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ANALYSIS ON ECONOMIC RESCUE PLANS AND REGULATION PROCESS ADOPTED IN THE USA AND EU AFTER 2007 FINANCIAL CRISIS

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INTRODUCTION

The global financial crisis that broke out in 2007 in the USA was one of the biggest financial crises in history, which, starting from the banking sector, has hit other branches of the economy in a capillary way, with a high range of action mainly due to the use of digital technology. Nowadays the causes and the technical elements that have led to the development of the crisis have been analyzed by many experts, politicians, economists who have understood its roots and explained how it has branched around the world.

The social and economic context in the early 2000s has encouraged the development of an unprecedented crisis, incentivized by a deregulation system inappropriately exploited by all market players.

This thesis will address the issue from a different point of view, paying more attention to the reactions and maneuvers carried out by the United States of America and the European Union to face and overcome this period of uncertainty that has enveloped us for about ten years. The regulatory process that took place was of such magnitude that it decisively disrupted the foundations of the world economic system, putting into question dogmas and certainties that before 2007 were considered untouchables and solid. The roots of the financial disaster are to be found in the banking sector, as financial institutions are considered responsible for their credit management policies, especially on subprime mortgages, considered too risky and lacking any concrete guarantees. However, defects are not exclusively attributable to large American banks, because even organizations such as rating agencies have not performed their duties properly. In order to have a more complete picture of regulatory development, since there are several actors involved, core arguments will regard the innovations introduced in the banking sector, rating agencies and derivatives market.

In Chapter 1 the analysis will be on the financial crisis development, hinting at its evolution but focusing mainly on the impact it has had on the real economy, in terms of GDP and inflation, and the heavy sovereign debt crisis that resulted in the following years. For data collection and graphs draw it has been consulted websites and database including the World Economic Outlook Database of the International Monetary Fund, and websites such as "macrotrends.net" and "tradingeconomics.com". For the drawing up of the tables, it has been consulted the European Stability Mechanism (ESM) and European Commission websites to gather numerical data.

In Chapter 2 the analysis will focus on the core argument of the thesis, talking about the regulation process and rescue plans adopted from both American and European Governments. For what concern USA, the attention will focus on Troubled Asset Relief Programs, explaining its features and target sectors, and the Dodd-Frank Act, explaining the most important points,

especially in banking and rating agencies announcements. As regards Europe, the financing plan that will be illustrate are the Long-Term Refinancing Operation program (LTRO) and the Target Long-Term Refinancing Operations (TLTRO), explaining amount provided and beneficiaries of the programs, and an overall explanation of Basel Accords, emphasizing the attention on its evolution since Basel 1 Accords up today. Moreover, an explanation on derivatives market and its regulation process will be illustrated to underline its relevant role in the financial crisis and the unavoidable necessity to regulate it. Data gathered to analyze these topics have been taken from Treasury Department website and Bank of International Settlements database, in particular for what concern Basel Accords (documents consulted have been *"The New Basel Capital Accord"* and *"Basel III: A global regulatory framework for more resilient banks and banking systems"*) and details of TARP and LTRO programs.

The Chapter 3 will illustrate the Basel Accords evolution, informally called Basel 4 Accords, that regards modification inherent to Basel 3 Accords regulation in terms of contents and implementation date; the economic bubble phenomenon, underlying how its presence stimulated the birth of the crisis and its importance in the economic system, in that bubbles are phenomena that regularly occur in the history. A comparative analysis of some economic bubbles of the past will be shown to identify the evolutionary process and ways in which they could be avoided or mitigated. In the end, the final part will talk about Eurobond, or Stability bond, project, that was born to solve sovereign debt crisis in 2011 and its technical wide spreading, underling the advantages that European Union could draw from using this financing system. To face these topics, it has been consulted the official document released by Bank of International Settlements called *"Basel III: Finalizing post-crisis reform"*, CONSOB website and the Green Paper document released by European Commission. Further sources used are listed in Bibliography and Webliography at the end of this thesis.

1. CHAPTER 1: 2007 GLOBAL FINANCIAL CRISIS

1.1 Causes and technical aspects

The 2007 Global financial crisis has been considered one of the biggest ones occurred after the 1929 economic crisis, due to its relevant impact on the overall economy, originating in USA and extended in European Union (EU) and the rest of the world. Nowadays, States hit by the crisis are still suffering the after-effects, and Governments are longer studying possible ways to overcome the consequent impacts. In order to better understand the reasons that brought to crisis eruption, it is necessary to analyze the picture in which the crisis is collocated.

In the 1990s and early 2000s, the USA economy was based on deregulation principles (one of the key concepts of the modern finance) that is characterized by a little pervasive regulation, a system of capital allocation based on the market and an extensive use of leverage. Modern finance can be considered a successor of traditional banking, this latter a system in which banks, regulated by special authorities, lend money to trusted customers and hold the debt in their balance sheets. The development of modern finance has been fueled largely by deregulation, as well as by technological innovations and the increasing international mobility of capital, phenomena that have occurred since the 1980s, and have been very pronounced in the last years. It is widespread opinion that one of the main factors that stimulated the financial crisis eruption was the excessive degree of "laissez-faire".

The origins of 2007 financial crisis (the so called "subprime[1] mortgage crisis"), can be found in the USA starting from 2000, when American banks pursued an expansive credit policy to favor the purchase of housing, even to subjects that did not have sufficient and solid guarantees to repay the incurred debt.

The system that contributed to increase the insolvency risk and subprime mortgage loan growth is the securitization, through which financial institutions transformed mortgage loan in mortgage-back securities, called "Collateralized debt obligations"[2] (CDO), and sold them to Special Purpose Vehicle (SPV, see Figure 1). By doing so, banks collected immediately a good portion of the credit without waiting for the mortgage expiration.

[1] "Subprime" refers to a loan granted to a person who could not have access to a more favorable interest rate in the credit market, due to its bad reputation as debtor.

[2] A collateralized debt obligation is a structured financial product that pools together cash flow-generating assets and repackages this asset pool into discrete tranches that can be sold to investors and these tranches vary substantially in their risk profiles (i.e. Senior, Mezzanine, Junior).

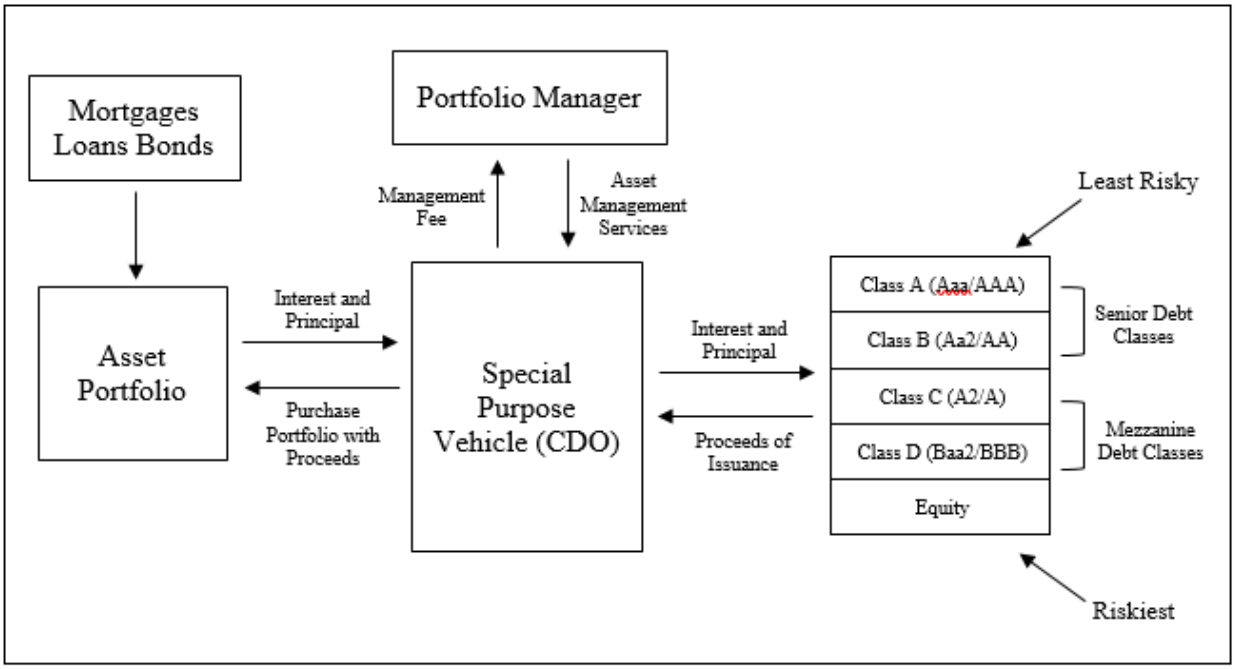

Figure 1. Sale mechanism of CDO

This system is called "Originate to Distribute" (OTD), that substituted the previous one "Originate to Hold" (OTH), thanks to which banks, returning in advance of a part of the money lent, could continue to provide loans (thanks to financial leverage[3]), raising profit levels, but, at the same time, exposing themselves to higher levels of risk. Originally, the OTD model should contribute to financial stability by fragmenting and distributing risk to "non-systemic" investors. The crisis, instead, revealed a concentration of credit risk exposures both in commercial and investment banks that were looking for new sources of profits (e.g. hedge funds). *"With this change, banks limited the growth of their balance sheets but maintained a key role in the origination of corporate loans, and in the process contributed to the growth of non-bank financial intermediaries"*[4]. Below the process explained in detail.

Initially, American banks, in order to acquire new liquidity for the provision of subprime mortgages and, in the end, to get away the overt risk of insolvency, transferred their receivables to third parties by packaging them in these financial products. They proceeded to securitize these loans or transform them into credit instruments that they then placed on the foreign market.

