR liquid-asset criteria, banks will shy away from holding high run-off assets such as Special Purpose Vehicles and Structured Investment Vehicles. The demand for secularized assets and lower-quality corporate bonds will decrease due to the LCR bias towards banks holding government bonds and covered bonds. As a result, banks will hold more liquid assets and increase the proportion of long-term debts to reduce maturity mismatch and maintain minimum NSFR. Banks will also minimize business operations that are subject to liquidity risks.

The implementation of Basel III will affect the derivatives markets, as more clearing brokers exit the market due to higher costs. Basel III capital requirements focus on reducing counterparty risk, which depends on whether the bank trades through a dealer or a central clearing counterparty (CCP). If a bank enters into a derivative trade with a dealer, Basel III creates a liability and requires a high capital charge for that trade. On the contrary, derivative trade through the CCP attracts only a 2% charge, which is attractive to banks. The exit of dealers would consolidate risks among fewer members, thereby making it difficult to transfer trades from one bank to another and increase systemic risk.

 Criticisms against Basel III

The Institute of International Finance, a 450-member banking trade association, located in the United States, protested the implementation of Basel III due to its potential to hurt banks and slow down economic growth. The study by OECD revealed that Basel III would decrease annual GDP growth rate by 0.05 to 0.15%. Further, the American Bankers Association and a host of Democrats in the U.S. Congress argued against the implementation of Basel III, saying that it would cripple small U.S. banks by increasing their capital holdings on mortgage and SME loans. How do the Basel III proposals bear on these issues, in the sense of helping to ensure that the chance of another crisis like the current one can be greatly reduced? The Basel III capital proposals have some very useful elements – notably the support for a leverage ratio, a capital buffer and the proposal to deal with procyclicality through dynamic provisioning based on expected losses. Adopting the buffer capital proposal to ensure the leverage ratio was not compromised in crisis situations seems especially important – so that in good times, dividends, share buyback policies and bonuses would be restrained as necessary to build back buffers used up in bad times – seems very important. (Atkinson P. 2010)

Annex 11-The Basel 3 effect

The Basel 3 effect
Big banks

■ United States   ■ Europe

Basel 3 leverage ratio, %

Basel 3 common equity tier-1 ratio, %

Sources: Company reports; Autonomous Research

Economist.com
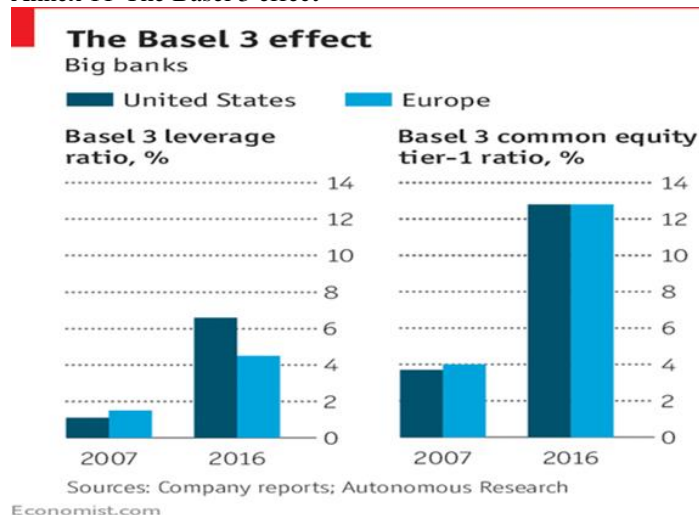
Shortcomings of Basel II	→	Components of Basel III
Unclear and inconsistent capital definition	→	Enhanced transparency, consistency and quality of capital base
Exposure to some risk not addressed (e.g. re-securitization etc.)	→	Risk coverage includes securitisations, off BS items and CCR
Inadequate treatment of Liquidity Risk	→	Enhanced liquidity standards including LCR & NSFR
Excessive BS growth despite relatively small levels of capital	→	Leverage ratio introduced as a risk-invariant measure of BS growth
Causes pro-cyclical amplification of shocks in financial sector	→	Adoption of measures to counteract pro-cyclicality

Source: (Edu-Pristine, 2011)

Annex 12- Improvements of Basel III over Basel II

CHAPTER 4

FINANCIAL ANALYSIS OF MAJORS HELLENIC BANKS

4.1   Financial Analysis of Greek Banks

In order to detect the factors that affect the capital adequacy of banking institutions, it is appropriate to present the main financial data of Greek banks in the years 2006 to 2017.

The 12 financial institutions that formed the Branch of Banks and were active in the Athens Stock Exchange, accumulating more than 90% of the share of the Greek market, were the following:

- ATE Bank
- Alpha Bank
- Attica Bank
- Cyprus Bank
- Eurobank Ergasias Bank
- Geniki Bank
- Marfin Bank
- National Bank Of Greece
- New Proton Bank
- Piraeus Bank
- Post Bank of Greece
- T Bank

At this point, it should be noted that following the recent developments in banking sector and the need for recapitalization have been under pressure merging, which led to:

– The takeover of ATE Bank, Cyprus Bank and Geniki Bank from Piraeus Bank.
– Merge of T Bank, Post Bank as well as New Proton Bank with Eurobank Ergasias Bank.
– Takeover of Emporiki Bank from Alpha Bank.

For the preparation of this coursework, they will be used the financial data of the groups of banks that continue their operation until today.

Below is a financial analysis of each bank separately for the period from 2006 to 2017, based on the published financials the data[27]

For the year 2017 we use the Financial Reports that refers to the period till 30/09/2017 due to the fact that the final Financial Report haven't been published yet.

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[27] Financial Statements of Banks

4.1.1 Alpha bank

Annex 13: Assets and Liabilities-Alpha Bank

ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks	1.477.675	1.650.327	1.724.081	2.725.974	2.805.166	1.280.230	770.193	1.006.294	1.265.442	698.730	674.439	1.177.430
Due from banks	6.184.088	7.349.675	8.420.793	12.161.433	8.824.257	6.853.617	6.623.503	5.036.860	4.714.551	3.406.859	2.912.313	1.774.658
Securities held for trading	346.207	264.788	86.880	66.946	35.796	14.492	14.119	7.001	1.729	1.888	2.865	18.049
Derivative financial assets	254.566	384.466	494.386	373.600	442.013	649.102	740.614	807.911	1.153.944	794.471	644.436	568.690
Loans and advances to customers	28.237.691	35.267.874	42.189.278	41.810.755	39.919.035	38.316.053	32.796.574	44.236.465	43.475.910	41.558.014	40.261.524	43.566.603
Investment securities	7.504.394	6.342.747	42.195	48.325	47.706	40.496	31.683	28.205	31.939	28.813	27.836	626.625
Total Assets	46.768.612	54.039.136	66.738.174	67.848.576	63.770.895	58.630.819	53.773.359	68.103.047	67.634.557	64.992.882	60.402.573	61.290.405

Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks	7.222.117	5.637.562	10.883.969	15.291.428	18.729.995	21.262.215	25.825.551	19.355.329	17.558.462	25.170.637	19.433.001	14.945.489
Due to customers	20.372.543	23.334.888	33.816.094	35.258.048	31.233.710	25.544.490	23.191.009	37.504.689	37.817.447	27.733.679	29.009.979	33.900.174
Derivative financial liabilities	226.223	383.129	804.172	628.886	1.106.591	1.469.142	1.529.730	1.374.261	1.946.401	1.556.555	1.337.559	1.028.591
Debt securities in issue held by institutional investors and other borrowed funds	15.148.320	20.521.976	17.395.646	10.405.582	6.980.873	5.297.410	2.317.252	1.295.445	2.021.165	406.231	598.759	470.390
Other liabilities and Provisions	531.212	51.529	8.415	3.768	9.247	15.989	30.173	258.945	333.520	410.446	383.188	348.668
Total Liabilities	46.768.612	54.039.136	66.738.174	67.848.576	63.770.895	58.630.819	53.773.359	68.103.047	67.634.557	64.992.882	60.402.573	61.290.405

Annex 14: Assets and Liabilities Structure

Assets Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks/Total Assets	3,16%	3,05%	2,58%	4,02%	4,40%	2,18%	1,43%	1,48%	1,87%	1,08%	1,12%	1,92%
Due from banks/Total Assets	13,22%	13,60%	12,62%	17,92%	13,84%	11,69%	12,32%	7,40%	6,97%	5,24%	4,82%	2,90%
Securities held for trading/Total Assets	0,74%	0,49%	0,13%	0,10%	0,06%	0,02%	0,03%	0,01%	0,00%	0,00%	0,00%	0,03%
Derivative financial assets/Total Assets	0,54%	0,71%	0,74%	0,55%	0,69%	1,11%	1,38%	1,19%	1,71%	1,22%	1,07%	0,93%
Loans and advances to customers/Total Assets	60,38%	65,26%	63,22%	61,62%	62,60%	65,35%	60,99%	64,96%	64,28%	63,94%	66,66%	71,08%
Investment securities/Total Assets	16,05%	11,74%	0,06%	0,07%	0,07%	0,07%	0,06%	0,04%	0,05%	0,04%	0,05%	1,02%

Liabilities Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks/Total Liabilities	15,44%	10,43%	16,31%	22,54%	29,37%	36,26%	48,03%	28,42%	25,96%	38,73%	32,17%	24,38%
Due to customers/Total Liabilities	43,56%	43,18%	50,67%	51,97%	48,98%	43,57%	43,13%	55,07%	55,91%	42,67%	48,03%	55,31%
Derivative financial liabilities/Total Liabilities	0,48%	0,71%	1,20%	0,93%	1,74%	2,51%	2,84%	2,02%	2,88%	2,39%	2,21%	1,68%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	32,39%	37,98%	26,07%	15,34%	10,95%	9,04%	4,31%	1,90%	2,99%	0,63%	0,99%	0,77%
Other liabilities and Provisions/Total Liabilities	1,14%	0,10%	0,01%	0,01%	0,01%	0,03%	0,06%	0,38%	0,49%	0,63%	0,63%	0,57%

4.1.2 Attica Bank

Annex 15: Assets and Liabilities Attica Bank

ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks	100.022	164.582	120.443	146.288	86.367	109.968	109.461	70.944	106.948	49.558	43.361	38.028
Due from banks	402.558	559.130	627.116	617.736	304.911	29.395	52.319	82.544	43.202	9.557	4.870	1.751
Securities held for trading	20.499	22.021	0	-	-	-	-	-	-	-	-	-
Derivative financial assets	36	36	313	5.048	4.384	3.754	1.287	4.852	11.168	3.569	84	160
Loans and advances to customers	2.315.882	2.900.606	3.385.815	3.922.449	3.709.704	3.584.492	3.240.904	3.300.523	3.193.064	2.757.428	2.776.959	2.191.351
Investment securities	123.900	89.208	28.768	34.333	43.769	44.758	43.339	45.841	46.510	58.190	56.369	58.680
Total Assets	3.092.770	3.904.628	4.519.160	5.259.340	4.780.734	4.348.597	3.906.305	4.060.313	3.962.330	3.674.024	3.619.184	3.558.778

Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks	297.076	447.833	1.068.225	1.082.640	778.053	683.505	730.931	181.153	203.311	783.768	1.025.342	987.414
Due to customers	2.423.405	2.919.784	2.956.553	3.433.627	3.331.029	3.099.573	2.931.371	3.327.619	3.268.298	2.157.384	1.906.224	1.836.911
Derivative financial liabilities	0	74	30	7	844	77	-	-	-	-	236	51
Debt securities in issue held by institutional investors and other borrowed funds	149.070	149.129	99.541	94.295	94.360	94.411	94.497	79.133	79.229	0	0	0
Other liabilities and Provisions	42.565	33.677	24.302	14.385	12.216	26.696	33.769	39.263	27.371	24.976	16.880	42.051
Total Liabilities	3.092.770	3.904.628	4.519.160	5.259.340	4.780.734	4.348.597	3.906.305	4.060.313	3.962.330	3.674.024	3.619.184	3.558.778

Annex 16: Assets and Liabilities Structure

Assets Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks/Total Assets	3,23%	4,22%	2,67%	2,78%	1,81%	2,53%	2,80%	1,75%	2,70%	1,35%	1,20%	1,07%
Due from banks/Total Assets	13,02%	14,32%	13,88%	11,75%	6,38%	0,68%	1,34%	2,03%	1,09%	0,26%	0,13%	0,05%
Securities held for trading/Total Assets	0,66%	0,56%	0,00%	-	-	-	-	-	-	-	-	-
Derivative financial assets/Total Assets	0,00%	0,00%	0,01%	0,10%	0,09%	0,09%	0,03%	0,12%	0,28%	0,10%	0,00%	0,00%
Loans and advances to customers/Total Assets	74,88%	74,29%	74,92%	74,58%	77,60%	82,43%	82,97%	81,29%	80,59%	75,05%	76,73%	61,58%
Investment securities/Total Assets	4,01%	2,28%	0,64%	0,65%	0,92%	1,03%	1,11%	1,13%	1,17%	1,58%	1,56%	1,65%

Liabilities Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks/Total Liabilities	9,61%	11,47%	23,64%	20,59%	16,27%	15,72%	18,71%	4,46%	5,13%	21,33%	28,33%	27,75%
Due to customers/Total Liabilities	78,36%	74,78%	65,42%	65,29%	69,68%	71,28%	75,04%	81,95%	82,48%	58,72%	52,67%	51,62%
Derivative financial liabilities/Total Liabilities	0,00%	0,00%	0,00%	0,00%	0,02%	0,00%	-	-	-	-	0,01%	0,00%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	4,82%	3,82%	2,20%	1,79%	1,97%	2,17%	2,42%	1,95%	2,00%	0,00%	0,00%	0,00%
Other liabilities and Provisions/Total Liabilities	1,38%	0,86%	0,54%	0,27%	0,26%	0,61%	0,86%	0,97%	0,69%	0,68%	0,47%	1,18%