These new financial instruments are in fact asset-based securities, completely sold on the market without any control and, above all, without any guarantee of repayment, as this is solely linked to the regular payment of the original subprime loan from which they derive (this is why

[3] System that allow a subject to purchase an asset using debt; it means that subject borrow capital by trusting in its ability to invest it by obtaining a return greater than the interest rate requested by the lender.
[4] Vitaly M. Bord and João A.C. Santos, *"The Rise of the Originate-to-Distribute Model and the Role of Banks in Financial Intermediation"*, Federal Reserve Bank of New York, July 2012, p. 1.

they are called "derivatives"). Then, these derivative securities were further pooled with other securities as collateral, which came from ordinary commercial transactions and from real bonds, becoming CDO. The SPV bought CDO through the offer of short-term securities to investors, both in USA and EU. The investors held highly rated securities (i.e. senior tranches) with the highest probability of performing. Banks thought they had got away the riskiest loans from their balance sheets and Regulators started seeing firms making profits and borrowing costs reducing. But each step in the mortgage securitization path depended on the following step to keep demand going on. In this way, the effects of the crisis have been moving to European economy. Thanks to the subprime and securitized securities, the accessibility of households to credit has grown, number of people owning a home were increasing, and those people increased consumption volume over time, reducing the impact of periods of economic difficulty.

The exploitation of securitization system brought to the distribution of these structured financial products, characterized by low liquidity and low standardization, not easy valuable from rating agencies. In particular, due to their characteristics, they have been traded in Over the Counter[5] (OTC) markets, without comparable prices that could be used to evaluate them. Usually derivatives instruments are used as hedging or speculating measure on market variables changes as prices, rates, or indices or even probability of debts defaults. Without any active supervision, OTC derivatives rapidly spiraled out of control and spread among all the markets. Rating agencies began the most significative vehicle to assess these structured products, in that the only ones able to provide estimates of their value. However, valuation models adopted by rating agencies were not sufficiently sophisticated to assess the instruments, in that based on hypothesis of too optimistic scenarios evolution.

Beyond deregulation system, an aspect to consider as accomplice for crisis eruption was the monetary policy adopted in the early 2000s by the Federal Reserve System[6] (FED), which was aimed at maintaining low interest rates, leading to an increase in the demand for real estate loans (low interest rates imply low borrowing cost), and consequent increase in house prices. Since 2001, the FED has maintained the official interest rate at levels below 2% (see Figure 2). Two opposite effects verified: from one side, American investors, seeing interest rates too low, stopped their money supply by locking it into the financial system and waiting for the growth of interest rates.

This anomaly behavior of the investors, known as the "Keynesian liquidity trap[7]", shown that, if interest rates reach levels close to zero, investors will prefer to hold money and will not ask for fixed rate bonds because their price will fall to the next and inevitable increase in rates, thus they

[5] Markets in which are made transactions involving the sale and purchase of securities that are not listed on stock exchanges, whose functionality is organized by some players, and whose characteristics of the contracts being traded are not standardized.
[6] US Central Bank.
[7] Liquidity trap is a concept, explained by Keynes, according to which if interest rate fallen up to certain level, everyone prefers holding cash rather than holding a debt which guarantee low interest rate.

will wait for future rates increases. On the other side, banks could borrow liquidity from the Federal Reserve, which easily transferred it from the entire international system, at particularly low costs, with the aim of pouring it into the economic system in favor of those who wanted to borrow it at equally advantageous costs.

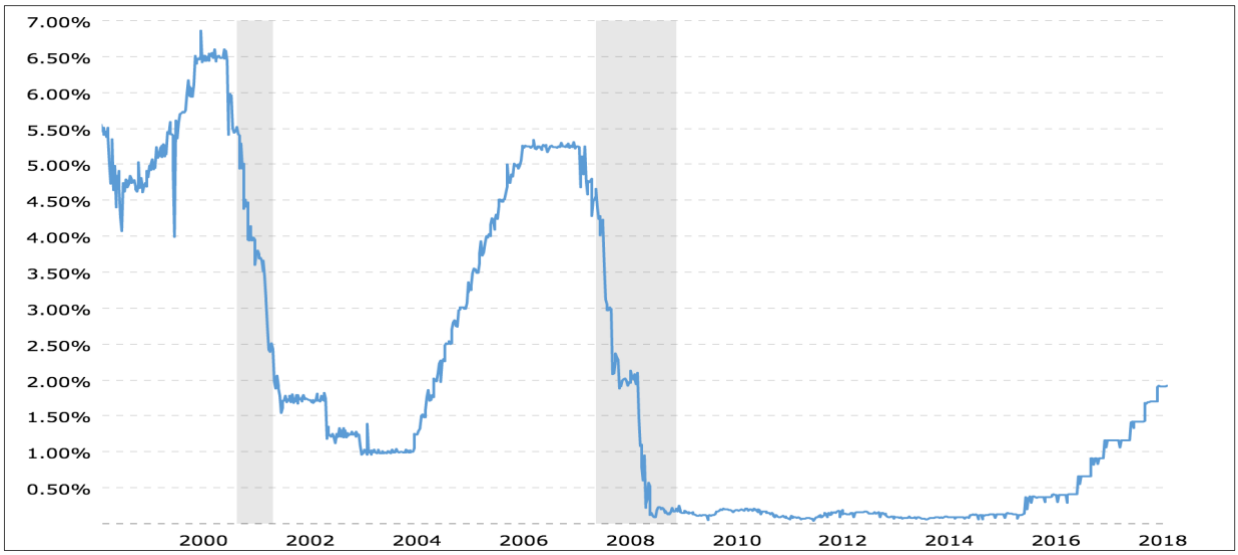

Figure 2. Historical trends of Federal Funds rate from 2000 to 2018[8]

According to the Bank for International Settlements[9], this policy of low-cost money over a long period of time led to the development of a "real estate bubble"[10], a mechanism that encouraged the granting of loans by financial institutions, which, in the event of debtor insolvency, could recover the money lent by foreclosing and reselling the house. Starting from 2004, thank to economic recovery, FED began to raise interest rates and mortgage began more expensive; people could not pay, and insolvency cases raised. In this period the real estate bubble broke out and house demand reduced. The real estate markets of many countries, including Italy, after having reached a condition of extreme overvaluation, had started a reverse path of normalization, destined to last for several years. The real estate bubbles, in Italy as in other countries, have begun to deflate and the end of this journey backwards did not seem close.

Since 2007, mortgage loan securities and CDO started losing their value suffering a credit rating downgrades by rating agencies. These securities, widely disseminated in the market, lost all their value and had a really low level of liquidity, forcing the SPV to ask for funds from banks that issued them and that had guaranteed lines of liquidity. However, some banks could not find the necessary liquidity to meet these demands, as financial institutions were not inclined to credit them

[8] Source: https://www.macrotrends.net/2015/fed-funds-rate-historical-chart.
[9] International financial institution based in Basel, Switzerland, which promote international monetary policy and financial cooperation and works as a bank for central banks.
[10] In economy, the term "bubble" refers to a particular phase of the market characterized by a considerable and unjustified increase in the prices of one or more goods, due to a sudden and limited increase in demand.

due to increase of risk level. Given the complex structure of the securities and being them widely distributed in the market, the financial institutions market experienced a strong increase in rates and each credit line suffered a contraction, especially in lending activity between banks (i.e. credit crunch). Thus, a liquidity crisis developed in a consistent manner. The banks suffered heavy losses not only for the exposure to SPV, but also for the exposures to subjects hit by the crisis (e.g. funds that had invested in the securitized securities). This situation led some American financial institutions to bankruptcy risk, avoided thanks Treasury intervention, in consultation with the FED, that provided some banks with the necessary amount of liquidity.

However, the investment bank Lehman Brothers did not receive public support or help from private entities and initiated bankruptcy procedures on September 15th, 2008. The insolvency of the American investment bank Lehman Brothers triggered a new phase of intense instability. The American Authorities choice to let fail a so large bank, with a wide and significant operations outside the US borders, has deeply undermined the trust of the market operators, triggering a climate of extreme pressure and uncertainty on the markets. Lehman Brothers default generated widespread concerns about the stability of other investment banks and fears of market participants that were exposed to these financial institutions. The counterparty risk suddenly increased and its perception by operators, leading to a new drastic reduction in liquidity in the bank deposit and an increase of short-term interest rates.

The crisis transformed in its systemic nature, that extended from the structured products market to equity markets, in particular to the securities of companies in the financial sector, and progressively to the entire financial system, highlighting a high degree of interconnection among sectors. As a result of the direct or indirect exposure of the banks of some European countries to the phenomenon of subprime mortgages, the impact extended also to European economy. The last decades have been marked by the American "draft" and by the ever-closer interconnection between the European and American economies. The trend in interest rates and the consequent economic situation that hit the United States ended up modifying the European economic cycle.

1.2 From financial crisis to systemic crisis: impact on real economy

The financial crisis outbreaks underlined how effectively the overall economic system is interconnected, in consideration of the fact that the crisis became systemic and had impact on real economy[11].

The FED expansive monetary policy (explained in the previous paragraph) guaranteed high level of liquidity to financial institutions that required investors to positioning it in the market through leverage operations. By this system, a connection was created among institutional investors and consumers, in particular with consumers of real estate and durable goods, whose value, being always growing, assured the success of the leverage transaction. Therefore, this apparently ingenious operation brought enormous profits to the investing banks and, at the same time, determined: 1) immediate restart of the real economy through the reactivation of the real estate market, which by definition is a labor-intensive sector with a high employment demand for building companies and 2) contraction in the unemployment rate with an increase in consumption and, therefore, in GDP[12] (see Figure 3 and Figure 4).

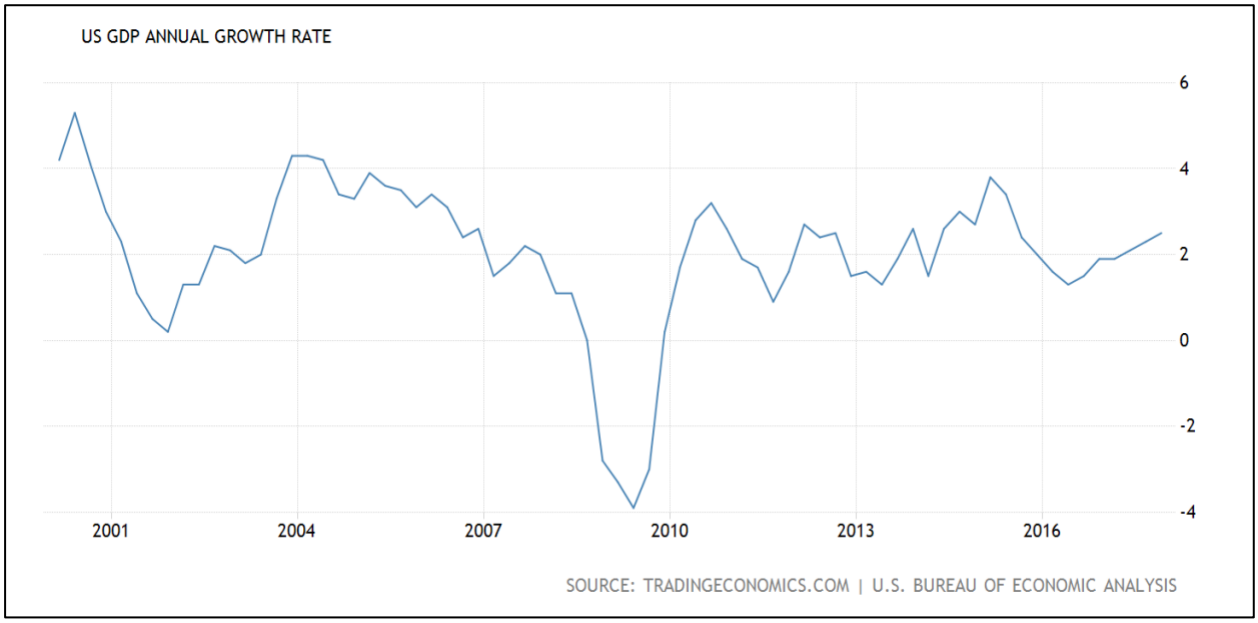

Figure 3. Historical trend of US GDP annual growth rate[13]. Between 2001 and 2004, GDP grew up to 4% annual rate, in relation to FED monetary policy and expansive credit line exercised by financial institutions

[11] Real economy means economy scope that refers to the production and distribution of good and services, opposed to financial economy that refers to all that market in which work financial instruments.
[12] The Gross Domestic Product measures the total value of all goods and services produced in an economy in a specific period.
[13] Source: https://tradingeconomics.com/united-states/gdp-growth-annual.

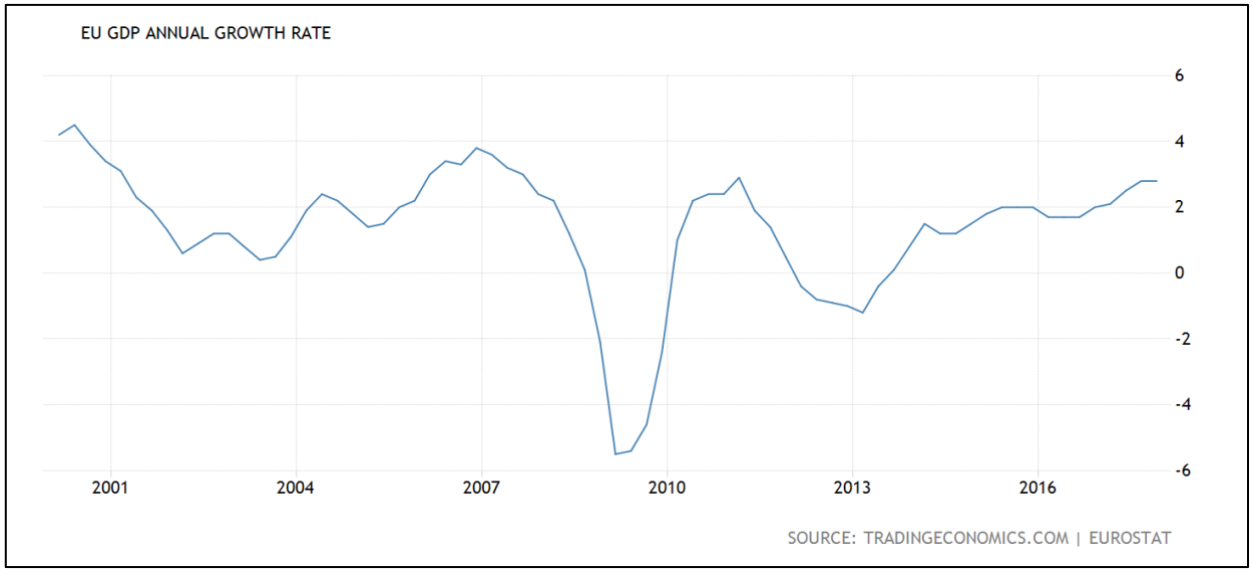

Figure 4. Historical trend of European GDP growth rate[14]: it is possible to notice that Europe GDP trend is really close to the US one

More specifically, the link between the American mortgage market and the large international financial companies, including also European credit institutions, is to be found in the typical functioning of derivative finance, which tends to turn all financial instrument enters its availability into any credit. The default of subprime loans (and in a short time also that of revolving credit cards which will cause a further collapse of the American financial system and therefore worldwide) have forced the issuing banks to transfer the foreclosed houses onto the market, creating an inverse effect (i.e. a drastic reduction in property prices). These financial instruments (like all derivatives products) subsist alone and are therefore purchased not only by hedge funds (which are atypical banks that do not undergo any form of control), but also by multinationals and various institutions for the purpose of diversifying their financial investments.

This last grouping of subscribers was the most negatively hit. We are talking about large and medium-sized companies and Public Entities, which, thanks to the advice of their banks and reference promoters, have seen a derivation of savings in derivative finance products that could be transformed into an investment to serve the enterprise, such as to create real wealth. But the result was that of generating a displacement effect of the real economy in favor of derivative atypical finance. Therefore, companies and organizations, attracted by expectations to easy reach high returns, have therefore diverted resources destined for productive investments, firstly aimed at the real growth of aggregate demand, towards financial capitalizations that are toxic and without intrinsic value.

The effect of the market law based on the balance between demand and supply was harmful: banks owned a foreclosed property, difficult to place in the market and with an intrinsic value

[14] Source: https://tradingeconomics.com/euro-area/gdp-growth-annual.

equal to half of the amount lent. The real estate market and those connected to it paralyzed: layoffs began, banks, failing to return their loans, could not return deposits and finance investments, and therefore economic growth. The financial crisis became real. Consumption by households, investments made by businesses, public spending and net exports reduced, leading to a drastic decrease in aggregate demand and therefore in production, with negative effects on the labor market which necessarily involved related sectors.

The placement of "toxic financial products" was almost easy and immediate thanks to the strong information asymmetry of the placers and intermediaries coming from foreign markets attracted by the apparent and high yields produced by the guarantees provided by rating agencies, paid for their assessments by same owners of toxic financial products. But the complex structure of CDO made it impossible to identify the toxic securities among those pooled in these financial instruments.

The chain effect created among US and EU economy can be found not only in relation to financial market and derivatives products by now spread like wildfire, but in a wider economic context that link USA and EU in different market.

In a macroeconomic point of view, the crisis can be analyzed dividing its effects in two specific periods: the first half took place between 2008 and 2009 and is often referred to as the Great Recession, with the simultaneous collapse of GDP, industrial production and turnovers, after the collapse of the investment bank Lehman Brothers and the oil price increase in the summer of 2008. After the first half of the crisis there was a resumption of duration and intensity varying according to the countries, and it could be placed between 2009 and 2011; the second half of the crisis began in the summer of 2011, when the sovereign debt crisis (deeper analyzed in the following paragraph) began in 2010 in Greece, Ireland and Portugal, with the widening public debts differences spread between Spain, Italy and Germany.

To better understand the events evolution, it is important to deeper analyze the GDP trends (already shown in Figure 3 and 4) and inflation rate. As shown by the two graphs in Figure 3 and Figure 4, the pre-crisis period, years 2000-2006, seems revealing a pretty stable level of GDP, whose trend value is around to 3% growth on average (considering both USA and EU); inflation rate followed a similar trend, staying between 2-3% in EU and 2-4% in USA (see Figure 5 and Figure 6).

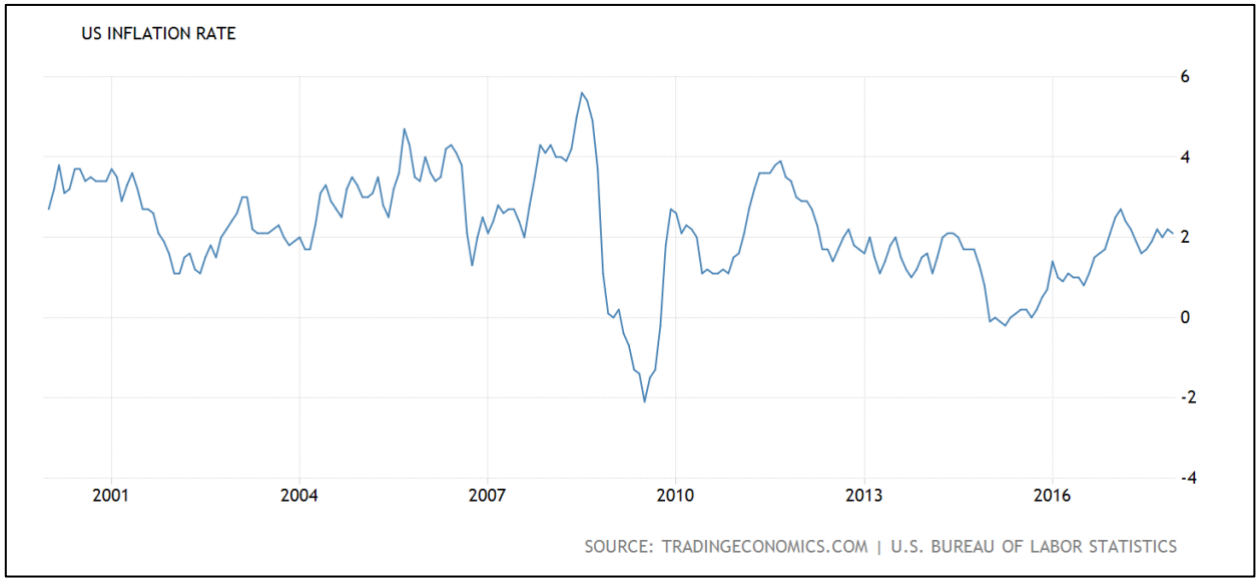

Figure 5. Historical trend of US inflation rate[15]