4.1.3 Eurobank Ergasias Bank

Annex 17: Assets and Liabilities Eurobank Ergasias Bank

ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks	1.641.000	1.259.000	2.535.000	1.731.000	2.230.000	1.563.000	2.065.000	1.986.000	1.948.000	1.798.000	1.477.000	1.254.000
Due from banks	5.196.000	16.545.000	31.695.000	39.828.000	29.483.000	25.353.000	4.693.000	2.567.000	3.059.000	2.808.000	2.759.000	2.275.000
Securities held for trading	0	-	-	-	-	-	-	-	-	-	-	-
Derivative financial assets	1.148.000	1.282.000	1.659.000	1.460.000	1.725.000	2.225.000	1.888.000	1.264.000	2.134.000	1.884.000	1.980.000	1.747.000
Loans and advances to customers	30.183.000	37.235.000	46.757.000	45.432.000	47.918.000	42.551.000	43.171.000	45.610.000	42.133.000	39.893.000	39.058.000	37.192.000
Investment securities	10.019.000	9.355.000	2.563.000	2.428.000	2.055.000	96.000	616.000	728.000	876.000	925.000	905.000	330.000
Total Assets	50.057.000	68.272.000	93.065.000	99.856.000	90.372.000	79.605.000	67.653.000	77.586.000	75.518.000	73.553.000	66.393.000	60.800.000

Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks	11.550.000	15.300.000	27.663.000	30.604.000	33.505.000	36.587.000	29.047.000	16.907.000	12.610.000	25.267.000	13.906.000	11.080.000
Due to customers	30.363.000	38.939.000	44.467.000	45.807.000	40.522.000	28.392.000	30.752.000	41.535.000	40.878.000	31.446.000	34.031.000	33.201.000
Derivative financial liabilities	734.000	935.000	2.792.000	2.151.000	2.689.000	2.974.000	2.677.000	1.558.000	2.475.000	2.359.000	2.441.000	1.974.000
Debt securities in issue held by institutional investors and other borrowed funds	3.515.000	7.919.000	13.859.000	15.299.000	8.032.000	6.427.000	-1.299.000	4.165.000	5.559.000	6.420.000	6.672.000	6.847.000
Other liabilities and Provisions	-	-	-	-	-	-	-	-	-	-	-	-
Total Liabilities	50.057.000	68.272.000	93.065.000	99.856.000	90.372.000	79.605.000	67.653.000	77.586.000	75.518.000	73.553.000	66.393.000	60.800.000

Annex 18: Assets and Liabilities Structure

Assets Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks/Total Assets	3,28%	1,84%	2,72%	1,73%	2,47%	1,96%	3,05%	2,56%	2,58%	2,44%	2,22%	2,06%
Due from banks/Total Assets	10,38%	24,23%	34,06%	39,89%	32,62%	31,85%	6,94%	3,31%	4,05%	3,82%	4,16%	3,74%
Securities held for trading/Total Assets	0,00%	-	-	-	-	-	-	-	-	-	-	-
Derivative financial assets/Total Assets	2,29%	1,88%	1,78%	1,46%	1,91%	2,80%	2,79%	1,63%	2,83%	2,56%	2,98%	2,87%
Loans and advances to customers/Total Assets	60,30%	54,54%	50,24%	45,50%	53,02%	53,45%	63,81%	58,79%	55,79%	54,24%	58,83%	61,17%
Investment securities/Total Assets	20,02%	13,70%	2,75%	2,43%	2,27%	0,12%	0,91%	0,94%	1,16%	1,26%	1,36%	0,54%

Liabilities Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks/Total Liabilities	23,07%	22,41%	29,72%	30,65%	37,07%	45,96%	42,94%	21,79%	16,70%	34,35%	20,94%	18,22%
Due to customers/Total Liabilities	60,66%	57,04%	47,78%	45,87%	44,84%	35,67%	45,46%	53,53%	54,13%	42,75%	51,26%	54,61%
Derivative financial liabilities/Total Liabilities	1,47%	1,37%	3,00%	2,15%	2,98%	3,74%	3,96%	2,01%	3,28%	3,21%	3,68%	3,25%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	7,02%	11,60%	14,89%	15,32%	8,89%	8,07%	-1,92%	5,37%	7,36%	8,73%	10,05%	11,26%
Other liabilities and Provisions/Total Liabilities	-	-	-	-	-	-	-	-	-	-	-	-

4.1.4 National Bank of Greece

Annex 19: Assets and Liabilities NBG

ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks	2.219.796	4.135.632	1.959.249	2.073.721	5.069.505	1.960.765	1.213.000	2.195.000	1.870.000	2.208.000	1.501.000	1.208.000
Due from banks	4.539.923	4.318.696	5.202.048	5.881.701	7.091.089	7.335.865	4.195.000	3.478.000	3.790.000	2.799.000	2.227.000	1.886.000
Securities held for trading	12.283.625	11.048.630	1.717.902	3.003.966	1.082.292	-	1.046.000	908.000	-	-	-	-
Derivative financial assets	204.690	331.206	1.303.708	1.670.914	1.542.961	2.487.130	3.380.000	2.581.000	4.796.000	3.895.000	4.482.000	3.563.000
Loans and advances to customers	32.755.298	39.568.570	55.798.270	59.613.250	65.277.894	62.936.244	47.000.000	46.327.000	43.531.000	45.375.000	41.643.000	38.072.000
Investment securities	2.542.531	2.537.345	0	0	0	0	0	0	600	8.690	8.690	8.670
Total Assets	61.145.069	71.058.950	83.819.855	91.220.464	96.304.857	93.178.304	77.939.000	84.197.000	81.946.000	111.232.000	78.531.000	65.843.000

Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks	5.871.463	8.935.585	13.801.415	18.390.685	28.869.460	31.520.508	33.287.000	26.473.000	20.481.000	25.166.000	18.188.000	9.855.000
Due to customers	44.564.664	49.259.670	56.291.053	58.081.167	52.471.008	45.446.938	40.908.000	45.290.000	44.130.000	42.959.000	40.459.000	38.795.000
Derivative financial liabilities	344.687	580.062	1.426.951	1.204.621	1.404.051	3.119.235	4.373.000	2.559.000	5.706.000	4.638.000	5.169.000	3.798.000
Debt securities in issue held by institutional investors and other borrowed funds	0	3.482.135	3.482.135	2.694.486	3.181.869	977.770	-	-	1.743.000	1.252.000	536.000	288.000
Other liabilities and Provisions	-	-	-	-	-	2.130.024	2.168.000	2.093.000	963.000	1.251.000	1.118.000	963.000
Total Liabilities	61.145.069	71.058.950	83.819.855	91.220.464	96.304.857	93.178.304	77.939.000	84.197.000	81.946.000	111.232.000	78.531.000	65.843.000

Annex 20: Assets and Liabilities Structure

Assets Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks/Total Assets	3,63%	5,82%	2,34%	2,27%	5,26%	2,10%	1,56%	2,61%	2,28%	1,99%	1,91%	1,83%
Due from banks/Total Assets	7,42%	6,08%	6,21%	6,45%	7,36%	7,87%	5,38%	4,13%	4,62%	2,52%	2,84%	2,86%
Securities held for trading/Total Assets	20,09%	15,55%	2,05%	3,29%	1,12%	-	1,34%	1,08%	-	-	-	-
Derivative financial assets/Total Assets	0,33%	0,47%	1,56%	1,83%	1,60%	2,67%	4,34%	3,07%	5,85%	3,50%	5,71%	5,41%
Loans and advances to customers/Total Assets	53,57%	55,68%	66,57%	65,35%	67,78%	67,54%	60,30%	55,02%	53,12%	40,79%	53,03%	57,82%
Investment securities/Total Assets	4,16%	3,57%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%	0,01%

Liabilities Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks/Total Liabilities	9,60%	12,57%	16,47%	20,16%	29,98%	33,83%	42,71%	31,44%	24,99%	22,62%	23,16%	14,97%
Due to customers/Total Liabilities	72,88%	69,32%	67,16%	63,67%	54,48%	48,77%	52,49%	53,79%	53,85%	38,62%	51,52%	58,92%
Derivative financial liabilities/Total Liabilities	0,56%	0,82%	1,70%	1,32%	1,46%	3,35%	5,61%	3,04%	6,96%	4,17%	6,58%	5,77%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	0,00%	4,90%	4,15%	2,95%	3,30%	1,05%	-	-	2,13%	1,13%	0,68%	0,44%
Other liabilities and Provisions/Total Liabilities	-	-	-	-	-	2,29%	2,78%	2,49%	1,18%	1,12%	1,42%	1,46%

4.1.5 Piraeus Bank

Annex 21: Assets and Liabilities Piraeus Bank

ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks	1.361.547	2.066.182	2.486.574	1.747.045	1.523.902	2.658.565	2.091.406	1.912.478	2.864.234	2.444.752	3.071.788	3.214.997
Due from banks	2.968.672	4.296.193	4.636.273	4.442.538	4.424.327	3.475.982	2.620.677	1.163.172	932.793	787.795	118.859	142.747
Securities held for trading	1.866.702	4.403.891	1.166.899	1.041.535	184.259	226.620	81.209	27.692	2.059.917	2.407.828	2.740.246	2.626.651
Derivative financial assets	109.428	584.462	356.820	170.606	142.258	2.299.675	423.395	321.307	506.941	437.028	449.482	458.071
Loans and advances to customers	18.728.736	26.762.959	33.482.618	31.245.446	31.189.760	30.678.773	37.618.002	57.399.117	53.987.068	49.425.753	49.707.608	45.662.646
Investment securities	1.111.713	1.274.431	42.676	121.221	188.010	200.357	435.871	291.057	321.636	317.980	1.208.647	1.141.230
Total Assets	27.941.609	42.343.311	50.212.997	48.922.004	51.786.358	51.200.704	63.022.379	85.777.870	84.603.099	83.002.278	81.504.371	68.173.999

Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks	4.709.542	10.704.842	14.445.532	14.250.445	20.348.801	24.856.163	32.515.139	27.251.988	24.566.067	34.591.752	27.020.940	14.373.965
Due to customers	14.606.019	19.030.022	24.109.587	25.729.695	24.051.885	20.277.836	31.107.800	48.498.391	50.240.344	36.771.355	42.364.829	41.821.740
Derivative financial liabilities	61.069	83.609	360.907	160.575	182.219	329.234	419.846	325.996	538.260	444.639	657.127	430.355
Debt securities in issue held by institutional investors and other borrowed funds	6.222.249	8.693.073	7.742.696	4.905.404	3.181.065	2.289.277	-2.744.356	8.269.089	7.386.867	9.608.016	9.663.623	9.723.674
Other liabilities and Provisions	-	-	-	-	-	-	-	-	-	-	-	-
Total Liabilities	27.941.609	42.343.311	50.212.997	48.922.004	51.786.358	51.200.704	63.022.379	85.777.870	84.603.099	83.002.278	81.504.371	68.173.999

Annex 22: Assets and Liabilities Structure

Assets Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash and balances with Central Banks/Total Assets	4,87%	4,88%	4,95%	3,57%	2,94%	5,19%	3,32%	2,23%	3,39%	2,95%	3,77%	4,72%
Due from banks/Total Assets	10,62%	10,15%	9,23%	9,08%	8,54%	6,79%	4,16%	1,36%	1,10%	0,95%	0,15%	0,21%
Securities held for trading/Total Assets	6,68%	10,40%	2,32%	2,13%	0,36%	0,44%	0,13%	0,03%	2,43%	2,90%	3,36%	3,85%
Derivative financial assets/Total Assets	0,39%	1,38%	0,71%	0,35%	0,27%	4,49%	0,67%	0,37%	0,60%	0,53%	0,55%	0,67%
Loans and advances to customers/Total Assets	67,03%	63,20%	66,68%	63,87%	60,23%	59,92%	59,69%	66,92%	63,81%	59,55%	60,99%	66,98%
Investment securities/Total Assets	3,98%	3,01%	0,08%	0,25%	0,36%	0,39%	0,69%	0,34%	0,38%	0,38%	1,48%	1,67%

Liabilities Structure	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Due to banks/Total Liabilities	16,85%	25,28%	28,77%	29,13%	39,29%	48,55%	51,59%	31,77%	29,04%	41,68%	33,15%	21,08%
Due to customers/Total Liabilities	52,27%	44,94%	48,01%	52,59%	46,44%	39,60%	49,36%	56,54%	59,38%	44,30%	51,98%	61,35%
Derivative financial liabilities/Total Liabilities	0,22%	0,20%	0,72%	0,33%	0,35%	0,64%	0,67%	0,38%	0,64%	0,54%	0,81%	0,63%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	22,27%	20,53%	15,42%	10,03%	6,14%	4,47%	-4,35%	9,64%	8,73%	11,58%	11,86%	14,26%
Other liabilities and Provisions/Total Liabilities	-	-	-	-	-	-	-	-	-	-	-	-

4.2 Analysis of key financial ratios per bank

The major Financial ratios per bank are presented below:

4.2.1 Alpha Bank

On the basis of the abovementioned data the following indicators arise:

Annex 22: Financial Ratios Alpha Bank

ALPHA BANK	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EFFICIENCY INDICATORS												
TOTAL EXPENSES/TOTAL REVENUE	42.35%	49.07%	24.62%	20.57%	51.59%	47.32%	104.50%	65.99%	64.82%	54.09%	51.34%	45.52%
Personnel Fees and Expenses/TOTAL REVENUE	22.73%	24.37%	77.48%	67.01%	24.28%	22.79%	49.98%	29.04%	27.54%	22.00%	21.28%	19.02%
Net Interest Income/TOTAL REVENUE	70.30%	77.35%	77.48%	67.01%	81.34%	78.90%	127.28%	80.58%	81.03%	88.10%	80.60%	78.47%
Profit after Taxes	502,293	457,006	334,238	428,657	-56,309	-384.266	-1,132,934	2,857,021	-58,529	-1,032,276	42,302	85,081
Basic earnings per share	1.28	1.13	0.7498	0.8188	-0.2139	-7.3331	-1.1732	0.4303	-0.2373	-2.6792	0.03	0.06
LIQUIDITY INDICATORS												
Cash and balances with Central Banks/TOTAL ASSETS	3.16%	3.05%	2.58%	4.02%	4.40%	2.18%	1.43%	1.48%	1.87%	1.08%	1.12%	1.92%
Loans and advances to customers/Due to Customers	138.61%	151.14%	124.76%	118.58%	127.81%	150.00%	141.42%	117.95%	114.96%	149.85%	138.79%	128.51%
Cash and balances with Central Banks/Due t Customers	7.25%	7.07%	5.10%	7.73%	8.98%	5.01%	3.32%	2.68%	3.35%	2.52%	2.32%	3.47%
CREDIT RISK INDICATOR												
Loans and advances to customers/TOTAL ASSETS	60.38%	65.26%	63.22%	61.62%	62.60%	65.35%	60.99%	64.96%	64.28%	63.94%	66.66%	71.08%
PROFITABILITY INDICATOR												
ROE=Net Income/Equity	20.62%	16.68%	14.11%	8.98%	-1.27%	-0.06%	263.25%	39.97%	-0.86%	-12.26%	0.46%	0.90%
ROA = Net Income / Total Assets	1.07%	0.85%	0.50%	0.63%	-0.09%	0.00%	-2.11%	4.20%	-0.09%	-1.59%	0.07%	0.14%
ILLEGAL INDEX												
TOTAL ASSETS/TOTAL EQUITY	19.20	19.72	28.17	14.21	14.39	98.88	-124.95	9.53	9.92	7.72	6.63	6.49

Alpha Bank has an equal cost in relation to its revenues over the years except from year 2012, which appears to have increased expenditure in relation to its revenue and years 2008 and 2009, which has managed to bear its costs. Generally, there is an image of balance. However, it appears to be a stagnation in the staff cost index, except for the year 2012, which generally the expenses appear to be over against revenue, but also seems to be a stability to the loan-to-deposit ratio. In addition, profits appear to be falling in 2010 and beyond and a fluctuation from 2013 until today.