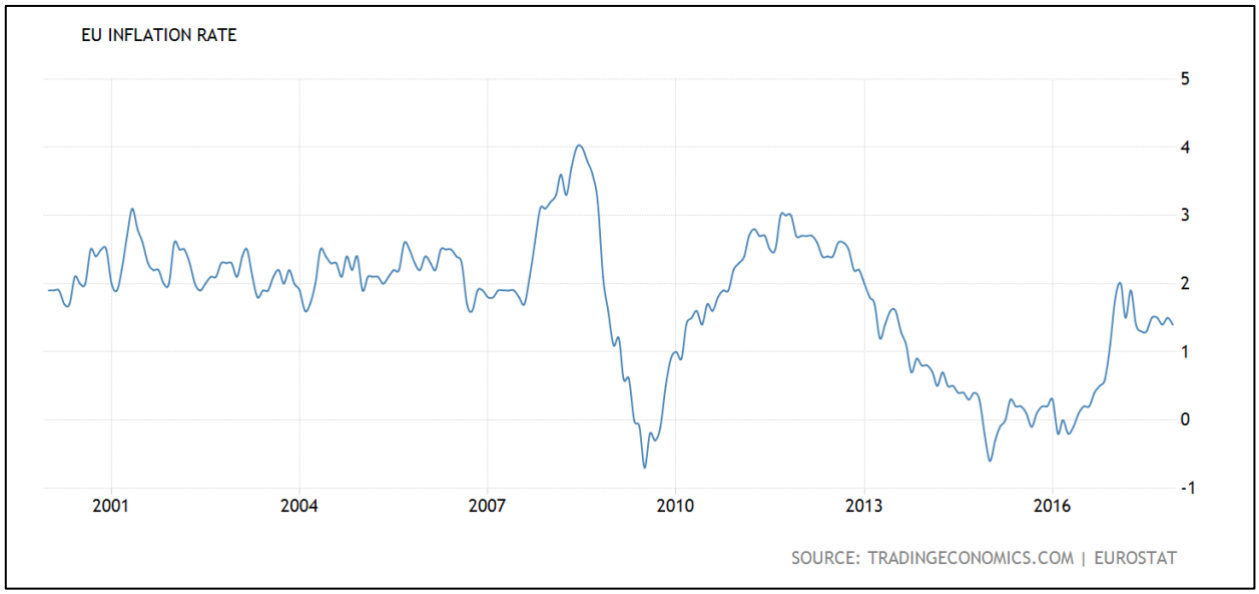

Figure 6. Historical trend of EU inflation rate[16]

The following year, 2007, the growth suffered a sharp decline, until reaching ever lower levels of growth in the subsequent years; in particular, it can be noticed that first warning from American economy was already launched, in that level of national production starting declined before than Europe, caused by internal policy decisions (FED raised interest rate levels). The reference period from 2000 to 2006 underlines that 2007 was a year of economic overheating for the European economy, with values higher than those recorded on average in previous years. The situation changes sharply in the two-year period 2008-2009. In 2008, US GDP growth drop down until

[15] Source: https://tradingeconomics.com/united-states/inflation-cpi.
[16] Source: https://tradingeconomics.com/euro-area/inflation-cpi.

negative growth levels, around -2%, and, in parallel, inflation accelerated from 4% to 6%. As underlined by the graph, inflation trend is similar in Europe and United States, even if lying on different levels. The year 2009 was the worst period of the previous ten years, due to ongoing negative GDP growth, reaching negative growth around -2% in United States and -4% in Europe, overcoming it for a period. The US inflation rate also declined sharply, from 6% to -2,5%, and in Europe from 4% to about -0,5%.

In the second half of 2009, the recovery for both of the economies came: it translated into a very positive GDP growth for 2010 (USA GDP came back to grow at positive value, around 2%, that is more or less as in 2007, but in EU the growth was still negative, even if at higher level), in parallel to a return of inflation above 3%. The recovery in 2010 had removed fears that the Great recession was transforming into a depression, as happened in the 1930s. But the scenario changed again: the 2011-2012 data indicate American GDP growth at around 3%, a figure very similar to the pre-crisis average for the period 2000-2006, and European GDP at around 1%. The growth in 2011-2013, however, was supported by higher inflation for about one percentage point, close to 4%.

As previously mentioned, the price of oil drastically rose, overcoming the price of 140 dollars per barrel (see Figure 7). Almost in parallel, the market capitalization of the five most important commercial and investment banks (HSBC, Goldman Sachs, Bank of America, Citigroup, JP Morgan Chase) was reduced. In the first quarter of 2009, the flow of world exports decreased compared to 2008.

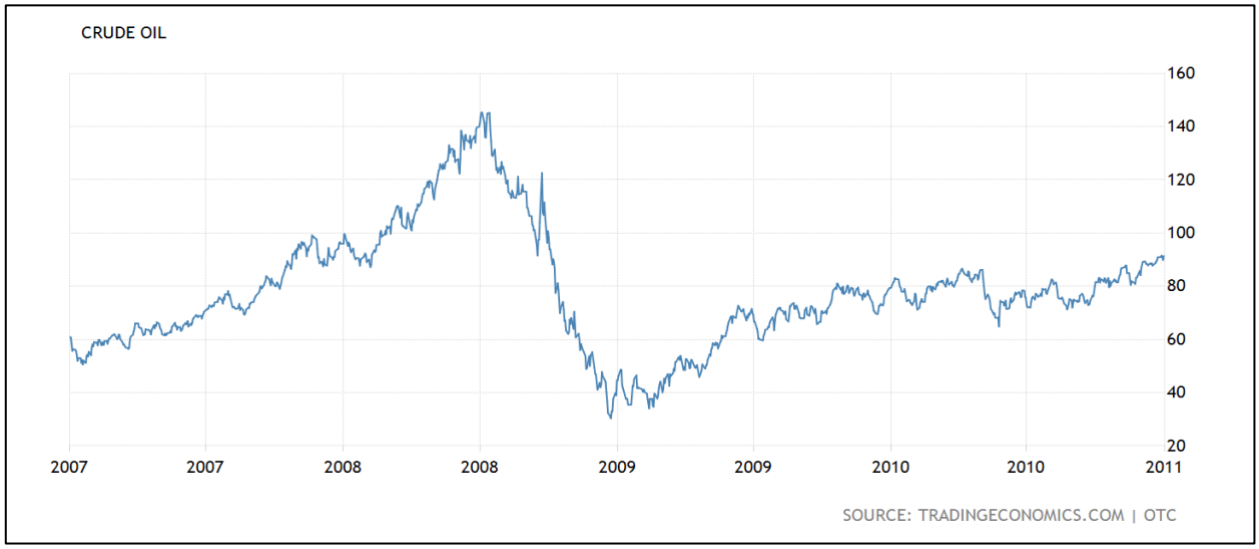

Figure 7. Historical trend of crude oil price from January 2007 to January 2011[17]

[17] Source: https://tradingeconomics.com/commodity/crude-oil.

High oil price, stock market values and a drastic reduction in the volume of international trade made the situation awful. The interaction among the negative shock of the aggregate supply (i.e. the increase in the price of oil) and the negative shocks of aggregate demand (i.e. financial activities collapse and the drastic reduction in international trade), with the inevitable deterioration in the families and corporates expectations and the credit crunch to the economy, laid the foundations of the Great Recession, the most serious economic crisis in the world in the last eighty years.

Going deeper in the graph shown, it is useful to analyze the growth level of the main countries hit by the crisis in the core year of crisis spreading.

Table 1 summarizes the most important numbers of the Great Recession of 2008-2009, that is the evolution of the GDP growth of the United States and the most important European countries.

The first element that emerges from the table is that the Great Recession took between 2008 and 2009. The level of GDP in 2008 has not decreased in all the countries (France, Germany, Spain and Portugal registered an increase on average of 0,58%, against the negative growth of Greece, United Kingdom, Ireland, Italy and United States on average of -1,21%). The European countries sent the first signal of general collapse.

Table 1. GDP growth rate in the USA and principal economies of EU[18]

Country	2008	2009
France	+0,195%	-2,941%
Germany	+0,816%	-5,563%
Greece	-0,335%	-4,301%
Ireland	-3,932%	-4,668%
Italy	-1,05%	-5,482%
Portugal	+0,199%	-2,978%
Spain	+1,118%	-3,574%
United Kingdom	-0,473%	-4,188%
United States	-0,292%	-2,776%

However, in 2009 all pre-crisis differences suddenly lost importance, as for a few months the Great Recession came to interest the entire world economy. Each country suffers internally in a different way: considering the developed countries, GDP decreased on average of 3%, while it has

[18] Source: International Monetary Fund, World Economic Outlook Database, April 2018.

continued to grow in emerging countries. Among the rich countries, the GDP of European countries, with -4% of the euro area, suffered the most marked reduction. Within the euro area, Germany and Italy recorded a dramatic 5%, similar to what happened (outside the euro area but within the European Union) to the United Kingdom (-4,18% reduction), while France product loss at -2,94% and Spain and Portugal stopped halfway with respectively -3,57% and -2,97%. Instead in the US economy, which was the epicenter of the crisis but also the place where the political responses to the crisis were more rapid and consistent, the reduction in GDP was more contained than the eurozone average (USA reduction was -2,77%, instead European average reduction was -4,21%). The crisis was felt even in emerging countries; to describe the way in which the Great Recession occurred in emerging countries, the term growth recession is used to indicate that in countries such as China, India, Indonesia, Brazil and the Republic of South Africa, in spite of economic growth continued, the development process suffered a significant but temporary setback; in fact, for these countries, the crisis effect arrived later and in different ways than USA and EU.

As you can see in Figure 3 and Figure 4, the negative data sequence of 2009 was interrupted in 2010. The world economy returned in 2010 to grow up to about 2%, with rhythms similar to those of 2007. For the world economy it was therefore a temporary but certainly a very rapid return to the "business as usual" of the recent past. Data had been a strong but episodic temporary storm like in the year 2009. The subsequent slow growth in the following years also highlighted that the recovery in 2010 was not the result of a rapid reversion to normal functioning of the market forces that had driven the sustained growth of the previous years, but instead it was the consequence of the exceptionally rapid and consistent political response to the recession. Faced with the shocks described above and their dramatic economic consequences, governments have left aside caution and the principles they have asked for from the chairs of the Executive Committee by the International Monetary Fund in previous decades on the conduct of monetary and fiscal policy. *"This time the governments, above all the ones of rich countries, have done everything to avoid turning a serious («Big») recession into a Great Depression like that of the 1930s, during which both real GDP and the general price level in the US economy fell by more than 20% in just four years between 1929 and 1933"*[19]. There was the common interest to avoid another Great Depression that gave the green light to the strongly expansionary monetary and fiscal policies adopted by the United States and Europe. These policies produced the little growth in GDP in 2010.

[19] F. Daveri, *"Macroeconomia della crisi"*, ed. Zanichelli, p. 4

A physiological consequence was the increase of the unemployment rate[20] of each country (see Figure 8).

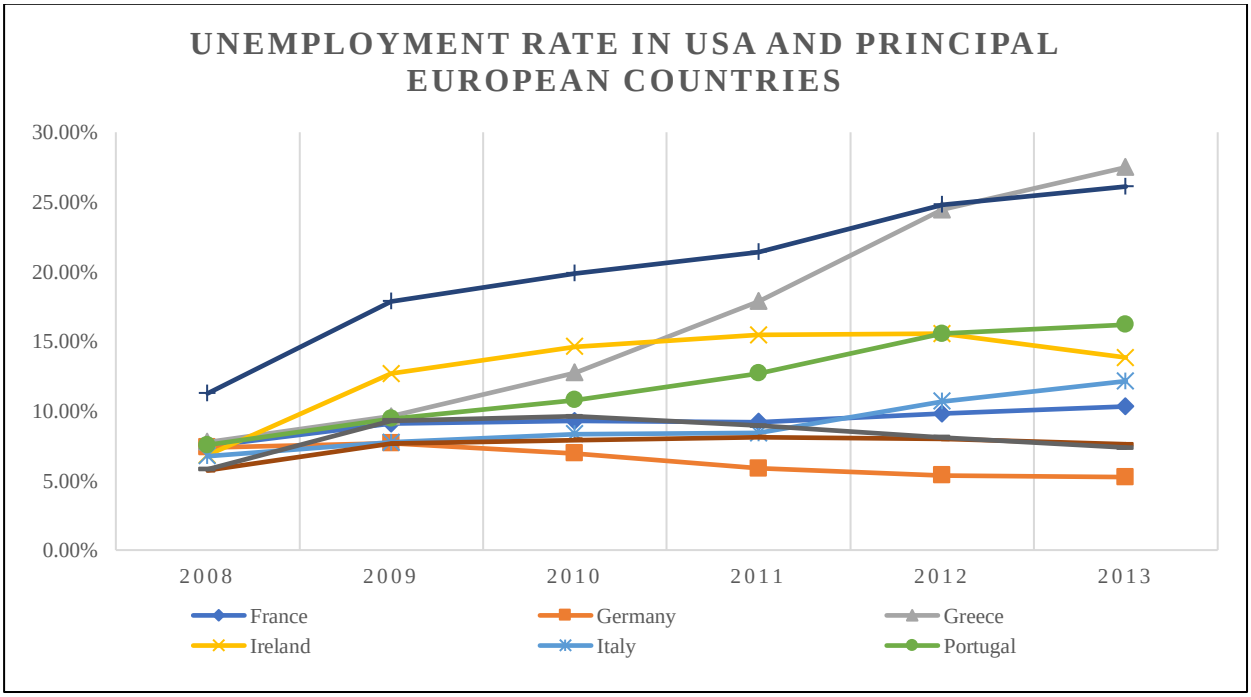

Figure 8. Trends of unemployment rate in the USA and the main European countries[21]

In fact, in spite of the substantial amount of economic and financial resources allocated to anti-crisis policies, the Great Recession has caused serious social effects on the labor market. The unemployment rate increases on average for European countries, reaching growth level above 25% (in particular Spain and Greece). In the same period, the share of the US unemployed reached a quarter of the labor force. In April 2010, the Great Recession had already translated into 13 million of new unemployed people only in the United States and in the euro area. Also, as regards the availability of credit for the economy, we have moved from the double growth in pre-crisis banking credit to zero growth. It was precisely the extension of the Great Recession at work and credit that transformed the second half of the crisis (the years 2011-2013) into a social meltdown, still more than economic, particularly serious for the countries of southern Europe.

[20] Unemployment rate can be defined as the number of unemployed persons as a percentage of the labor force (labor force is the total number of people employed plus unemployed).
[21] Source: International Monetary Fund, World Economic Outlook Database, April 2018.

1.3 Sovereign debt crisis

Following on what explained before, the problems arisen from the crisis spread to the state level. The second half of the crisis extended its range of action to public finance, damaging countries economy that increased national debt levels. The years 2010-2012 contained the so-called sovereign debt crisis, erupted as a consequence of 2007 financial crisis, that pulled States involved in a worse spiral of poverty. But the causes that triggered this crisis cannot be found only in the subprime crisis; for sure the latter can be considered as a push towards the decline. The picture that stood before the coming sovereign debt crisis was the following.

As a result of the subprime crisis, many European financial institutions have experienced serious difficulties and have received monetary helps from public intervention. These kinds of interventions have enforced the balance of payments of the weakest countries that contributed to causing a global contraction of GDP by about 1% in 2009. In particular, while the main developing countries suffered a relevant reduction in their growth rates, the developed countries recorded a negative trend of gross domestic product (please refer to Table 1). The eurozone countries had significant differences in public finance and growth rates. It is possible to distinguish in the so-called "core" countries (like Germany, France and United Kingdom) that in that period were characterized by contained levels of public debt and by a more solid economic activity; the second category is that of the "peripherical" countries (e.g. Greece, Ireland, Italy, Portugal and Spain), that were characterized by greater finance weakness, linked to high levels of public debt due to debt backlog over the years, uncontrolled increase in the public deficit and low GDP growth rates (see Figure 9).

Despite these differences, in 2010 the euro area took benefit from the economic recovery that affected the "core" countries, although with different patterns and trends between countries and geographical areas: GDP growth rates reached pre-crisis values in the United States and Germany but have remained at significantly lower levels in the United Kingdom and many countries in the euro area (including Italy). Each country heavily hit with a high debt and high debt to GDP ratio were helped by the European Commission, European central Bank and the International Monetary Fund (i.e. Troika). The crisis had an epicenter in the peripheral countries of the eurozone (Portugal, Ireland and Greece) and then extended in 2011 to Spain and Italy.

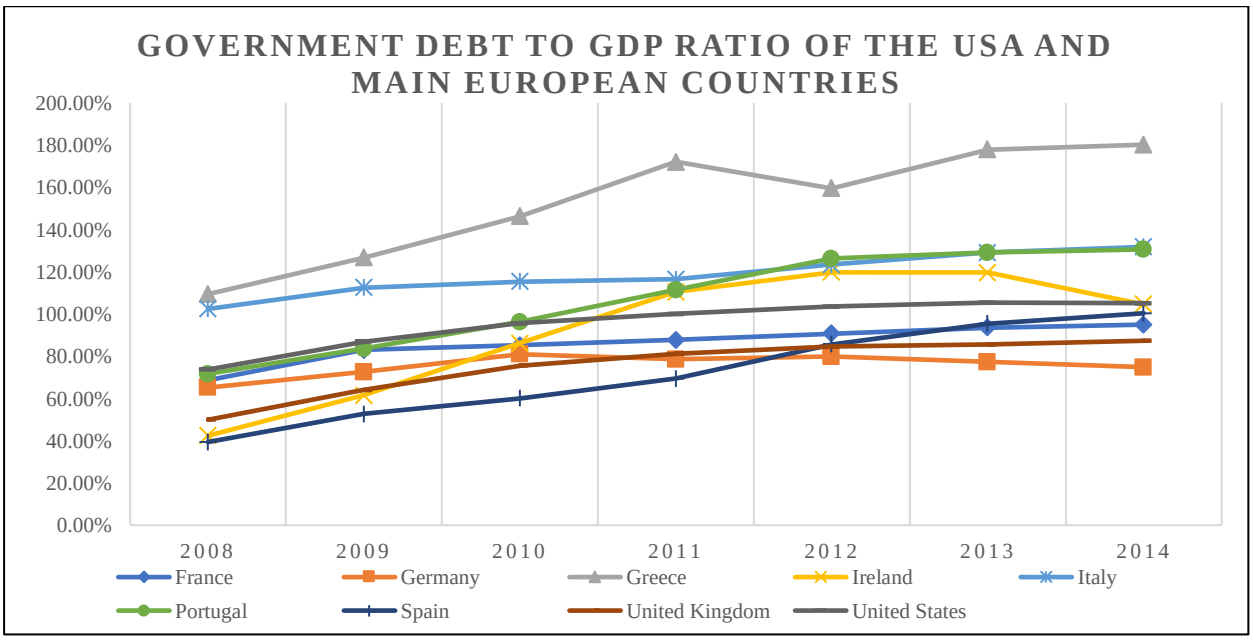

Figure 9. Government debt to GDP ratio of USA and principal European countries[22]. The graph underlined how effectively the most important economies suffered credit crisis, raising debt level due to high helps given specially to bank sector

The point that signed in a significant manner the start of debt crisis was the failure of the Greek public accounts, announced in October 2009, that marked the transition to a new phase of the crisis (that of sovereign debt), interrupting the already uncertain recovery. In 2009, Greek debt, due to high level of expenditure without constraints for a long time, has reached € 300 billion and the public deficit 15,1% of GDP[23].

In April 2010, the Greek public debt suffered a downgraded to the level of junk bonds by international rating agencies, with further serious repercussions on the financial markets. The Troika institution would provide several financial helps to Greece, whose name is Economic Greek Adjustments Program.

In May 2010, the European Central Bank and the International Monetary Fund (IMF) approved a rescue loan for Greece of € 110 billion[24] (above which € 80 from bilateral loan of the Member States and € 30 of from the IMF): goal was to avoid default risk and maintain debt to GDP ratio below 80% within 2020. There was a serious risk that the Greek crisis would extend also to the other European countries. To prevent the Greek crisis spreading to other euro countries, the ECOFIN[25] decided to set up a stabilization fund with a budget of € 750 billion, of which € 60 billion from the Commission, € 440 billion from the States and € 250 billion from the IMF: the

[22] Source: International Monetary Fund, World Economic Outlook Database, April 2018.
[23] Source: International Monetary Fund, World Economic Outlook Database, April 2018.
[24] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance/financial-assistance-greece_en
[25] Economic Financial Affair Council; it takes care of coordinating economic policies, monitoring the economic situation and monitoring the budget policies and public finances of the member countries.