4.2.2 Attica Bank

On the basis of the abovementioned data the following indicators arise:

Annex 23: Financial Ratios Attica Bank

ATTICA BANK	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EFFICIENCY INDICATORS												
TOTAL EXPENSES/TOTAL REVENUE	97.82%	81.25%	90.14%	88.74%	98.65%	329.79%	451.55%	334.73%	241.98%	63.41%	121.30%	90.59%
Personnel Fees and Expenses/TOTAL REVENUE	45.81%	35.86%	39.92%	40.79%	43.06%	58.33%	104.37%	97.66%	41.05%	39.46%	40.92%	19.67%
Net Interest Income/TOTAL REVENUE	67.19%	64.56%	72.41%	70.03%	76.41%	87.02%	75.61%	69.51%	76.26%	79.35%	81.83%	42.62%
Profit after Taxes	51,283.67	200,285.00	102,346.00	93,501.00	-59,969.00	-253,442.00	-180,886.00	-1,131,600.00	-499,246.00	-3,494,848	-155,130	74,490
Basic earnings per share	0.001	0.186	0.0643	0.0254	-0.0556	-1.0679	-0.7716	-0.1523	-0.0427	-0.2906	-0.01	-0.0007
LIQUIDITY INDICATORS												
Cash and balances with Central Banks/TOTAL ASSETS	3.23%	4.22%	2.67%	2.78%	1.81%	2.53%	2.80%	1.75%	2.70%	1.35%	1.20%	1.07%
Loans and advances to customers/Due to Customers	95.56%	99.34%	114.52%	114.24%	111.37%	115.64%	110.56%	99.19%	97.70%	127.81%	145.68%	119.30%
Cash and balances with Central Banks/Due t Custome	4.13%	5.64%	4.07%	4.26%	2.59%	3.55%	3.73%	2.13%	3.27%	2.30%	2.27%	2.07%
CREDIT RISK INDICATOR												
Loans and advances to customers/TOTAL ASSETS	74.88%	74.29%	74.92%	74.58%	77.60%	82.43%	82.97%	81.29%	80.59%	75.05%	76.73%	61.58%
PROFITABILITY INDICATOR												
ROE=Net Income/Equity	3.35%	6.33%	3.19%	1.60%	-1.15%	-9.98%	-19.70%	-27.99%	-14.28%	-51.99%	-2.45%	1.17%
ROA = Net Income / Total Assets	1.66%	5.13%	2.26%	1.78%	-1.25%	-5.83%	-4.63%	-27.87%	-12.60%	-95.12%	-4.29%	2.09%
ILLEGAL INDEX												
TOTAL ASSETS/TOTAL EQUITY	2.02	1.23	1.41	0.90	0.92	1.71	4.25	1.00	1.13	0.55	0.57	0.56

From the above, we see that the bank presents a balance in the staff cost ratio beyond 2012 and 2013, which has a sudden rise but then again on balance in the coming years, but in the last year we see a significant decrease. It also shows an increase in the Loans to Deposits and Net Income ratios from interest to total revenue except the last year that there is a significant decrease. However, we see a reduction in the profit from 2010 and then, which cause damages, with a recovery in the last year.

4.2.3 Eurobank Ergasias Bank

On the basis of the abovementioned data the following indicators arise:

Annex 24: Financial Ratios Eurobank Ergasias Bank

Eurobank Ergasias Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EFFICIENCY INDICATORS												
TOTAL EXPENSES/TOTAL REVENUE	42,09%	41,35%	47,79%	48,37%	48,77%	50,45%	59,94%	67,49%	57,63%	57,72%	48,11%	48,13%
Personnel Fees and Expenses/TOTAL REVENUE	23,78%	22,22%	14,95%	16,67%	15,49%	17,65%	21,20%	37,11%	31,12%	30,02%	26,33%	27,45%
Net Interest Income/TOTAL REVENUE	77,98%	72,32%	72,78%	76,98%	77,09%	88,27%	83,25%	81,54%	81,85%	83,03%	75,07%	78,60%
Profit after Taxes	475.000	705.000	677.000	316.000	84.000	-549.600	-1.440.000	-1.157.000	-1.196.000	-1.155.000	249.000	72.000
Basic earnings per share	10	12	1,17	0,41	0,15	-10,4202	-2,1408	0,41	-9,0588	-3,6824	0,11	0,06
LIQUIDITY INDICATORS												
Cash and balances with Central Banks/TOTAL ASSETS	3,28%	1,84%	2,72%	1,73%	2,47%	1,96%	3,05%	2,56%	2,58%	2,44%	2,22%	2,06%
Loans and advances to customers/Due to Customers	99,41%	95,62%	105,15%	99,18%	118,25%	149,87%	140,38%	109,81%	103,07%	126,86%	114,77%	112,02%
Cash and balances with Central Banks/Due t Custome	5,40%	3,23%	5,70%	3,78%	5,50%	5,51%	6,72%	4,78%	4,77%	5,72%	4,34%	3,78%
CREDIT RISK INDICATOR												
Loans and advances to customers/TOTAL ASSETS	60,30%	54,54%	50,24%	45,50%	53,02%	53,45%	63,81%	58,79%	55,79%	54,24%	58,83%	61,17%
PROFITABILITY INDICATOR												
ROE=Net Income/Equity	15,02%	14,49%	18,87%	7,35%	1,38%	-62,81%	-219,85%	-25,58%	-18,97%	-16,19%	3,39%	1,04%
ROA = Net Income / Total Assets	0,95%	1,03%	0,73%	0,32%	0,09%	-0,69%	-2,13%	-1,49%	-1,58%	-1,57%	0,38%	0,12%
ILLEGAL INDEX												
TOTAL ASSETS/TOTAL EQUITY	15,83	14,03	25,95	23,23	14,83	90,98	103,29	17,15	11,98	10,31	9,03	8,82

We can see that the Eurobank Ergasias bank generally holds at a constant level, with small differentiations, the staff cost index towards total revenues while its cash and balances is fluctuating within the last decade. The profits of this bank also dropped

significantly, resulting in losses in 2011 that almost doubled in 2012, but it seems that in the last two years there has been a rise in the positive levels

4.2.4 National Bank of Greece

On the basis of the abovementioned data the following indicators arise:

Annex 25: Financial ratios NBG

National Bank of Greece	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EFFICIENCY INDICATORS												
TOTAL EXPENSES/TOTAL REVENUE	45,81%	46,33%	52,00%	50,60%	61,57%	59,91%	132,38%	66,99%	69,69%	60,77%	53,29%	60,73%
Personnel Fees and Expenses/TOTAL REVENUE	34,49%	34,56%	37,61%	37,75%	44,11%	44,93%	94,40%	48,88%	44,44%	41,26%	37,64%	41,53%
Net Interest Income/TOTAL REVENUE	74,08%	71,11%	87,01%	84,63%	114,99%	100,99%	198,69%	77,35%	119,80%	106,08%	94,56%	106,78%
Profit after Taxes	583.658	914.592	480.306	224.985	-360.852	-1.214.474	-2.926.000	618.000	-382.000	-4.540.000	20.000	-44.000
Basic earnings per share	1,39	1,92	0,84	0,32	-0,57	-12,70	-15,41	0,45	-1,83	-0,40	0,000	0,01
LIQUIDITY INDICATORS												
Cash and balances with Central Banks/TOTAL ASSETS	3,63%	5,82%	2,34%	2,27%	5,26%	2,10%	1,56%	2,61%	2,28%	1,99%	1,91%	1,83%
Loans and advances to customers/Due to Customers	73,50%	80,33%	99,12%	102,64%	124,41%	138,48%	114,89%	102,29%	98,64%	105,62%	102,93%	98,14%
Cash and balances with Central Banks/Due t Custome	4,98%	8,40%	3,48%	3,57%	9,66%	4,31%	2,97%	4,85%	4,24%	5,14%	3,71%	3,11%
CREDIT RISK INDICATOR												
Loans and advances to customers/TOTAL ASSETS	53,57%	55,68%	66,57%	65,35%	67,78%	67,54%	60,30%	55,02%	53,12%	40,79%	53,03%	57,82%
PROFITABILITY INDICATOR												
ROE=Net Income/Equity	9,54%	13,99%	7,47%	2,74%	-4,11%	-11,40%	74,45%	9,68%	-4,41%	-54,60%	0,29%	-0,65%
ROA = Net Income / Total Assets	0,95%	1,29%	0,57%	0,25%	-0,37%	-1,30%	-3,75%	0,73%	-0,47%	-4,08%	0,03%	-0,07%
ILLEGAL INDEX												
TOTAL ASSETS/TOTAL EQUITY	9,99	10,87	13,03	11,09	10,97	8,74	-19,83	13,19	9,47	13,38	11,37	9,74

And in the National Bank of Greece there is an increase in expenses and wages with scrapping in the year 2012, which we observe in general as a year-by-year change for each bank. There is also an increase in the indicator of fixed interest income in the total revenues. In this bank, we see fluctuations in earnings over the years even causing damages, notably in 2011 and 2012

4.2.5 Piraeus Bank

On the basis of the abovementioned data the following indicators arise:

Annex 26: Financial Ratios Piraeus Bank

Pieaeus Bank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EFFICIENCY INDICATORS												
TOTAL EXPENSES/TOTAL REVENUE	55,47%	53,91%	59,75%	54,29%	58,72%	66,28%	40,66%	22,46%	55,32%	57,39%	55,88%	48,81%
Personnel Fees and Expenses/TOTAL REVENUE	23,91%	23,52%	28,45%	25,35%	26,52%	30,41%	18,69%	12,01%	28,10%	30,26%	26,52%	23,83%
Net Interest Income/TOTAL REVENUE	66,91%	65,27%	90,73%	77,31%	89,67%	102,69%	45,26%	24,73%	79,29%	79,46%	76,53%	73,18%
Profit after Taxes	340.084	423.191	113.148	145.939	-3.620	-6.428.843	-806.727	2.506.328	-2.065.200	-2.389.397	-40.143	-90.142
Basic earnings per share	1,23	1,45	0,3426	0,3865	-0,0057	-5,9138	-7,016	0,9093	-1,2774	-1,0759	-0,0036	-0,1568
LIQUIDITY INDICATORS												
Cash and balances with Central Banks/TOTAL ASSETS	4,87%	4,88%	4,95%	3,57%	2,94%	5,19%	3,32%	2,23%	3,39%	2,95%	3,77%	4,72%
Loans and advances to customers/Due to Customers	128,23%	140,64%	138,88%	121,44%	129,68%	151,29%	120,93%	118,35%	107,46%	134,41%	117,33%	109,18%
Cash and balances with Central Banks/Due t Customers	9,32%	10,86%	10,31%	6,79%	6,34%	13,11%	6,72%	3,94%	5,70%	6,65%	7,25%	7,69%
CREDIT RISK INDICATOR												
Loans and advances to customers/TOTAL ASSETS	67,03%	63,20%	66,68%	63,87%	60,23%	59,92%	59,69%	66,92%	63,81%	59,55%	60,99%	66,98%
PROFITABILITY INDICATOR												
ROE=Net Income/Equity	20,89%	14,37%	4,31%	4,51%	-0,12%	312,28%	29,40%	30,31%	-27,96%	-24,87%	-0,41%	-0,93%
ROA = Net Income / Total Assets	1,22%	1,00%	0,23%	0,30%	-0,01%	-12,56%	-1,28%	2,92%	-2,44%	-2,88%	-0,05%	-0,13%
ILLEGAL INDEX												
TOTAL ASSETS/TOTAL EQUITY	17,16	14,38	19,14	15,11	17,51	-24,87	-22,96	10,37	11,45	8,64	8,30	7,01

The Piraeus Bank, following the trend of the whole sector, shows an increase in its expenses compared to its revenues, with the exception of the year 2012 that appears to have experienced a significant decrease. We see a relative calm in the wage bill with a decline in the years 2012 and 2013 but immediately afterwards restores to original

levels and continues the balanced course. We see in this bank the downward trend in earnings with a clear increase in losses in 2011.