European Financial Stability Fund (EFSF)[26]. A combination of internal and external pressure brought Greek government to rapidly take decisions. In fact, together with European subsidies, Greece decided to carry out a series of internal maneuvers, above which fiscal policy, pension reform and public administration reform. In 2011, however, the Greek situation didn't seem to improve, indeed the recession was also accentuated due to the austerity measures decreed. The necessary renovation of Greek debt started to be supported, even with the aim of sharing the burden of debt between taxpayers and private investors. However, the decision on a second loan to Greece prevailed, despite the uncertainties expressed in some Member States regarding the constitutionality of the crisis management mechanisms implemented in the euro area and, in particular, with regard to economic aid to Greece. In 2011 the eurozone States decided to grant Greece € 130 billion loan, subordinated not only to the implementation of another package of austerity measures, but also to the acceptance by all private creditors of a restructuring of the Greek debt, with a reduction in the debt burden expected from a 198% of GDP in 2012 to 120,5% of GDP by 2020.

In 2012, euro area finance ministers and the IMF approved the financing of the second economic adjustment program[27] for Greece, amounting to € 164,5 billion, of which € 19,8 billion from the IMF and € 144,7 billion from the eurozone Member States, which will be provided through the EFSF, active from August 2010, and it was also decided to involve the private sector to improve the sustainability of the Greek debt, through a debt-exchange offer (i.e. bail-in).

All these subsidies provided by Troika and European member States continued to be subordinated to implementation of internal reforms. After several years of recession, at the end of 2014 the Greek economy seemed to slowly recover, recording, in the third quarter, a weak growth of 0,7% on GDP, among the strongest in the euro area. The country's trade balance also improved, with exports increasing 9% over the year. In addition, from a financial point of view, the sustainability analysis of debt made by the IMF appeared reassuring: on May 2014, the Fund predicted a debt reduction of 175% of GDP in 2013 to 128% of GDP in 2020 and 117% in 2022. Due to a series of internal political maneuvers and radical changes, the country's economic situation worsened again, and investors trust faded. In 2015, an agreement was reached to provide the third session of economic subsidies, which consisted in a further loan of between € 82 billion and € 86 billion for the following three years. The loan was subject to the implementation of new measures by the Government of Athens to obtain the planned aid, including: pension reform,

[26] The European Financial Stability Facility (EFSF) was created as a temporary crisis resolution mechanism by the euro area Member States in June 2010. The EFSF provided financial assistance to European Member States that needed financial subsidies during the sovereign debt crisis; the assistance was financed through the issuance of EFSF bonds and other debt instruments on capital markets. Nowadays, the EFSF does not provide any further financial assistance, as this task is now performed solely by the ESM.

[27] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance/financial-assistance-greece_en

economic liberalization, privatization, new labor laws and collective redundancies and more controls on banks. It is also decided to establish the "privatization fund", to which a series of Greek properties will be transferred for the value of € 50 billion, which would then be privatized under the control of the European institutions. Twenty-five billion of the funds would have to be used to recapitalize banks and other institutions, while the remaining portion will serve to reduce the debt to GDP ratio and for new investments. For what concern the more intensive control on bank activities, a second development considered the intensification of the supervision of the banking and financial sector. The bank of Greece was undertaken to increase the frequency information reports (revised information will henceforth be provided on a four-monthly basis). Furthermore, the central bank has extended its supervision to the insurance sector and started recruitment of new units of specialized personnel. Finally, a complete framework for regulation has been developed stress tests for financial institutions.

Crisis hit also the Irish banking system: the Irish Central Bank Governor revealed that the losses of the domestic banks amounted to € 85 billion (equal to 55% of GDP) and the European institutions with the IMF participation approved a support plan for the same amount between 2010 and 2013, not totally provided by European Authorities, in that Ireland contributed through the treasury cash buffer and investments of the national pension reserve funds. The economic adjustment program for Ireland was formally agreed in December 2010. The contributions to the package were so distributed:

- EFSM[28] € 22,5 billion (see Table 2);
- EFSF € 17,7 billion (see Table 3);
- United Kingdom € 3,8 billion;
- Sweden € 0,6 billion;
- Denmark € 0,4 billion;
- IMF € 22,5 billion;
- Ireland contribution of € 17,5 billion.

[28] European Financial Stabilization Mechanism: emergency funding program consisted in raising funds for the financial markets guaranteed by the European Commission using the budget of the European Union as collateral. It works under the supervision of the Commission and aims at preserving financial stability in Europe by providing financial assistance to European Union Member States in financial difficulties.

Table 2. Financial loans provided by the EFSM program to Ireland[29]

Amount (€ billion)	Maturity (years)	Distribution date	Cumulative disbursed amount (€ billion)
2	25	12/01/2011	2
1	19	12/01/2011	3
2	13	12/01/2011	5
3,4	7	24/03/2011	8,4
3	10	31/05/2011	11,4
2	15	29/09/2011	13,4
0,5	7	06/10/2011	13,9
1,5	30	16/01/2012	15,4
3	20	05/03/2012	18,4
2,3	15	03/07/2012	20,7
1	15	30/10/2012	21,7
0,8	10	25/03/2014	**22,5**

Table 3. Financial loans provided by the EFSF program to Ireland[30]

Amount (€ billion)	Maturity	Distribution date	Cumulative disbursed amount (€ billion)
1,9	01/08/2032	01/02/2011	1,9
1,7	01/02/2033	01/02/2011	3,6
0,9	01/08/2030	10/11/2011	4,5
2,1	25/07/2031	10/11/2011	6,6
1	01/08/2030	15/12/2011	7,6
1,2	01/08/2029	12/01/2012	8,8
0,5	01/07/2034	19/01/2012	9,3
2,7	01/08/2031	03/04/2012	12
0,8	01/08/2029	02/05/2013	12,8
1,6	15/11/2042	18/06/2013	14,4
1	27/09/2034	27/09/2013	15,4
2,3	04/12/2033	04/12/2013	**17,7**

Ireland successfully completed the EU-IMF financial assistance program at the end of 2013, together with the vast majority of policy conditions under the program. Ireland is subject to post-program surveillance[31] (PPS), until it will repay at least 75% of the financial assistance received. PPS will finish in 2031. The objective of the PPS is to assess the European Financial Stability Facility (EFSM), the European Financial Stability Facility (EFSF) and bilateral lenders work.

[29] Source: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance/financial-assistance-ireland_it

[30] Source: https://www.esm.europa.eu/assistance/ireland

[31] A specific program made by the European Commission that identify the ongoing economic situation of the specific country and the remaining challenges for the economy.

Under PPS, the European Commission and the European Central Bank (ECB) make regular controls to assess Ireland economic, fiscal and financial situation and prepare semi-annual assessments.

During its three-year assistance program, Ireland arrived to fix many of the problems listed above. Two big banks were closed, but firms survived received a capital incentive. A dedicated bank was created to deal with problem loans and dismiss them from the banking business. The country reduced its fiscal deficit, and successfully exited its EFSF program without the need for any further assistance in December 2013.

Situation similar to Ireland happened in Portugal; in April 7th, 2011, Portugal Government requested financial assistance from the EU, eurozone countries and the IMF, and an economic adjustment program was negotiated in May 2011 between the Portuguese authorities and the European Commission, ECB and the IMF[32]. The program was formerly adopted in May 2011.

It covered the period from 2011 to 2014 and included financing package of € 78 billion, so divided:

- € 24,3 billion by the EFSM;
- € 26 billion by the EFSF;
- € 26,5 billion by the IMF.

It is important to underline that each economical subsidy must be accompanied by internal reforms. The economic adjustment program included: structural reforms to drive potential growth and jobs market and improve competitiveness. A fiscal consolidation strategy supported by structural fiscal measures and better fiscal control over companies and partnerships, with the goal of fixing the gross public debt to GDP ratio on a solid path in the medium term and reducing the deficit below 3% of GDP by 2014. A financial sector strategy based on recapitalization and deleveraging, with efforts to the safeguard of the financial sector through market-based mechanisms supported by backstop facilities. As happened in Ireland, Portugal completed its financial assistant program and nowadays is under the post-program surveillance (PPS), until at least 75% of the financial assistance received has been repaid, and it is expected to finish on 2035. Same objectives and procedures adopted in Ireland were used for Portugal, measuring Portugal's capacity to repay its outstanding loans to the European financial stability mechanism (EFSM) and European financial stability facility (EFSF). Moreover, regular controls were made to analyze economic, fiscal and financial developments, and prepare semi-annual assessments.

Spain situation was better compared to the other countries in crisis. The country start suffering crisis in 2011. The balance of payments deficit rose to 11% of GDP in 2009 and banks could no

[32] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance/financial-assistance-portugal_en

more borrow money or raise capital[33]. Savings banks were the weakest financial institutions and no support were granted to them, many of which were risking of bankruptcy. With the budget already stretched, the government cannot act as wanted. Differently from the other countries, Spain continued to enter in the market financing, but raising money became increasingly expensive. In a bid to raise the destiny and quickly address the banking issues, Spain requested assistance in July 2012. Helps provided to Spain were focused on two directions: 1) the recapitalization of financial institutions in a bank-to-bank way; 2) the so-called horizontal conditionality, aimed at identifying measures to be applied to the banking sector in general or to the regulatory and supervisory framework.

The bank-to-bank program involved three main components: analysis of capital needs of each bank, making an asset quality reassessment and stress tests; take out impaired assets from banks' balance sheet receiving public support and transfer them to an external asset management company (i.e. Sareb[34]); providing restructuring plan of viable banks and a resolution of non-viable banks, asking help to private sector.

Horizontal conditionality, instead, aims to involve the entire banking structure and included measures aimed at: making stronger regulatory, supervisory and bank frameworks; enhancing the governance structure of savings and commercial banks; giving more attention to consumer protection legislation as regards the sale of subordinated debt instruments.

The ESM provided Spain with € 100 billion in assistance, although, in the end, it was necessary used only € 41,3 billion; these moneys were disbursed in two tranches, one in December 2012 and the other in February 2013, and were given Spanish government. In return for the financial assistance, Spain carried out the objective of the program of restructuring governance structure and internal reforms, a process that had already started before the program but completed thanks to European subsidies. Spain successfully exited its program in December 2013 and start to repay the ESM loans earlier than required.