4.3 Comparative Analysis of Main Financial Indicators

This section presents the main financial ratios of Greek banks and calculates the average of the Greek banking sector.

TOTAL EXPENSES/TOTAL REVENUES

This indicator shows the revenue of a bank in relation to her expenses , If the resulting percentage is less than 100%, this implies that the bank is profitable. Otherwise, that her total income is unable to over the costs incurred.

Annex 27: TOTAL EXPENSES/TOTAL REVENUES

TOTAL EXPENSES/TOTAL REVENUE	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	42,35%	49,07%	24,62%	20,57%	51,59%	47,32%	104,50%	65,99%	64,82%	54,09%	51,34%	45,52%	51,82%
ATTICA BANK	97,82%	81,25%	90,14%	88,74%	98,65%	329,79%	451,55%	334,73%	241,98%	63,41%	121,30%	90,59%	174,16%
EUROBANK ERGASIAS	42,09%	41,35%	47,79%	48,37%	48,77%	50,45%	59,94%	67,49%	57,63%	57,72%	48,11%	48,13%	51,49%
NBG	45,81%	46,33%	52,00%	50,60%	61,57%	59,91%	132,38%	66,99%	69,69%	60,77%	53,29%	60,73%	63,34%
PIRAEUS	55,47%	53,91%	59,75%	54,29%	58,72%	66,28%	40,66%	22,46%	55,32%	57,39%	55,88%	48,81%	52,41%
TOTAL AVERAGE	56,71%	54,38%	54,86%	52,52%	63,86%	110,75%	157,81%	111,53%	97,89%	58,68%	65,98%	58,75%	**78,64%**

From the reading of the table, we see that, despite the years of the crisis in Greece and the withdrawal of investor deposits and the minimization of borrowing, the banking sector keeps the index ratio at a reasonable level of profitability around 100%.

Personnel Fees and Expenses/TOTAL REVENUE

This indicator compares the bank's earnings with fees and staff costs to check how well the staff is working or not and whether there is excess work. In an attempt to reduce their costs, banks could turn to cuts in fees and expenses staff, which are the main source of costs for each banking institution. The Remuneration & Personnel / Total Revenue Index basically reflects the cost of staffing costs involved in making revenue.

Annex 28: Personal Fees and Expenses/Total Revenues

Personnel Fees and Expenses/TOTAL REVENUE	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	22,73%	24,37%	77,48%	67,01%	24,28%	22,79%	49,98%	29,04%	27,54%	22,00%	21,28%	19,02%	33,96%
ATTICA BANK	45,81%	35,86%	39,92%	40,79%	43,06%	58,33%	104,37%	97,66%	41,05%	39,46%	40,92%	19,67%	50,57%
EUROBANK ERGASIAS	23,78%	22,22%	14,95%	16,67%	15,49%	17,65%	21,20%	37,11%	31,12%	30,02%	26,33%	27,45%	23,67%
NBG	34,49%	34,56%	37,61%	37,75%	44,11%	44,93%	94,40%	48,88%	44,44%	41,26%	37,64%	41,53%	45,13%
PIRAEUS	23,91%	23,52%	28,45%	25,35%	26,52%	30,41%	18,69%	12,01%	28,10%	30,26%	26,52%	23,83%	24,80%
TOTAL AVERAGE	30,15%	28,10%	39,68%	37,51%	30,69%	34,82%	57,73%	44,94%	34,45%	32,60%	30,54%	26,30%	**35,63%**

As can be seen from the table, we see that this indicator has a growth trend with attempts to reduce it. This can be explained by both the weakness of the banking industry, due to strong unions, of mass layoffs, and of the apparent inability of credit institutions to increase their revenue amidst a financial crisis.

Net Interest Income/Total Revenues

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The net interest income to total income ratio is shown the percentage of revenue earned by a bank from its net interest income in its total income. Essentially, this indicator measures how much bank income comes from interest, from the bank's main activity, to borrowing.

Annex 29: Net Interest/Total Revenues

Net Interest Income/TOTAL REVENUE	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	70,30%	77,35%	77,48%	67,01%	81,34%	78,90%	127,28%	80,58%	81,03%	88,10%	80,60%	78,47%	82,37%
ATTICA BANK	67,19%	64,56%	72,41%	70,03%	76,41%	87,02%	75,61%	69,51%	76,26%	79,35%	81,83%	42,62%	71,90%
EUROBANK ERGASIAS	77,98%	72,32%	72,78%	76,98%	77,09%	88,27%	83,25%	81,54%	81,85%	83,03%	75,07%	78,60%	79,06%
NBG	74,08%	71,11%	87,01%	84,63%	114,99%	100,99%	198,69%	77,35%	119,80%	106,08%	94,56%	106,78%	103,01%
PIRAEUS	66,91%	65,27%	90,73%	77,31%	89,67%	102,69%	45,26%	24,73%	79,29%	79,46%	76,53%	73,18%	72,58%
TOTAL AVERAGE	71,29%	70,12%	80,08%	75,19%	87,90%	91,58%	106,02%	66,74%	87,65%	87,20%	81,72%	75,93%	**81,78%**

As shown in the above table, interest income is increasing are rising as a percentage of the total income of Greek banks, which is justified by the significant decline in the banks' activities, which now increasingly accrue to the interest earned on the loans they have made in the past.

Cash and Balances to the Central Banks/Total Assets

The Treasury and Available in the Central Bank / Total Assets indicator shows how much of the bank's revenue has as deposits in the Central Bank in relation to those that it has invested in loans. The minimum required reserves available to the Central Bank amounted to 2%, due to the crisis this percentage has been reduced to 1%.

Annex 30: Cash and Balances to the Central Banks/Total Assets

Cash and balances with Central Banks/TOTAL ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	3,16%	3,05%	2,58%	4,02%	4,40%	2,18%	1,43%	1,48%	1,87%	1,08%	1,12%	1,92%	2,36%
ATTICA BANK	3,23%	4,22%	2,67%	2,78%	1,81%	2,53%	2,80%	1,75%	2,70%	1,35%	1,20%	1,07%	2,34%
EUROBANK ERGASIAS	3,28%	1,84%	2,72%	1,73%	2,47%	1,96%	3,05%	2,56%	2,58%	2,44%	2,22%	2,06%	2,41%
NBG	3,63%	5,82%	2,34%	2,27%	5,26%	2,10%	1,56%	2,61%	2,28%	1,99%	1,91%	1,83%	2,80%
PIRAEUS	4,87%	4,88%	4,95%	3,57%	2,94%	5,19%	3,32%	2,23%	3,39%	2,95%	3,77%	4,72%	3,90%
TOTAL AVERAGE	3,64%	3,96%	3,05%	2,88%	3,38%	2,79%	2,43%	2,12%	2,56%	1,96%	2,04%	2,32%	**2,76%**

It is perceived by the table that the index Cash and Balances/Total Assets is showing fluctuations in the last years with a downward trend. A recovery occurs in 2010 due to the fact that funds were made available from the public to the banks, which were used as deposits in the Bank of Greece to strengthen their security net.

Loans and advances to customers/Due to Customers

The Index Loans and advances to customers/Due to Customers shows the relationship between the loans granted by the bank and the deposits it holds. An index of over 100% indicates that there are more loan allocations than deposits. Generally, a bank should provide loans proportional to the money it holds as deposits.

Annex 31: Loans and advances to customers/Due to customers

Loans and advances to customers/Due to Customers	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	138,61%	151,14%	124,76%	118,58%	127,81%	150,00%	141,42%	117,95%	114,96%	149,85%	138,79%	128,51%	133,53%
ATTICA BANK	95,56%	99,34%	114,52%	114,24%	111,37%	115,64%	110,56%	99,19%	97,70%	127,81%	145,68%	119,30%	112,58%
EUROBANK ERGASIAS	99,41%	95,62%	105,15%	99,18%	118,25%	149,87%	140,38%	109,81%	103,07%	126,86%	114,77%	112,02%	114,53%
NBG	73,50%	80,33%	99,12%	102,64%	124,41%	138,48%	114,89%	102,29%	98,64%	105,62%	102,93%	98,14%	103,42%
PIRAEUS	128,23%	140,64%	138,88%	121,44%	129,68%	151,29%	120,93%	118,35%	107,46%	134,41%	117,33%	109,18%	126,48%
TOTAL AVERAGE	107,06%	113,41%	116,49%	111,22%	122,30%	141,06%	125,64%	109,52%	104,37%	128,91%	123,90%	113,43%	**118,11%**

As a result of the data we can see that the index Loans and advances to customers/Due to Customers it is higher than 100%. That will be an outcome not so much from borrowing funds due to the fact that during the crises this activity reduced scientifically. We can say that is index has this view because of many depositors have been withdrawn their money in the fear of an unexpected loss.

Cash and balances with Central Banks/Due to Customers

The Index Cash and balances with Central Banks/Due to Customers is counterbalancing the bank's available cash in relation to the obligations to its customers, which in their turn are the result of their deposits. In general, the bank tries to maintain the indicator at a satisfactory level so as to be able to meet the demands of its customers, where it is the liquidation of deposits.

Annex 32: Cash and Balances with Central Bank/Due to Customers

Cash and balances with Central Banks/Due to Customers	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	7,25%	7,07%	5,10%	7,73%	8,98%	5,01%	3,32%	2,68%	3,35%	2,52%	2,32%	3,47%	4,90%
ATTICA BANK	4,13%	5,64%	4,07%	4,26%	2,59%	3,55%	3,73%	2,13%	3,27%	2,30%	2,27%	2,07%	3,33%
EUROBANK ERGASIAS	5,40%	3,23%	5,70%	3,78%	5,50%	5,51%	6,72%	4,78%	4,77%	5,72%	4,34%	3,78%	4,94%
NBG	4,98%	8,40%	3,48%	3,57%	9,66%	4,31%	2,97%	4,85%	4,24%	5,14%	3,71%	3,11%	4,87%
PIRAEUS	9,32%	10,86%	10,31%	6,79%	6,34%	13,11%	6,72%	3,94%	5,70%	6,65%	7,25%	7,69%	7,89%
TOTAL AVERAGE	6,22%	7,04%	5,73%	5,23%	6,61%	6,30%	4,69%	3,68%	4,26%	4,46%	3,98%	4,02%	**5,19%**

Generally this index has a downward trend too, with a try to increase in 2010 due to the funds that have been given to the banks from the public sector.

Loans and advances to customers/TOTAL ASSETS

The index Loans and advances to customers/ total Assets shows the loans that the bank has given to its customers, that is, it shows the demands that the business has for its customers. Also, on the basis of the indicator Loans and advances to customers/ total Assets , we can determine which part of the investments the bank has redeemed in the loans to indicate to us the percentage of the risk that has been exposed.

Annex 33: Loans and advances to customers/Total Assets

Loans and advances to customers/TOTAL ASSETS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	60,38%	65,26%	63,22%	61,62%	62,60%	65,35%	60,99%	64,96%	64,28%	63,94%	66,66%	71,08%	64,19%
ATTICA BANK	74,88%	74,29%	74,92%	74,58%	77,60%	82,43%	82,97%	81,29%	80,59%	75,05%	76,73%	61,58%	76,41%
EUROBANK ERGASIAS	60,30%	54,54%	50,24%	45,50%	53,02%	53,45%	63,81%	58,79%	55,79%	54,24%	58,83%	61,17%	55,81%
NBG	53,57%	55,68%	66,57%	65,35%	67,78%	67,54%	60,30%	55,02%	53,12%	40,79%	53,03%	57,82%	58,05%
PIRAEUS	67,03%	63,20%	66,68%	63,87%	60,23%	59,92%	59,69%	66,92%	63,81%	59,55%	60,99%	66,98%	63,24%
TOTAL AVERAGE	63,23%	62,60%	64,33%	62,18%	64,25%	65,74%	65,55%	65,39%	63,52%	58,71%	63,25%	63,73%	63,54%

We can see a moderate increase over the years not in the increase in borrowing due to the economic crisis, but in the deterioration of other assets such as the haircut of available Greek government bonds.

ROE=Net Income/Equity

The index Return on Equity reflects the return on equity of an invested bank's stock. If the index is low relative to other banks, then it is very difficult to raise capital from the market. This indicator is very important for the shareholders of the banking group.

Annex 33: ROE=Net Income/Equity

ROE=Net Income/Equity	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	20,62%	16,68%	14,11%	8,98%	-1,27%	-0,06%	263,25%	39,97%	-0,86%	-12,26%	0,46%	0,90%	29,21%
ATTICA BANK	3,35%	6,33%	3,19%	1,60%	-1,15%	-9,98%	-19,70%	-27,99%	-14,28%	-51,99%	-2,45%	1,17%	-9,33%
EUROBANK ERGASIAS	15,02%	14,49%	18,87%	7,35%	1,38%	-62,81%	-219,85%	-25,58%	-18,97%	-16,19%	3,39%	1,04%	-23,49%
NBG	9,54%	13,99%	7,47%	2,74%	-4,11%	-11,40%	74,45%	9,68%	-4,41%	-54,60%	0,29%	-0,65%	3,58%
PIRAEUS	20,89%	14,37%	4,31%	4,51%	-0,12%	312,28%	29,40%	30,31%	-27,96%	-24,87%	-0,41%	-0,93%	30,15%
TOTAL AVERAGE	13,88%	13,17%	9,59%	5,04%	-1,06%	45,60%	25,51%	5,28%	-13,30%	-31,98%	0,26%	0,31%	6,03%

We can see that the index Return on Equity beyond the years has a significant decrease, in sometimes we van notice that has negative prices. This is for sure a mirror of the bad situation that Greek economy suffers including and the bank sector.

ROA = Net Income / Total Assets

Return on assets (ROA) is an indicator of how profitable a company is relative to its total assets. ROA gives a manager, investor, or analyst an idea as to how efficient a company's management is at using its assets to generate earnings. Return on assets is displayed as a percentage.

Annex 34: ROA= Net Income/Total Assets

ROA = Net Income / Total Assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	1,07%	0,85%	0,50%	0,63%	-0,09%	0,00%	-2,11%	4,20%	-0,09%	-1,59%	0,07%	0,14%	0,30%
ATTICA BANK	1,66%	5,13%	2,26%	1,78%	-1,25%	-5,83%	-4,63%	-27,87%	-12,60%	-95,12%	-4,29%	2,09%	-11,56%
EUROBANK ERGASIAS	0,95%	1,03%	0,73%	0,32%	0,09%	-0,69%	-2,13%	-1,49%	-1,58%	-1,57%	0,38%	0,12%	-0,32%
NBG	0,95%	1,29%	0,57%	0,25%	-0,37%	-1,30%	-3,75%	0,73%	-0,47%	-4,08%	0,03%	-0,07%	-0,52%
PIRAEUS	1,22%	1,00%	0,23%	0,30%	-0,01%	-12,56%	-1,28%	2,92%	-2,44%	-2,88%	-0,05%	-0,13%	-1,14%
TOTAL AVERAGE	1,17%	1,86%	0,86%	0,65%	-0,33%	-4,08%	-2,78%	-4,30%	-3,44%	-21,05%	-0,77%	0,43%	-2,65%

And with this is index it is obvious the bad situation in economy that Greece occurs, with this index take a negative view.

TOTAL ASSETS/TOTAL EQUITY

It is known that corporations belonging to the banking industry usually have a lower return on assets than liabilities over other businesses. Companies are therefore obliged to use a large amount of financial leverage to be able to offer shareholders equity returns similar to other firms. However, when large financial leverage is used in a company's operations, then various changes in net operating earnings result in greater changes in earnings per share and hence in return on equity. If we associate this volatility with financial risk, then we see why financial leverage is a double-edged knife.

Annex 35: Total Assets/Total Equity

TOTAL ASSETS/TOTAL EQUITY	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	19,20	19,72	28,17	14,21	14,39	98,88	-124,95	9,53	9,92	7,72	6,63	6,49	9,16
ATTICA BANK	2,02	1,23	1,41	0,90	0,92	1,71	4,25	1,00	1,13	0,55	0,57	0,56	1,36
EUROBANK ERGASIAS	15,83	14,03	25,95	23,23	14,83	90,98	103,29	17,15	11,98	10,31	9,03	8,82	28,79
NBG	9,99	10,87	13,03	11,09	10,97	8,74	-19,83	13,19	9,47	13,38	11,37	9,74	8,50
PIRAEUS	17,16	14,38	19,14	15,11	17,51	-24,87	-22,96	10,37	11,45	8,64	8,30	7,01	6,77
TOTAL AVERAGE	12,84	12,05	17,54	12,91	11,72	35,09	-12,04	10,25	8,79	8,12	7,18	6,52	**10,91**

Despite its fluctuations, it shows a general picture showing growth rates and this is increasingly depreciating the participation of foreign capital in the Greek banks' balance sheets.

Profit or losses after Taxes

The Profit or Losses after Taxes is and indicator of the total carrying amount of a bank, since the purpose of each bank is to increase its profitability by making wage profits in the invested capital

Annex 36: Profit or Losses after Taxes

Profit after Taxes	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	502293,00	457006,00	334238,00	428657,00	-56309,00	-384,27	-1132934,00	2857021,00	-58529,00	-1032276,00	42302,00	85081,00	202180,48
ATTICA BANK	51283,67	200285,00	102346,00	93501,00	-59969,00	-253442,00	-180886,00	-1131600,00	-499246,00	-3494848,00	-155130,00	74490,00	-437767,94
EUROBANK ERGASIAS	475000,00	705000,00	677000,00	316000,00	84000,00	-549600,00	-1440000,00	-1157000,00	-1196000,00	-1155000,00	249000,00	72000,00	-243300,00
NBG	583658,00	914592,00	480306,00	224985,00	-360852,00	-1214474,00	-2926000,00	618000,00	-382000,00	-4540000,00	20000,00	-44000,00	-552148,75
PIRAEUS	340084,00	423191,00	113148,00	145939,00	-3620,00	-6428843,00	-806727,00	2506328,00	-2065200,00	-2389397,00	-40143,00	-90142,00	-691281,83
TOTAL AVERAGE	390463,73	540014,80	341407,60	241816,40	-79350,00	-1689348,65	-1297309,40	738549,80	-840195,00	-2522304,20	23205,80	19485,80	**-344463,61**

Observing the table in the overall and individual points we see that there is an increased reduction in the profits of the company and especially from 2010 and afterwards there is a dramatic decrease. In the last two years, the average returns to positive levels, but the overall average is negative.

Basic earnings per share

This indicator Basic earnings per share is of interest to investors and shows the profits that can be gained from the bank's equity. The more profitable the stock is, the more attractive it is to invest in the bank and the more credible for the bank's course.

Annex 37: Basic earnings per share

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Basic earnings per share	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	1,28	1,13	0,75	0,82	-0,21	-7,33	-1,17	0,43	-0,24	-2,68	0,03	0,06	-0,59
ATTICA BANK	0,00	0,19	0,06	0,03	-0,06	-1,07	-0,77	-0,15	-0,04	-0,29	-0,01	0,00	-0,18
EUROBANK ERGASIAS	10,00	12,00	1,17	0,41	0,15	-10,42	-2,14	0,41	-9,06	-3,68	0,11	0,06	-0,08
NBG	1,39	1,92	0,84	0,32	-0,57	-12,70	-15,41	0,45	-1,83	-0,40	0,00	0,01	-2,17
PIRAEUS	1,23	1,45	0,34	0,39	-0,01	-5,91	-7,02	0,91	-1,28	-1,08	0,00	-0,16	-0,93
TOTAL AVERAGE	2,78	3,34	0,63	0,39	-0,14	-7,49	-5,30	0,41	-2,49	-1,63	0,03	-0,01	**-0,79**

From the analysis of the table we see that an investor cannot benefit from his investment in Greek banks but from 2010 and afterwards he causes damages.

Due from banks/Total Assets – Due from banks/Total Liabilities

In the tables below, we see the obligations that banks have to the other bank institutions, The Bank Market is the market where banks are targeting when they have difficulty in getting cash to raise capital. However, although there is a tendency for borrowing borrowing, fewer banks can borrow capital.

Annex 38: Due from Banks/Total Assets

Due from banks/Total Assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	13,22%	13,60%	12,62%	17,92%	13,84%	11,69%	12,32%	7,40%	6,97%	5,24%	4,82%	2,90%	10,21%
ATTICA BANK	13,02%	14,32%	13,88%	11,75%	6,38%	0,68%	1,34%	2,03%	1,09%	0,26%	0,13%	0,05%	5,41%
EUROBANK ERGASIAS	10,38%	24,23%	34,06%	39,89%	32,62%	31,85%	6,94%	3,31%	4,05%	3,82%	4,16%	3,74%	16,59%
NBG	7,42%	6,08%	6,21%	6,45%	7,36%	7,87%	5,38%	4,13%	4,62%	2,52%	2,84%	2,86%	5,31%
PIRAEUS	10,62%	10,15%	9,23%	9,08%	8,54%	6,79%	4,16%	1,36%	1,10%	0,95%	0,15%	0,21%	5,19%
TOTAL AVERAGE	10,93%	13,68%	15,20%	17,02%	13,75%	11,78%	6,03%	3,64%	3,57%	2,56%	2,42%	1,95%	**8,54%**

Annex 39: Due from Banks/Total Liabilities

Due to banks/Total Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	15,44%	10,43%	16,31%	22,54%	29,37%	36,26%	48,03%	28,42%	25,96%	38,73%	32,17%	24,38%	27,34%
ATTICA BANK	9,61%	11,47%	23,64%	20,59%	16,27%	15,72%	18,71%	4,46%	5,13%	21,33%	28,33%	27,75%	16,92%
EUROBANK ERGASIAS	23,07%	22,41%	29,72%	30,65%	37,07%	45,96%	42,94%	21,79%	16,70%	34,35%	20,94%	18,22%	28,65%
NBG	9,60%	12,57%	16,47%	20,16%	29,98%	33,83%	42,71%	31,44%	24,99%	22,62%	23,16%	14,97%	23,54%
PIRAEUS	16,85%	25,28%	28,77%	29,13%	39,29%	48,55%	51,59%	31,77%	29,04%	41,68%	33,15%	21,08%	33,02%
TOTAL AVERAGE	14,92%	16,43%	22,98%	24,61%	30,40%	36,06%	40,80%	23,58%	20,36%	31,74%	27,55%	21,28%	**25,89%**

Securities held for trading/Total Assets

Annex 40: Securities held for trading/Total Assets

Securities held for trading/Total Assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	0,74%	0,49%	0,13%	0,10%	0,06%	0,02%	0,03%	0,01%	0,00%	0,00%	0,00%	0,03%	0,08%
ATTICA BANK	0,66%	0,56%	0,00%	-	-	-	-	-	-	-	-	-	0,28%
EUROBANK ERGASIAS	0,00%	-	-	-	-	-	-	-	-	-	-	-	-
NBG	20,09%	15,55%	2,05%	3,29%	1,12%	-	1,34%	1,08%	-	-	-	-	4,07%
PIRAEUS	6,68%	10,40%	2,32%	2,13%	0,36%	0,44%	0,13%	0,03%	2,43%	2,90%	3,36%	3,85%	**2,58%**
TOTAL AVERAGE	5,63%	6,75%	1,13%	1,84%	0,51%	0,23%	0,50%	0,37%	1,22%	1,45%	1,68%	1,94%	1,75%

We can see from the table that after 2009 the banks have significantly restricted their trading activities in an attempt to reduce the losses caused by the economic crisis. But we can see from the year 2014 it seems that is been an effort to increase the index and the trading activities of the banks become more vivid.

Investment securities/Total Assets

The same trend appears in the index of the investment portfolio with a downward trend indicating banks' reluctance to invest. However, in the last few years it has shown a small recovery.

Annex 41: Investments securities/Total Assets

Investment securities/Total Assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	16,05%	11,74%	0,06%	0,07%	0,07%	0,07%	0,06%	0,04%	0,05%	0,04%	0,05%	1,02%	2,44%
ATTICA BANK	4,01%	2,28%	0,64%	0,65%	0,92%	1,03%	1,11%	1,13%	1,17%	1,58%	1,56%	1,65%	1,48%
EUROBANK ERGASIAS	20,02%	13,70%	2,75%	2,43%	2,27%	0,12%	0,91%	0,94%	1,16%	1,26%	1,36%	0,54%	3,96%
NBG	4,16%	3,57%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%	0,01%	0,65%
PIRAEUS	3,98%	3,01%	0,08%	0,25%	0,36%	0,39%	0,69%	0,34%	0,38%	0,38%	1,48%	1,67%	1,09%
TOTAL AVERAGE	9,64%	6,86%	0,71%	0,68%	0,73%	0,32%	0,55%	0,49%	0,55%	0,66%	0,89%	0,98%	1,92%

Derivative financial assets/Total Assets

Banks, especially before the onset of the financial crisis, have used the derivative financial instruments in an attempt to capitalize claims that in many cases were even precarious in order to contain the losses resulting from the impairment of these assets

Annex 42: Derivative financial assets/Total Assets

Derivative financial assets/Total Assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	0,54%	0,71%	0,74%	0,55%	0,69%	1,11%	1,38%	1,19%	1,71%	1,22%	1,07%	0,93%	0,99%
ATTICA BANK	0,00%	0,00%	0,01%	0,10%	0,09%	0,09%	0,03%	0,12%	0,28%	0,10%	0,00%	0,00%	0,07%
EUROBANK ERGASIAS	2,29%	1,88%	1,78%	1,46%	1,91%	2,80%	2,79%	1,63%	2,83%	2,56%	2,98%	2,87%	2,32%
NBG	0,33%	0,47%	1,56%	1,83%	1,60%	2,67%	4,34%	3,07%	5,85%	3,50%	5,71%	5,41%	3,03%
PIRAEUS	0,39%	1,38%	0,71%	0,35%	0,27%	4,49%	0,67%	0,37%	0,60%	0,53%	0,55%	0,67%	0,92%
TOTAL AVERAGE	0,71%	0,89%	0,96%	0,86%	0,91%	2,23%	1,84%	1,27%	2,25%	1,58%	2,06%	1,98%	1,46%

It is obvious that in the first years of examination till 2010 there has been a stabilization, after 2011 although it was an increase we can see lot of fluctuations.

Derivative financial liabilities/Total Liabilities

The following table shows the participation of derivatives financial instruments (liabilities) to total liabilities. From it is understood that derivatives of liabilities are decreasing, following the trend of customer accounts for the the whole of the Greek banking sector.

Annex 43: Derivative financial Liabilities/Total Liabilities

Derivative financial liabilities/Total Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	0,48%	0,71%	1,20%	0,93%	1,74%	2,51%	2,84%	2,02%	2,88%	2,39%	2,21%	1,68%	1,80%
ATTICA BANK	0,00%	0,00%	0,00%	0,00%	0,02%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%
EUROBANK ERGASIAS	1,47%	1,37%	3,00%	2,15%	2,98%	3,74%	3,96%	2,01%	3,28%	3,21%	3,68%	3,25%	2,84%
NBG	0,56%	0,82%	1,70%	1,32%	1,46%	3,35%	5,61%	3,04%	6,96%	4,17%	6,58%	5,77%	3,45%
PIRAEUS	0,22%	0,20%	0,72%	0,33%	0,35%	0,64%	0,67%	0,38%	0,64%	0,54%	0,81%	0,63%	0,51%
TOTAL AVERAGE	0,55%	0,62%	1,33%	0,95%	1,31%	2,05%	2,62%	1,49%	2,75%	2,06%	2,66%	2,27%	**1,72%**

Due to customers/Total Liabilities

The index Due to customers/Total Liabilities presents the obligation of the banking institution to pay interest to customers who have deposits in it.