The stress of these countries was immediately reflected in all the main financial markets, where there were large drops, in some cases comparable to those that occurred during the 1929 crisis. The major rating agencies also lowered the merit of credit of several European countries and, consequently, of several banks based in those countries or with large exposures in public securities of countries in difficulty, amplifying in many cases the uncertainty on the markets. The banking sector, due to the deep links with the public sector, was the one most exposed to the contagion, so much so that, in 2011, it recorded a fall in excess of that of the other sectors in all advanced economies. The effects of the crisis were then found in the dynamics connected to bank

[33] Source: https://www.esm.europa.eu/assistance/spain
[34] Spanish Asset Management Company.

credit concessions because considered as a fast channel of transmission to the real economy: since the beginning of 2009 there have been strong signs of stiffening the standards for granting credit from part of the banking system both in Europe and in the USA. The data reported underlined how was difficult to European countries instill trust not only to private creditors, but also inside the entire European system. Solvency risk were not immediately solved, even if the danger were pretty avoided for the major countries, and all European governments considered necessary to modify regulations aspects on more subjects.

2. CHAPTER 2: FROM DEREGULATION TO REGULATION

2.1 Banking regulation and main US and EU authorities' interventions

The outbreak of the crisis in 2007 highlighted important issues: in light of what happened, an instantaneous consideration is that some mechanism in the Supervisory and Regulatory System did not work as it should, bringing consequences that over the years have become increasingly heavy and risky (see the sovereign debt crisis, credit crunch and lock of entire economic system). Regarding the situation, it remains important to analyze the plans of interventions made by the US economy and the European community, considering the overall historical evolution of the regulatory framework and the changes made to safeguard the entire economic system from the possible recurrence of these circumstances.

In the United States we can analyze that political interventions made were heading in two directions: first, adjusting and recovering the economic situation with important monetary maneuvers; second, changing and reassessing the regulation structure inside the banking and non-banking system. The main interventions adopted by the FED and the US Government consisted in the immediate re-introduction of liquidity into the economic system at very low interest rates. Initially, at the beginning of the crisis eruption, FED slightly reduced its discount rate in order to lower borrowing cost, but without significant impact for banks and other financial institutions, in that this maneuver was not sufficient to prevent the insolvency risk.

Considering the weak results obtained, the FED Chairman Ben Bernanke (in charge from 2006 to 2014, acting in a complete different way from the previous FED Chairman Alan Greenspan, in charge from 1987 to 2006, who based all its economic policy on liberalism concept of laissez-faire) changed drastically FED policy trend and lowered US interest rate to values close to zero in 2008 (see Figure 2), in order to facilitate the access to capital source. This measure wasn't sufficient to prevent the liquidity crisis, and the FED adopted a Quantitative Easing[35] policy, consisting in inserting in the overall economy about $ 1300 billion between the period 2008 and 2010.

The characteristics of this very expansive monetary policy allow the reduction in the value of households' debts to financial institutions and the consequent greater propensity to spend of these families, which can lead to a net increase in consumption that will result in higher growth in the medium term. This outcome could be achieved because, with the implementation of this "unconventional" monetary policy, a new monetary offer has been added on the market, through

[35] Quantitative easing is an expansionary monetary policy where a central bank buys predetermined amounts of government bonds or other financial assets in order to stimulate the economy and increase liquidity. It is considered as an unconventional form of monetary policy, it is usually used when inflation is very low or negative, and standard expansionary monetary policy has become ineffective, like what happened in post financial crisis period.

which the State bought governments bonds and cleaned financial institutions balance sheets[36]. In this way, intervening on the securities market, securities' price grew, and yield reduced. In particular, if the yield of public securities is linked to that of bank interest rates (that's the case of United States), bank interest rates reduce and consequently reduce also loans price in the medium term.

Exploiting this system, the United States Treasury initiated the Tarp (i.e. Troubled asset relief program), a bank rescue program expected in the Emergency Economic Stabilization Act of 2008[37] (EESA, created by the Treasury Secretary Henry Paulson) and started in October 2008.

The program consisted in buying and guaranteeing the so-called "troubled asset" so defined by the above-mentioned law:

"(A) residential or commercial mortgages and any securities, obligations, or other instruments that are based on or related to such mortgages, that in each case was originated or issued on or before March 14, 2008, the purchase of which the Secretary determines promotes financial market stability; and (B) any other financial instrument that the Secretary, after consultation with the Chairman of the Board of Governors of the Federal Reserve System, determines the purchase of which is necessary to promote financial market stability, but only upon transmittal of such determination, in writing, to the appropriate committees of Congress."[38].

Furthermore, in order to protect the government by giving the Treasury the possibility of making profit, the EESA required financial institutions to issue equity warrants, equity or senior debt securities (for non-publicly listed companies) to the Treasury.

In the case of warrants, the Treasury will only receive warrants for non-voting shares. In this way, the Treasury received a sort of guarantee from the institutions helped. The program initially accounted an overall expenditure of repurchasing of $ 700 billion, but in the end the total expenditure was fixed at about $ 475 billion, as written in the "Dodd-Frank Wall Street Reform and Consumer Protection Act".

[36] Curcuru, Stephanie E., Steven B. Kamin, Canlin Li, and Marius Rodriguez (2018), *"International Spillovers of Monetary Policy: Conventional Policy vs. Quantitative Easing",* International Finance Discussion Papers 1234, Board of Governors of the Federal Reserve System.

[37] Specific law through which the United States Secretary of the Treasury authorized to spend up to $700 billion to purchase distressed assets, especially mortgage-backed securities, and supply cash liquidity directly to banks.

[38] Take from the Division A (i.e. Emergency Economic Stabilization Act of 2008) of Public Law 110-343.

In Figure 10 are illustrated the amount committed and disbursed for each program within Tarp by the Treasury.

Programs as of July 31, 2018 (dollar amounts in billions)

	Obligation/ Commitment	*Disbursed as of July 31*	*Outstanding Investment Balance as of July 31*	*Estimated Lifetime Cost as of November 30*[4]
Bank Support Programs:				
Capital Purchase Program (CPP)[5]	$ 204.89	$ 204.89	$ 0.04	$ (16.32)
Targeted Investment Program (TIP)	$ 40.00	$ 40.00	$ -	$ (4.00)
Asset Guarantee Program (AGP)[6]	$ 5.00	$ -	$ -	$ (4.00)
Community Development Capital Initiative (CDCI)	$ 0.57	$ 0.57	$ 0.06	$ 0.07
Sub-total Bank Support Programs	**$ 250.46**	**$ 245.46**	**$ 0.10**	**$ (24.25)**
Credit Market Programs:				
Public-Private Investment Program (PPIP)	$ 18.63	$ 18.63	$ -	$ (2.73)
Term Asset Backed Securities Lending Facility (TALF)	$ 0.10	$ 0.10	$ -	$ (0.61)
Purchase SBA 7(a) Securities (SBA)	$ 0.37	$ 0.37	$ -	$ (0.00)
Sub-total Credit Market Programs	**$ 19.09**	**$ 19.09**	**$ -**	**$ (3.34)**
Other Programs:				
American International Group (AIG)	$ 67.84	$ 67.84	$ -	$ 15.18
Automotive Industry Financing Program (AIFP)	$ 79.69	$ 79.69	$ -	$ 12.16
Sub-total Other Programs	**$ 147.53**	**$ 147.53**	**$ -**	**$ 27.34**
Sub-total for Investment Programs[7]	**$ 417.09**	**$ 411.72**	**$ 0.10**	**$ (0.25)**
Making Home Affordable	$ 23.78	$ 19.33	n/a	$ 22.91
Hardest Hit Fund[8]	$ 9.60	$ 9.01	n/a	$ 9.60
FHA-Refinance[9]	$ 0.05	$ 0.02	n/a	$ 0.02
Sub-total for Housing Programs	**$ 33.42**	**$ 28.36**	**n/a**	**$ 32.53**
Total for TARP Programs	**$ 450.51**	**$ 440.08**	**$ 0.10**	**$ 32.28**
Additional AIG Common Shares Held by Treasury[10]	n/a	n/a	n/a	$ (17.55)
Total for TARP Programs and Additional AIG Shares	**$ 450.51**	**$ 440.08**	**$ 0.10**	**$ 14.72**

Figure 10. Overview of Treasury investments made under Tarp program as of July 31st, 2018[39]

As evidenced, the Tarp program comprised five distinct programs, below explained in detail:

1. **Bank investment program**, aimed at stabilizing financial institutions, through which the Treasury provided about $ 250 billion; as specified in the "Warrant Disposition Report" of 2012 drafted by the Department of Treasury, Treasury has recovered $ 268 billion through payment, dividends, interest and other income[40].

   This program has been developed through five different bank programs:

   a. "Capital Purchase Program" (CPP): The CPP was designed to support the financial position of viable financial institutions of all sizes and to make them again the trust banks in the financial system as a whole. Treasury initially committed about $ 250 billion (approximately one third of total initial Tarp funding) to the CPP for 707 banks in 48 States, which was later reduced to $ 218 billion in 2009, receiving warrants, preferred stock and debt securities in exchange at the time of investments; in fact, most financial institutions payed Treasury a 5% dividend on preferred stocks for the first five years and a 9% rate for the following ones. At the end of the investment period, Treasury had invested approximately $ 205 billion and the total proceeds received as of July 31st, 2018

[39] U.S. Department of the Treasury, *"Monthly report to Congress, July 2018"*, August 10, 2018, p. 5.
[40] U.S. Department of the Treasury, *"Warrant Disposition Report"*, December 31, 2012, p. 1.

are $ 226,8 billion so divided: $ 196,62 billion through repayments, $ 3,04 billion through auctions, $ 19,05 billion through total dividends, interests and other income, $ 8,07 billion through income deriving from warrants exercise[41]. The program closed in 2009.

b. "Targeted Investment Program" (TIP): It was established in December 2008. Treasury goal was to provide, through this program, additional funding to financial institutions that could get in trouble the financial system, aiming at preventing a lack of trust in critical banks which could have resulted in financial market disruptions during the crisis, threatening the financial strength of similar financial institutions and undermined the overall economy. As illustrated in Figure 10, amount invested was $ 20 billion both in Bank of America and Citigroup (see in Figure 10, column "Disbursed as of July 31st", are signed $ 40 billion) that made the extinction possible of the Asset Guarantee Program (see point c below). These investments went to increment those ones already received under the CPP. Like the Capital Purchase Program, Treasury received in exchange preferred stock and warrants to purchase common stock in each institution. Treasury gained 8% annual rate on dividends, which was higher than the CPP rate. The program closed in December 2009 when both banks paid back in full the investments made and Treasure gained about $ 4 billion.