Annex 44: Due to Customers/Total Liabilities

Due to customers/Total Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	43,56%	43,18%	50,67%	51,97%	48,98%	43,57%	43,13%	55,07%	55,91%	42,67%	48,03%	55,31%	48,50%
ATTICA BANK	78,36%	74,78%	65,42%	65,29%	69,68%	71,28%	75,04%	81,95%	82,48%	58,72%	52,67%	51,62%	68,94%
EUROBANK ERGASIAS	60,66%	57,04%	47,78%	45,87%	44,84%	35,67%	45,46%	53,53%	54,13%	42,75%	51,26%	54,61%	49,47%
NBG	72,88%	69,32%	67,16%	63,67%	54,48%	48,77%	52,49%	53,79%	53,85%	38,62%	51,52%	58,92%	57,12%
PIRAEUS	52,27%	44,94%	48,01%	52,59%	46,44%	39,60%	49,36%	56,54%	59,38%	44,30%	51,98%	61,35%	50,57%
TOTAL AVERAGE	61,55%	57,85%	55,81%	55,88%	52,88%	47,78%	53,09%	60,18%	61,15%	45,41%	51,09%	56,36%	**54,92%**

As a consequence of the economic crisis and the uncertainty surrounding the capital spreads, this was expected and the customer deposits of the banking institution to be reduced.

Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities

In terms of debt securities in issue 2007 to 2011, it is on a downward path, culminating in 2012, with a recovery trend in 2013, which is staggering over the next few years, as banks are called to seek capital from the private sector.

Annex 45: Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities

Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	32,39%	37,98%	26,07%	15,34%	10,95%	9,04%	4,31%	1,90%	2,99%	0,63%	0,99%	0,77%	11,94%
ATTICA BANK	4,82%	3,82%	2,20%	1,79%	1,97%	2,17%	2,42%	1,95%	2,00%	0,00%	0,00%	0,00%	1,93%
EUROBANK ERGASIAS	7,02%	11,60%	14,89%	15,32%	8,89%	8,07%	-1,92%	5,37%	7,36%	8,73%	10,05%	11,26%	8,89%
NBG	0,00%	4,90%	4,15%	2,95%	3,30%	1,05%	-	-	2,13%	1,13%	0,68%	0,44%	2,07%
PIRAEUS	22,27%	20,53%	15,42%	10,03%	6,14%	4,47%	-4,35%	9,64%	8,73%	11,58%	11,86%	14,26%	10,88%
TOTAL AVERAGE	13,30%	15,76%	12,55%	9,09%	6,25%	4,96%	0,11%	4,71%	4,64%	4,41%	4,72%	5,35%	7,14%

Other liabilities and Provisions/Total Liabilities

Taking into account recent economic developments and unfavorable position in which the Greek as well as the global economy has come, today more than ever arises from the need to create and increase the risk profile of Greek banks. In this climate, many Greek banks have made a provisioning account, and have even increased over time

the amount they maintain to cover against unexpected risks, while others have not yet set up a provisioning account.

Annex 46: Other liabilities and Provisions/Total Liabilities

Other liabilities and Provisions/Total Liabilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AVERAGE
ALPHA BANK	1,14%	0,10%	0,01%	0,01%	0,01%	0,03%	0,06%	0,38%	0,49%	0,63%	0,63%	0,57%	0,34%
ATTICA BANK	1,38%	0,86%	0,54%	0,27%	0,26%	0,61%	0,86%	0,97%	0,69%	0,68%	0,47%	1,18%	0,73%
EUROBANK ERGASIAS	-	-	-	-	-	-	-	-	-	-	-	-	-
NBG	-	-	-	-	-	2,29%	2,78%	2,49%	1,18%	1,12%	1,42%	1,46%	1,82%
PIRAEUS	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL AVERAGE	1,26%	0,48%	0,28%	0,14%	0,14%	0,98%	1,23%	1,28%	0,79%	0,81%	0,84%	1,07%	**0,96%**

CHAPTER 5

THE CAPITAL ADEQUANCY OF THE MAJOR GREEK BANKS

5.1 INTRODUCTION

Capital Adequacy is defined as the measure that tells us whether the capital of a bank (and generally a financial institution) is sufficient for the bank to be able to cope with potential losses on loans it has already given, and to be able to be in the future that is consistent with its own obligations and its own debts. Capital adequacy is considered to be one of the most important features of a bank. If a bank does not meet this criterion it is considered to be financially weak7 and extremely dangerous to become insolvent. This is because if a bank does not have a sufficient equity capital and is therefore only financed with foreign capital (from its depositors and lenders), then it knows that even if it does not go well and bankrupt its owners will not be harmed especially since they have no "money", so they may start to work boldly by taking high-risk investments and hence high-risk (such as giving loans without very strict criteria). In other words, it will relax its "self-defense mechanisms" against bankruptcy, which eventually can actually lead it there. On the other hand, if part of its funding comes from its owners' funds, they will want a more prudent management , since a possible bankruptcy would mean a loss of their own capital. For this reason, and because the bankruptcy of a banking institution can create many problems in an economy, as it would be the beginning of a generalized financial crisis, capital adequacy is necessary and controlled.[28]

The core capital adequacy ratios of Greek banks are calculated with according to Law 3601/2007 and the provisions of the PD / TE2630 / 29.10.2012 "Determination of the own funds of credit institutions having their registered office in Greece" and Bank of Greece Governor's Act 2588 / 20.8.2007 "Capital adequacy of credit institutions institutions in accordance with the standardized approach ". Banking institutions are required to publish the capital adequacy ratios as required by Basel II Pillar 3.

It is noted that Greek banks are obliged to calculate the capital adequacy ratio and its objectivity and utilization.

5.2 Capital Adequacy Ratio

The total capital adequacy ratio of the main Greek banks that includes the capitals TIER I and TIER II on the basis of the published financial reports for the years 2006-2017 is presented in the following table:

Annex 47: Capital Adequacy Ratio Of Greek Banks

TIER I + TIER II	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL AVERAGE
ALPHA BANK	12,9	12,5	9,3	13,2	13,6	5,5	14,4	16,4	14,6	16,8	17,1	17,9	13,68
ATTICA BANK	9,7	8,48	12,6	11,4	18,2	19	4,7	11,9	9,6	18,5	14,8	15	12,82
EUROBANK ERGASIAS	10,4	12,2	10,4	12,7	11,7	12	11,6	12,2	16,6	17,4	17,9	17,4	13,54
NBG	15,6	10,2	10,3	11,3	13,7	8,3	12	16,8	21,8	21,3	16,3	16,8	14,53
PIRAEUS	11	12,3	9,9	9,8	9,6	8,7	9,7	14	12,5	17,5	16,9	16,8	12,39
TOTAL AVERAGE	11,92	11,14	10,50	11,68	13,36	10,70	10,48	14,26	15,02	18,30	16,60	16,78	13,39

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[28] Source: Equities Daily, Capital Adequacy (Available at: https://www.dailyeconomics.gr/oikonomikoi-oroi/kefalaiakh-eparkeia)

Alpha Bank:
Despite all the efforts to maintain the indicator at a specific level of 12% -13% in 2011 see a sharp reduction to 5.5% before the support of the Financial Stability Fund. From 2012 onwards, a recovery at a steady pace is evident.
Attica Bank:
The capital adequacy ratio has been successful in the first years of the survey, with a significant decrease from 2010 to 19% in 2011 by 4.7%, from 2013 seems to be recovering and following an upward trend.
Eurobank Ergasias Bank:
In this bank is stable in the capital adequacy ratio with a decline in the year 2014 and steadily rising.
National Bank of Greece:
Starting from a 15% index following a range of fluctuations, it reached 8.3% in 2011 after the funds of the Financial Stability Fund. By 2012 it seems to be booming with a maximum of the capital adequacy ratio in the years 201 and 2015 with 21 , 8% and 21.3% respectively.
Piraeus Bank:
Piraeus Bank, following an effort to improve its capital adequacy ratio in the years 2006 to 2007, showed a slight turning point in 2008-2010, which increased in 2011 with a capital adequacy ratio of 8.70%. Since then there has been an upward trend in the index rate.

5.3 Key Capital Adequacy Ratio

The key capital adequacy ratio of the main Greek banks that includes the capitals TIER I on the basis of the published financial reports for the years 2006-2017 is presented in the following table:

Annex 48: Key Capital Adequacy Ratio of Major Greek Banks

TIER I	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL AVERAGE
ALPHA BANK	10,2	9,6	7,4	11,6	11,9	4,2	13,9	16,1	14,3	16,6	17,1	17,80%	11,09
ATTICA BANK	-	9,9	9,7	15,8	16,4	8,6	3,3	11,3	9,1	18,5	14,8	15	12,04
EUROBANK ERGASIAS	8,5	9,2	8	11,5	10,6	11,5	9,3	13,9	16,2	17	17,6	17,3	12,55
NBG	12,4	9,2	10	11,3	13,1	7,2	10,5	15,8	21,4	21,3	16,3	16,8	13,775
PIRAEUS	7,4	9,8	8	9,1	-	-	9,3	13,9	12,4	17,5	16,9	16,8	12,11
TOTAL AVERAGE	9,63	9,54	8,62	11,86	13,00	7,88	9,26	14,20	14,68	18,18	16,54	13,22	12,31

From the above table and graph, it becomes clear that the Key Capital Adequacy follows the same trend as the General Index, with the adequacy of the Greek banks to initially present a turning point from which recovers in 2009 and 2010, but it is showing a significant decline in 2011, but there is a recovery from 2012, which is also growing in the next few years

CHAPTER 6

THE FINANCIAL FACTORS THAT AFFECT THE BANK'S CAPITAL ADEQUACY RATIO

6.1 Introduction

The direction of the capital adequacy ratio of the banking system may be affected by different financial factors that determine the overall picture of the banking institution. Of particular interest is the correlation between the capital adequacy ratio and the financial data of the banks as they arise from the analysis of the main financial indices of the Greek banks.

In order to analyze any correlation that may exist between the capital adequacy ratio and the bank's financial data, the regression analysis through the program Microsoft Excel.

Methodology:

    A. Separate the banks into Systemic and Non-Systemic, according of the Troika Sustainability Report systemic banks are the banks which will be recapitalized.

Systemic Banks:	Non-Systemic Banks:
1.Aplha Bank	1.Attica Bank
2.Eurobank Ergasias Bank	
3.National Bank of Greece	
4.Piraeus Bank	

    B. Calculation of the bank's Financial Ratios.

    C. An estimation of the average of the sizes of banks per year with a distinction between systemic and non-systemic banks. Thus, all of the indices to be used in the regression analysis are:

Annex 49: Average of Capital Adequacy Ratio and Financial Ratios of Systemic Banks

Systemic Banks	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL AVERAGE
TIER I AND TIER II	12,48%	11,80%	9,98%	11,75%	12,15%	8,63%	11,93%	14,85%	16,38%	18,25%	17,05%	17,23%	13,54%
EFFICIENCY INDICATORS													
TOTAL EXPENSES/TOTAL REVENUE	46,43%	47,67%	46,04%	43,46%	55,16%	55,99%	84,37%	55,73%	61,87%	57,49%	52,15%	50,80%	54,76%
Personnel Fees and Expenses/TOTAL REVENUE	26,23%	26,17%	39,62%	36,70%	27,60%	28,95%	46,07%	31,76%	32,80%	30,88%	27,94%	27,96%	31,89%
Net Interest Income/TOTAL REVENUE	72,32%	71,51%	82,00%	76,48%	90,77%	92,72%	113,62%	66,05%	90,49%	89,17%	81,69%	84,26%	84,26%
Profit after Taxes	475258,75	624947,25	401173,00	278895,25	-84195,25	-2048325,32	-1576415,25	1206087,25	-925432,25	-2279168,25	67789,75	5734,75	-321137,53
Basic earnings per share	3,48	4,13	0,78	0,48	-0,16	-9,09	-6,44	0,55	-3,10	-1,96	0,03	-0,01	-0,94
LIQUIDITY INDEX													
Cash and balances with Central Banks/TOTAL ASSETS	3,74%	3,90%	3,15%	2,90%	3,77%	2,86%	2,34%	2,22%	2,53%	2,11%	2,26%	2,63%	2,87%
Loans and advances to customers/Due to Customers	109,94%	116,93%	116,98%	110,46%	125,04%	147,41%	129,41%	112,10%	106,03%	129,19%	118,45%	111,96%	119,49%
Cash and balances with Central Banks/Due t Customers	6,74%	7,39%	6,15%	5,47%	7,62%	6,99%	4,93%	4,06%	4,51%	5,01%	4,41%	4,51%	5,65%
Securities held for trading/Total Assets	6,88%	8,81%	1,50%	1,84%	0,51%	0,23%	0,50%	0,37%	1,22%	1,45%	1,68%	1,94%	2,24%
Investment securities/Total Assets	12,84%	9,14%	1,13%	1,04%	1,00%	0,14%	0,51%	0,45%	0,55%	0,59%	0,85%	0,76%	2,42%
PROFIT AND LOSS INDEX													
ROE=Net Income/Equity	16,52%	14,88%	11,19%	5,89%	-1,03%	59,50%	36,81%	13,60%	-13,05%	-26,98%	0,93%	0,09%	9,86%
ROA = Net Income / Total Assets	1,05%	1,04%	0,51%	0,37%	-0,09%	-3,64%	-2,32%	1,59%	-1,14%	-2,53%	0,11%	0,01%	-0,42%
TOTAL ASSETS/TOTAL EQUITY	15,01%	14,21%	20,76%	15,31%	13,89%	41,76%	-15,30%	12,10%	10,32%	9,63%	8,50%	7,72%	12,83%
Risk Hazards index													
Derivative financial assets/Total Assets	0,89%	1,11%	1,20%	1,05%	1,12%	2,77%	2,29%	1,56%	2,75%	1,95%	2,58%	2,47%	1,81%
Loans and advances to customers/Total Assets	60,32%	59,67%	61,68%	59,08%	60,91%	61,57%	61,20%	61,42%	59,25%	54,63%	59,87%	64,26%	60,32%
Other liabilities and Provisions/Total Liabilities	1,14%	0,10%	0,01%	0,01%	0,01%	1,16%	1,42%	1,43%	0,83%	0,88%	1,03%	1,02%	1,08%
PASSIVE STRUCTURE INDICATOR													
Due to banks/Total Liabilities	16,24%	17,67%	22,82%	25,62%	33,93%	41,15%	46,32%	28,36%	24,17%	34,35%	27,36%	19,67%	28,14%
Due to customers/Total Liabilities	57,34%	53,62%	53,41%	53,53%	48,69%	41,90%	47,61%	54,73%	55,82%	42,09%	50,70%	57,55%	51,41%
Derivative financial liabilities/Total Liabilities	0,68%	0,77%	1,66%	1,18%	1,63%	2,56%	3,27%	1,86%	3,44%	2,58%	3,32%	2,83%	2,15%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	15,42%	18,75%	15,13%	10,91%	7,32%	5,66%	-0,66%	5,64%	5,30%	5,51%	5,89%	6,68%	8,45%
Due from banks/Total Assets	10,41%	13,51%	15,53%	18,33%	15,59%	14,55%	7,20%	4,05%	4,19%	3,13%	2,99%	2,43%	9,33%

Annex 50: Average of Capital Adequacy Ratio and Financial Ratios of Non-Systemic Banks

Non-Systemic Banks	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL AVERAGE
TIER I AND TIER II	9,70%	8,42%	12,60%	11,40%	18,20%	19,00%	4,70%	11,90%	9,60%	18,50%	14,80%	15,00%	12,82%
EFFICIENCY INDICATORS													
TOTAL EXPENSES/TOTAL REVENUE	97,82%	81,25%	90,14%	88,74%	98,65%	329,79%	451,55%	334,73%	241,98%	63,41%	121,30%	90,59%	174,16%
Personnel Fees and Expenses/TOTAL REVENUE	45,81%	35,86%	39,92%	40,79%	43,06%	58,33%	104,37%	97,66%	41,05%	39,46%	40,92%	19,67%	50,57%
Net Interest Income/TOTAL REVENUE	67,19%	64,56%	72,41%	70,03%	76,41%	87,02%	75,61%	69,51%	76,26%	79,35%	81,83%	42,62%	71,90%
Profit after Taxes	51283,67	200285,00	102346,00	93501,00	-59969,00	-253442,00	-180886,00	-1131600,00	-499246,00	-3494848,00	-155130,00	74490,00	-437767,94
Basic earnings per share	0,00	0,19	0,06	0,03	-0,06	-1,07	-0,77	-0,15	-0,04	-0,29	-0,01	0,00	-0,18
LIQUIDITY INDEX													
Cash and balances with Central Banks/TOTAL ASSETS	3,23%	4,22%	2,67%	2,78%	1,81%	2,53%	2,80%	1,75%	2,70%	1,35%	1,20%	1,07%	2,34%
Loans and advances to customers/Due to Customers	95,56%	99,34%	114,52%	114,24%	111,37%	115,64%	110,56%	99,19%	97,70%	127,81%	145,68%	119,30%	112,58%
Cash and balances with Central Banks/Due t Customers	4,13%	5,64%	4,07%	4,26%	2,59%	3,55%	3,73%	2,13%	3,27%	2,30%	2,27%	2,07%	3,33%
Securities held for trading/Total Assets	0,66%	0,56%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,41%
Investment securities/Total Assets	4,01%	2,28%	0,64%	0,65%	0,92%	1,03%	1,11%	1,13%	1,17%	1,58%	1,56%	1,65%	1,48%
PROFIT AND LOSS INDEX													
ROE=Net Income/Equity	3,35%	6,33%	3,19%	1,60%	-1,15%	-9,98%	-19,70%	-27,99%	-14,28%	-51,99%	-2,45%	1,17%	-9,33%
ROA = Net Income / Total Assets	1,66%	5,13%	2,26%	1,78%	-1,25%	-5,83%	-4,63%	-27,87%	-12,60%	-95,12%	-4,29%	2,09%	-11,56%
TOTAL ASSETS/TOTAL EQUITY	2,02%	1,23%	1,41%	0,90%	0,92%	1,71%	4,25%	1,00%	1,13%	0,55%	0,57%	0,56%	1,36%
Risk Hazards index													
Loans and advances to customers/TOTAL ASSETS	74,88%	74,29%	74,92%	74,58%	77,60%	82,43%	82,97%	81,29%	80,59%	75,05%	76,73%	61,58%	76,41%
Derivative financial assets/Total Assets	0,00%	0,00%	0,01%	0,10%	0,09%	0,09%	0,03%	0,12%	0,28%	0,10%	0,00%	0,00%	0,07%
Other liabilities and Provisions/Total Liabilities	1,38%	0,86%	0,54%	0,27%	0,26%	0,61%	0,86%	0,97%	0,69%	0,68%	0,47%	1,18%	0,73%
PASSIVE STRUCTURE INDICATOR													
Due to banks/Total Liabilities	9,61%	11,47%	23,64%	20,59%	16,27%	15,72%	18,71%	4,46%	5,13%	21,33%	28,33%	27,75%	16,92%
Due to customers/Total Liabilities	78,36%	74,78%	65,42%	65,29%	69,68%	71,28%	75,04%	81,95%	82,48%	58,72%	52,67%	51,62%	68,94%
Derivative financial liabilities/Total Liabilities	0,00%	0,00%	0,00%	0,00%	0,02%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	4,82%	3,82%	2,20%	1,79%	1,97%	2,17%	2,42%	1,95%	2,00%	0,00%	0,00%	0,00%	1,93%
Due from banks/Total Assets	13,02%	14,32%	13,88%	11,75%	6,38%	0,68%	1,34%	2,03%	1,09%	0,26%	0,13%	0,05%	5,41%

D. Separate the Financial Ratios in 5 basic categories:
1. Profit and Loss Index: Print out the major reason of operation of the bank institution, which is to achieve profits for the shareholders
- ROE
- ROA
- TOTAL ASSETS/TOTAL EQUITY

2. Efficiency Ratios: The efficiency is associated with the use of the sources of the bank institution.
- Total Expenses/Total Revenues
- Personal Fees and Expenses/Total Revenues
- Net Interest Income/Total Revenues
- Profit and Losses after taxes
- Basic Earnings per share

3. Liquidity Ratios: Liquidity for a bank implies an immediate response to short-term liabilities, planned or unforeseen, which may arise.

- Cash and Balances with Central Banks/Total Assets
- Cash and Balances with Central Banks/Due to Customers
- Loans and advances to customers/Due to customers
- Securities held for trading/Total Assets
- Investment Securities/Total Assets

4. Risk Hazards Ratios:
   - Derivative Financial assets/Total Assets
   - Loans and advances to customers/Total Assets
   - Other Liabilities and Provisions/Total Liabilities
5. Passive Structure Indicators:
   - Due to banks/Total Liabilities
   - Due to customers/Total Liabilities
   - Derivative Financial liabilities/Total Liabilities
   - Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities

E. Calculation of Regression with dependent variable the Capital Adequacy Ratio independent variable the Financial Indicators separate in the categories mentioned above.

6.2 Regression Analysis

6.2.1 Correlation of Capital Adequacy Ratio with Profit and Loss Index.

Basis of the above methodology, we perform a regression analysis, with a dependent index (Y), the Capital Adequacy Ratio, and independent (Xi) the Profit and Loss Index for both systemic and for non-systemic banks.

The results of the regression are as follows:

Systemic Banks:

Annex 51: Correlation of Capital Adequacy Ratio with Profit and Loss Index.

SUMMARY OUTPUT								
Regression statistics								
Multiple R	0,812853488							
R Square	0,660730794							
Adjusted R Square	0,533504841							
Standard Error	0,021263019							
Observations	12							
ANOVA								
	Df	*SS*	*MS*	*F*	*Significance F*			
Regressions	3	0,00704401	0,002348003	5,193364882	0,027810898			
Residual	8	0,003616928	0,000452116					
Total	11	0,010660938						
	Coefficients	*Standard Error*	*t*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	0,151675109	0,009013623	16,82731948	1,5759E-07	0,130889658	0,172460561	0,130889658	0,172460561
ROE=Net Income/Equity	-0,103004492	0,031179868	-3,303557646	0,010801412	-0,174905397	-0,031103587	-0,174905397	-0,031103587
TOTAL ASSETS/TOTAL EQUITY	-0,057430772	0,053129749	-1,080953201	0,31122355	-0,179948193	0,065086649	-0,179948193	0,065086649
ROA = Net Income / Total Assets	-0,29146228	0,407373625	-0,715466742	0,494669483	-1,230867544	0,647942983	-1,230867544	0,647942983

The above analysis shows that a significant percentage of the capital adequacy ratio is dependent on the profitability indices for systemic banks with R^2 = 81,28% and R_a^2 =66%. Moving to hypothesis testing, the value of the criterion F is lower than the

degrees of freedom 5% that we have defined and hence the zero hypothesis H_0 is resected, that the calculated regression equation does not explain the value of the capital adequacy ratio. In analyzing the contribution of the sub-indices in the formulation of the capital adequacy ratio, on the basis of the analysis of P criteria for the individual profit indices, we see that the index ROE meet the criterion $P < a=5\%$ and are therefore important in the configuration of the capital adequacy ratio the index ROA is a little bit less and the index Total Assets/Total Equity is less $P < a=5\%$ where it can be assumed that they not affect the Capital Adequacy Ratio

Non-Systemic Banks

Annex 52: Correlation of Capital Adequacy Ratio with Profit and Loss Index

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0,672617								
R Square	0,452413								
Adjusted R Square	0,247068								
Standard Error	0,038485								
Observations	12								
ANOVA									
	Df	*SS*		*MS*	*F*	Significance F			
Regressions	3	0,009789335		0,003263112	2,203186163	0,165370996			
Residual	8	0,011848701		0,001481088					
Total	11	0,021638037							
	Coefficients	Standard Error		*t*	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,157349	0,022514157		6,988886472	0,000113896	0,105431147	0,209266624	0,105431147	0,209266624
ROE=Net Income/Equity	0,004106	0,234673758		0,017496057	0,986469361	-0,537052791	0,545264522	-0,537052791	0,545264522
ROA = Net Income / Total Assets	-0,04073	0,148624077		-0,274045144	0,79099295	-0,383457443	0,30199803	-0,383457443	0,30199803
TOTAL ASSETS/TOTAL EQUITY	-2,47122	1,547306136		-1,597114075	0,148907255	-6,039318757	1,096869941	-6,039318757	1,096869941

The above analysis shows there is not such a significant percentage of the capital adequacy ratio is dependent on the profitability indices for non- systemic banks with $R^2 = 0.68\%$ and $R_a^2 = 0,45\%$. Moving to hypothesis testing, the value of the criterion F= 0,16 is higher than the degrees of freedom 5% that we have defined and hence the zero hypothesis H_0 is not rejected In analyzing the contribution of the sub-indices in the formulation of the capital adequacy ratio, on the basis of the analysis of P criteria for the individual profit indices, we see that all the profit indexes do not meet the criterion $P < a=5\%$
where it can be assumed that they not affect the Capital Adequacy Ratio.

6.2.2 Correlation of Capital Adequacy Ratio with Efficiency Index

Basis of the above methodology, we perform a regression analysis, with a dependent index (Y), the Capital Adequacy Ratio, and independent (Xi) the Efficiency Index for both systemic and for non-systemic banks.
The results of the regression are as follows:
Systemic Banks:

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Annex 53: Correlation of Capital Adequacy Ratio with Efficiency Index.

SYMMARY OUTPUT									
Refression Statistics									
Multiple R	0,577993								
R Square	0,334076								
Adjusted R Square	-0,22086								
Standard Error	0,034398								
Observations	12								
ANOVA									
	df	*SS*	*MS*	*F*	*significance F*				
Regressions	5	0,003562	0,000712	0,602008412	0,702945177				
Residual	6	0,007099	0,001183						
Total	11	0,010661							
	Coefficients+J1J1	*Standard E*	*t*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*	
Intercept	0,161357	0,115801	1,3934	0,212927408	-0,121997771	0,444712	-0,122	0,444712	
TOTAL EXPENSES/TOTAL REVENUE	0,206997	0,176248	1,174462	0,284708055	-0,224267346	0,638261	-0,22427	0,638261	
Personnel Fees and Expenses/TOTAL REVENUE	-0,13673	0,226186	-0,60448	0,567661588	-0,690181657	0,416731	-0,69018	0,416731	
Net Interest Income/TOTAL REVENUE	-0,11387	0,202055	-0,56355	0,593478774	-0,608280338	0,380542	-0,60828	0,380542	
Profit after Taxes	-1,8E-08	1,91E-08	-0,96613	0,37128869	-6,52706E-08	2,83E-08	-6,5E-08	2,83E-08	
Basic earnings per share	0,006081	0,005297	1,148077	0,294641731	-0,006879385	0,019041	-0,00688	0,019041	

From the above analysis it appears that is not an important percentage of the capital adequacy ratio depends on the indicators

with $R^2 = 57{,}80\%$ and $R_a^2 = 33{,}40\%$, the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than α = 5%. Efficiency indicators therefore do not interpret its value capital adequacy ratio for systemic banks.

<u>Non-Systemic Banks:</u>

Annex 54: Correlation of Capital Adequacy Ratio with Efficiency Index

Summary Output								
Regression Statictics								
Multiple R	0,748199							
R Square	0,559801							
Adjusted R Square	0,192969							
Standard Error	0,039844							
Observations	12							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regressions	5	0,012113	0,002423	1,526042261	0,308724898			
Residual	6	0,009525	0,001588					
Total	11	0,021638						
	Coefficients+J1J1	*Standard E*	*t*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	0,139584	0,090527	1,541901	0,174035689	-0,081928218	0,361097	-0,08193	0,361097
TOTAL EXPENSES/TOTAL REVENUE	-0,02075	0,026991	-0,76874	0,471215904	-0,086794206	0,045296	-0,08679	0,045296
Personnel Fees and Expenses/TOTAL REVENUE	-0,05472	0,109745	-0,4986	0,635809431	-0,323254516	0,213817	-0,32325	0,213817
Net Interest Income/TOTAL REVENUE	0,046749	0,128833	0,36286	0,729149193	-0,268495203	0,361992	-0,2685	0,361992
Profit after Taxes	-1E-08	1,33E-08	-0,7526	0,480163955	-4,25825E-08	2,25E-08	-4,3E-08	2,25E-08
Basic earnings per share	-0,08179	0,05914	-1,38297	0,215940569	-0,226497837	0,062921	-0,2265	0,062921

From the above analysis also for the non-systemic banks, however an important percentage of the capital adequacy ratio depends on the indicators with $R^2 = 74,82\%$ and $R_a^2 = 55,98\%$, the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than $P < \alpha = 5\%$. Efficiency indicators therefore do not interpret its value capital adequacy ratio for non-systemic banks.

6.2.3 Correlation of Capital Adequacy Ratio with Liquidity Index.

 Basis of the above methodology, we perform a regression analysis, with a dependent index (Y), the Capital Adequacy Ratio, and independent (Xi) the Liquidity Index for both systemic and for non-systemic banks.
The results of the regression are as follows:
Systemic Banks:
Annex 55: Correlation of Capital Adequacy Ratio with Liquidity Index.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,755046							
R Square	0,570094							
Adjusted R Square	0,211839							
Standard Error	0,027638							
Observations	12							
ANOVA								
	df	SS	MS	F	gnificance F			
Regressions	5	0,006078	0,001216	1,591306	0,29244			
Residual	6	0,004583	0,000764					
Total	11	0,010661						
	Coefficients+J1J1	Standard E	t	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,356201	0,284402	1,252457	0,257008	-0,3397	1,052107	-0,3397	1,052107
Cash and balances with Central Banks/TOTAL ASSETS	-3,82421	9,409053	-0,40644	0,698519	-26,8473	19,19891	-26,8473	19,19891
Loans and advances to customers/Due to Customers	-0,10214	0,246923	-0,41366	0,6935	-0,70634	0,502055	-0,70634	0,502055
Cash and balances with Central Banks/Due to Customers	0,052295	4,908776	0,010653	0,991845	-11,959	12,06364	-11,959	12,06364
Securities held for trading/Total Assets	0,494895	0,813254	0,608537	0,565142	-1,49507	2,484855	-1,49507	2,484855
Investment securities/Total Assets	-0,13277	0,557881	-0,23799	0,819809	-1,49786	1,232317	-1,49786	1,232317

From the above analysis, however an important percentage of the capital adequacy ratio depends on the indicators with $R^2 = 75,50\%$ and $R_a^2 = 57,01\%$, the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than P< α = 5%. Liquidity indicators therefore do not interpret its value capital adequacy ratio for systemic banks.

Non-Systemic Banks:

Annex 56: Correlation of Capital Adequacy Ratio with Liquidity Index.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,699045							
R Square	0,488663							
Adjusted R Square	0,062549							
Standard Error	0,042942							
Observations	12							
ANOVA								
	df	SS	MS	F	gnificance F			
Regressions	5	0,010574	0,002115	1,14679	0,428737			
Residual	6	0,011064	0,001844					
Total	11	0,021638						
	Coefficients+J1J1	Standard I	t	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,243179	0,237604	1,023463	0,345569	-0,33822	0,824576	-0,33822	0,824576
Cash and balances with Central Banks/TOTAL ASSETS	-5,48445	9,504545	-0,57703	0,5849	-28,7412	17,77233	-28,7412	17,77233
Loans and advances to customers/Due to Customers	0,03982	0,199041	0,200058	0,848044	-0,44722	0,526855	-0,44722	0,526855
Cash and balances with Central Banks/Due t Customers	0,339698	7,517919	0,045185	0,965426	-18,056	18,73538	-18,056	18,73538
Securities held for trading/Total Assets	22,26836	27,10609	0,821526	0,442759	-44,0579	88,59458	-44,0579	88,59458
Investment securities/Total Assets	-4,43458	5,568826	-0,79632	0,456188	-18,061	9,19185	-18,061	9,19185

Also for the Non-Systemic banks the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than $P<\alpha = 5\%$. Liquidity indicators therefore do not interpret its value capital adequacy ratio for non-systemic banks.

6.2.4 Correlation of Capital Adequacy Ratio with Risk Hazard Index.

 Basis of the above methodology, we perform a regression analysis, with a dependent index (Y), the Capital Adequacy Ratio, and independent (Xi) the Risk Hazard Index for both systemic and for non-systemic banks.
The results of the regression are as follows:
Systemic Banks:
Annex 57: Correlation of Capital Adequacy Ratio with Risk Hazard Index.

SUMMARY OUTPUT								
Refression Statistics								
Multiple R	0,549292144							
R Square	0,30172186							
Adjusted R Square	0,039867557							
Standard Error	0,030504712							
Observations	12							
ANOVA								
	df	SS	MS	F	gnificance F			
Regressions	3	0,003217	0,001072	1,152251	0,385719			
Residual	8	0,007444	0,000931					
Total	11	0,010661						
	Coefficients	Standard E	t	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,420537887	0,245072	1,715977	0,124503	-0,1446	0,985675	-0,1446	0,985675
Derivative financial assets/Total Assets	1,239696965	1,554733	0,79737	0,448254	-2,34552	4,824917	-2,34552	4,824917
Loans and advances to customers/Total Assets	-0,524361721	0,408125	-1,28481	0,23481	-1,4655	0,416777	-1,4655	0,416777
Other liabilities and Provisions/Total Liabilities	1,154709316	2,034036	0,567694	0,585818	-3,53579	5,845204	-3,53579	5,845204

From the above analysis, the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than $P< \alpha = 5\%$. Risk Hazard indicators therefore do not interpret its value capital adequacy ratio for systemic banks
Non-Systemic Banks:
 Annex 58: Correlation of Capital Adequacy Ratio with Risk Hazard Index.

SUMMARY OUTPUT								
Refression Statistics								
Multiple R	0,48464486							
R Square	0,23488064							
Adjusted R Square	-0,05203912							
Standard Error	0,045491319							
Observations	12							
ANOVA								
	df		*SS*	*MS*	*F*	*gnificance F*		
Regressions	3		0,005082356	0,001694	0,818628	0,51904		
Residual	8		0,016555681	0,002069				
Total	11		0,021638037					
	Coefficients		Standard Error	*t*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%* *Upper 95%*
Intercept	0,37425313		0,213816209	1,75035	0,11817	-0,11881	0,867314	-0,11881 0,867314
Loans and advances to customers/TOTAL ASSETS	-0,268660816		0,273504411	-0,98229	0,354727	-0,89936	0,362041	-0,89936 0,362041
Derivative financial assets/Total Assets	3,868046125		18,90560374	0,204598	0,842996	-39,7284	47,46445	-39,7284 47,46445
Other liabilities and Provisions/Total Liabilities	-5,944227799		4,274764566	-1,39054	0,201825	-15,8019	3,913397	-15,8019 3,913397

Also for the Non-Systemic banks the value of Criterion F is significantly higher than the 5% freedom we have set, and therefore the zero hypothesis H_0 is valid, that is it does not explain the estimated regression equation is the value of the Capital Adequacy Index. The same is presumed by the analysis of the P criteria for the individual indicators with values significantly higher than P< α = 5%. Liquidity indicators therefore do not interpret its value capital adequacy ratio for non-systemic banks.

6.2.5 Correlation of Capital Adequacy Ratio with Passive Structure Index.

Basis of the above methodology, we perform a regression analysis, with a dependent index (Y), the Capital Adequacy Ratio, and independent (Xi) the Passive Structure Index for both systemic and for non-systemic banks.
The results of the regression are as follows:
Systemic Banks:
Annex 59: Correlation of Capital Adequacy Ratio with Passive Structure Index.

SUMMARY OUTPUT

Refression Statistics	
Multiple R	0,921627
R Square	0,849396
Adjusted R Square	0,763337
Standard Error	0,015145
Observations	12

ANOVA

	df	SS	MS	F	gnificance F
Regressions	4	0,009055	0,002264	9,869897	0,005267
Residual	7	0,001606	0,000229		
Total	11	0,010661			

	Coefficients	Standard I	t	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,730256	0,157698	4,630708	0,002396	0,357358	1,103153	0,357358	1,103153
Due to banks/Total Liabilities	-0,76223	0,155386	-4,90539	0,001742	-1,12966	-0,3948	-1,12966	-0,3948
Due to customers/Total Liabilities	-0,54917	0,179358	-3,06185	0,018276	-0,97328	-0,12505	-0,97328	-0,12505
Derivative financial liabilities/Total Liabilities	-0,52874	0,95783	-0,55202	0,59811	-2,79365	1,736168	-2,79365	1,736168
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	-1,02436	0,25925	-3,95126	0,005523	-1,63739	-0,41133	-1,63739	-0,41133

The above analysis shows that a significant percentage of the capital adequacy ratio is dependent on the profitability indices for systemic banks with $R^2 = 92,14\%$ and $R_a^2 = 84,93\%$. Moving to hypothesis testing, the value of the criterion F is lower than the degrees of freedom 5% that we have defined and hence the zero hypothesis H_0 is resected, that the calculated regression equation does not explain the value of the capital adequacy ratio. In analyzing the contribution of the sub-indices in the formulation of the capital adequacy ratio, on the basis of the analysis of P criteria for the individual passive structure indices, we see that the index Due to banks/Total Liabilities ,Due to customers/Total Liabilities and Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities meet the criterion P < a=5% and are therefore important in the configuration of the capital adequacy ratio the index. Derivative financial liabilities/Total Liabilities is less than P < a=5% where it can be assumed that they not affect the Capital Adequacy Ratio

Non-Systemic Banks

Annex 60: Correlation of Capital Adequacy Ratio with Passive Structure Index

SUMMARY OUTPUT

Regrassion Satistics	
Multiple R	0,752883
R Square	0,566833
Adjusted R Square	0,319308
Standard Error	0,036592
Observations	12

ANOVA

	df	SS	MS	F	gnificance F
Regressions	4	0,012265	0,003066	2,290008	0,015962
Residual	7	0,009373	0,001339		
Total	11	0,021638			

	Coefficients	Standard I	t	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0,588501	0,314555	1,870898	0,103541	-0,1553	1,332307	-0,1553	1,332307
Due to banks/Total Liabilities	-0,55703	0,420094	-1,32597	0,026479	-1,5504	0,436333	-1,5504	0,436333
Due to customers/Total Liabilities	-0,5255	0,377191	-1,3932	0,02062	-1,41742	0,366413	-1,41742	0,366413
Derivative financial liabilities/Total Liabilities	316,4597	219,2679	1,443256	0,019216	-202,027	834,9458	-202,027	834,9458
Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities	-0,6082	1,206792	-0,50398	0,629746	-3,46181	2,245408	-3,46181	2,245408

The above analysis also for the Non-Systemic Banks shows that a significant percentage of the capital adequacy ratio is dependent on the profitability indices for systemic banks with $R^2 = 75,28\%$ and $R_a^2 = 56,68\%$. Moving to hypothesis testing, the value of the criterion F is lower than the degrees of freedom 5% that we have defined and hence the zero hypothesis H_0 is resected, that the calculated regression equation does not explain the value of the capital adequacy ratio. In analyzing the contribution of the sub-indices in the formulation of the capital adequacy ratio, on the basis of the analysis of P criteria for the individual passive structure indices, we see that the index Due to banks/Total Liabilities ,Due to customers/Total Liabilities and Derivative financial liabilities/Total Liabilities   meet the criterion P < a=5% and are therefore important in the configuration of the capital adequacy ratio the index. Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities is less than
P < a=5% where it can be assumed that they not affect the Capital Adequacy Ratio

6.3 Results of Regression Analysis

The above analysis aimed to find a correlation, if it is existed, with the capital adequacy ratio and the main economic indicators that portray the financial position of a banking institution.
In order to occur a valid analysis regression, it was seemed appropriate the distinction of the banks into systemic and non-systemic, due to the significant differences that factor entails in size, organization and operation of bank institutions.
In addition, the financial indicators were grouped together with aim to look at the correlation of the capital adequacy ratio with each of the individual categories of indicators, including profitability and leverage, efficiency, liquidity, risks and risks composition of liabilities.
The results of the regression analysis show us a different behavior of Capital Adequacy Ratio of Systemic and Non-Systemic Banks, with different factors affect the ratio in each category.
As concern as the Systemic Banks, the profit index ROE seems to affect the capital adequacy ratio, as well as the index Total Assets/Total Equity, which is justified by the high degree of leverage in Greek Banks and the need to de-escape them, in an effort to rehabilitate it their financial situation. From the other side, the profit index ROA seems to have no correlation with the capital adequacy ratio.
As everyone would expect that efficiency, liquidity and Risk Hazard indicators to play a significant role in the behavior of capital adequacy ratio, no relationship was founded between them.
For the Passive Structure Indicators, we can see that a have an affection on the capital adequacy ratio, and more specific the Due to banks/Total Liabilities, Due to customers/Total Liabilities and Derivative financial liabilities/Total Liabilities indicators seem to configure the behavior of capital adequacy ratio. The Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities it is founded that It is not correlated with the capital adequacy ratio.

From the other hand, as concern as the non-systemic banks the only correlation was founded was with the passive structure indicators and more specific the Due to banks/Total Liabilities, Due to customers/Total Liabilities and Debt securities in issue held by institutional investors and other borrowed funds/Total Liabilities indicators are these indexes that have effect on capital adequacy ratio in non-systemic banks. Derivative financial liabilities/Total Liabilities seem not to have any correlation. We can see that for the same category different indicators affecting the systemic and no systemic banks.

With the other categories of the indexes we were not able to find any correlation with the non-systemic banks and capital adequacy ratio.

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