c. "Asset Guarantee Program" (AGP), through which the government supported banks whose failure would have created serious problems to the financial system and the broader economy; it consisted in adjusting the value of assets held by financial institutions absorbing a portion of losses. AGP was conducted by Treasury, FED and the Federal Deposit Insurance Corporations[42] (FDIC). As for the TIP, the target companies of this program were Bank of America and Citigroup, both of them with high risk of losses during the financial crisis due to high number of toxic assets in their balance sheets. For what concerned Bank of America (BOA), in January 2009, Treasury, FED and the FDIC decided to cover potential losses on about $ 118 billion pool of financial instruments owned by the financial institutions. But the bank decided to terminate negotiations, and in September 2009, the agreement stopped existing due to a termination fee of $ 425 million paid to the Government, whose $ 276 million went to Treasury. Thanks to the announcement of the rescue agreement, Bank of America grew his value of that amount and the fee compensated this increase. The announcement was widely well seen by the markets and it contributed to restore investor trustee in these financial institutions. If this agreement had been finalized, Treasury and the FDIC would have received preferred

[41] Source: U.S. Department of the Treasury, *"Monthly report to Congress, July 2018"*, August 10, 2018, p. 1.
[42] United States government corporation, separated by the Government and FED, that provides deposit insurance to depositors in U.S. commercial banks and savings institutions.

stock and warrants as a premium for the guarantee (one of the agreement conditions). No Tarp funds were spent for Bank of America resulting in gain for taxpayers. Instead, regarding Citigroup, in January 2009 Treasury, FED and the FDIC agreed to cover potential losses on about $ 301 billion pool of Citigroup's assets. In this case, the agreement was finalized, and both Treasury and FDIC received $ 7,1 billion of preferred stock, and Treasury alone received about $ 66,5 million of common share. Citigroup requested to interrupt the agreement in December 2009 considering the repayment of $ 20 billion received with the TIP. Banking regulators approved its request together with Citibank's operation of raising more than $ 20 billion of private capital. Treasury and the FDIC kept most of the premium paid. Specifically, the Government retained a total of $ 5,3 billion of the $ 7,1 billion of preferred stock (which had been converted to trust preferred securities). Citigroup didn't make claims for loss payments and Treasury didn't make guarantee payments of Tarp funds to Citigroup; therefore, all payments cashed from the sale of the securities resulted in a net gain to the Treasury. As of April 2012, Treasury have received a positive return of $ 2,76 billion from Citigroup's participation in the AGP[43].

d. "Supervisory Capital Assessment Program & Capital Assistance Program" (SCAP & CAP): goal of this program was to evaluate the ability of banks to restart the lending activities even in adverse external conditions. Banks would be able to raise the necessary resources and private capital. This program was divided in two parties: the first part (Supervisory Capital Assessment Program – SCAP) consisted in a sort of stress test made at the 19 largest bank holding companies (BHCs), whose assets value exceeded $ 100 billion at the end of 2008, in order to evaluate their "*ability to hold additional capital as a buffer against potential high losses and still remain sufficiently capitalized at over the next two years (2009-2010) and to lend to creditworthy borrowers whether such losses materialize"*[44]. Treasure asked to each BHC selected to forecast expected credit losses and revenues in 2009 and 2010 under two different economic situations: a baseline scenario, that reflected the current situation, and a more pessimistic scenario, that considered a longer and harder recession. The objective was to quantify the size of capital needs to create a buffer and helping banks to raise capital if they had not sufficient resources to face crisis periods. Results were published by the Treasure in a formal document on May 7th, 2009; the test underlined that nine of the nineteen firms examined had sufficient capital buffers to face the adverse scenario; the remaining ten BHCs needed

[43] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/bank-investment-programs/agp/Pages/overview.aspx
[44] Board of Governors of the Federal Reserve System, *"The Supervisory Capital Assessment Program: Design and Implementation"*, April 24, 2009.

to add $ 75 billion more to reach the target; nine of those ten banks were able to raise additional capital through the private market. Just Ally Financial (formerly called GMAC) could not raise capital through private market and asked for additional funds to Tarp in order to meet its SCAP requirements.

GMAC was helped by another program (i.e. the Automotive Industry Financing program). In this way, since no funding was provided by the second part called "Capital Assistance Program" (that consisted in supplying capital provisions to those banks that were unable to raise it through private sources). This program was closed without providing any source of financing (this is the reason why it doesn't appear in the formal document "Monthly report to Congress, July 2018").

e. "Community Development Capital Initiative" (CDCI): Treasury created this program on February 2010 to help strong certified Community Development Financial Institutions[45] (CDFIs) and the communities they serve that faced the effects of the financial crisis. Department of Treasury financed these banks with about $ 570 million and received 2% interest rate for the first nine years, lower than 5 percent rate under the Capital Purchase Program, and 9% for the following. In this program 84 institutions were involved, whose investments finished in 2010, but currently there are 15 banks that are still in program scope for an amount of $ 60 million[46].

In Table 4 are illustrated the top ten banks with higher outstanding amount.

Table 4: Top ten remaining CDCI Institutions[47]

Institutions	Location	Amount Outstanding ($ million)
Carver Bancorp, Inc	New York	18,98
First American International Corporation	Brooklyn	17
Hope Federal Credit Union	Jackson	4,52
Community Bank of the Bay	Oakland	4,06
Cooperative Center Federal Credit Union	Berkeley	2,80
Tri-State Bank of Memphis	Memphis	2,80
Community First Guam Federal Credit Union	Hagatna	2,65
Opportunities Credit Union	Burlington	1,09
D.C. Federal Credit Union	Washington	0,50
Tulane-Loyola Federal Credit Union	New Orleans	0,42

[45] American financial institutions that provide financing to communities that are underserved by traditional banks and financial services providers found it harder to obtain credit in case of the economy downturn.
[46] Source: U.S. Department of the Treasury, *"Monthly report to Congress, July 2018"*, August 10, 2018, p. 2.
[47] Source: U.S. Department of the Treasury, *"Monthly report to Congress, July 2018"*, August 10, 2018, p. 2.

2. **Credit Market program**, with the goal of restarting the flow of credit to meet the critical needs of small businesses and consumers, through which were provided about $ 27 billion; this program was launched in 2008 using three different programs:
   a. "Public-Private Investment Program" (PPIP): launched in March 2009, it was designed to support credit market functioning and facilitate price discovery for legacy Commercial Mortgage-Backed Securities (CMBS) and non-agency Residential Mortgage-Backed Securities (RMBS)[48]. When crisis developed, prices of most financial assets dropped down, especially that of CMBS and RMBS, and many institutions had liquidity problems due to their hard valuation prices. *"The purpose of PPIP was to draw new private capital into the market for legacy RMBS and CMBS by providing financing on attractive terms as well as a matching equity investment from Treasury"*[49]. By providing this financing, PPIP was designed to restart the market for these securities, helping financial institutions to remove these hard-to-value assets from their balance sheets and allowing a general increase in credit availability to consumers and businesses. To raise the necessary capital, for this program were established Public-Private Investment Funds (PPIFs), that had the objective to purchase eligible legacy securities from banks, insurance companies, mutual funds, pension funds, and other eligible sellers. In order to be bought, securities had to have the following conditions:

      1) issue date before 2009;

      2) original rate AAA (or equivalent);

      3) directly secured by mortgage loan, leases or other assets.

      Treasury invested in this program $ 22,1 billion, after reduced at $ 18,6 billion ($ 6,2 billion in equity and $ 12,4 billion in debt). The program finished, and Treasury recovered $ 22,5 billion ($ 12,7 billion in debt and $ 9,8 in equity), involving a net gain of $ 3,8 billion so composed: $ 3,34 billion from dividends, $ 320 million in interest on debt and $ 86 million in warrants.
   b. "Small Business Administration 7(a) Securities Purchase Program": Treasury launched the Small Business Administration (SBA) 7(a) Securities Purchase Program to help small businesses in the wake of the 2008 financial crisis. America's small businesses play an important role in job market, but during the financial crisis, many entrepreneurs in the country could not receive credit they needed to grow their businesses and help drive the

[48] CMBS and RMBS are two types of mortgage-backed securities; the first (CMBS) is secured by mortgage on commercial properties, the second (RMBS) is secured on real estate properties. The term "legacy" refers to the troubled nature of securities, in that their price cannot be easily determined.

[49] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/credit-market-programs/ppip/Pages/purpose-and-overview.aspx.

economic recovery[50]. Goal of Government maneuvers was to provide more credit to small businesses in the primary market by temporarily expanding loan guarantees from 75 % to 90 % of an SBA 7(a) loan balance and eliminating certain loan origination fees. Within this program, Treasury purchased securities comprised of the guaranteed portion of SBA 7(a) loans. These loans financed a wide-range of small business needs, necessary to the ongoing activities such as machinery, equipment, furniture.

The initial investment was about $ 368 million in 31 SBA 7(a) securities between March and September 2010. These securities contained more than 1000 loans from different industries, among which retail, educational services, manufacturing, scientific and technical services, food services and healthcare. Through its purchases, Treasury injected liquidity in this market to help restart credit line. Since Treasury began its purchases, the SBA 7(a) market has recovered with new SBA 7(a) loan volumes returning to pre-crisis levels. In total, for this program Treasury recovered $ 376 million through securities sales (receiving $ 335 million) and principal and interest payments (the others $ 41 million) over the life of the SBA 7(a) Securities Purchase Program, with a gain of approximately $ 9 million[51].

c. "Term Asset Back Loan Facility" (TALF): objective of this program was to restart the securitization market that had contributed in a significant manner to credit supply before crisis eruption. Created by FED and Treasury together, this program consisted in the financing to subjects able to guarantee the loan with substantial collateral. The Federal Reserve Bank of New York (FRBNY) made available every type of financing with three to five years maturity with a frequency of once a month, and in case of no repayment, the bank took the collateral and sold it to a SPV called TALF, LLC that was engaged to manage these assets. Securities transformed had to receive a rating of triple A from the rating agencies and the risk associated to securities was guaranteed by the Bank of New York and collateral monitors. Additionally, each ABS issuer had to use an external auditor to verify the ABS eligibility. Total funding commitment made by the Treasury was $ 4,3 billion, reduced in June 2012 to $ 1,4 billion.

3. **Auto industry program**, providing about $ 82 billion so divided: $ 51 billion for General Motors, $ 12,5 billion for Chrysler, $ 17,2 billion for Ally Financing. One of the markets more hit by the crisis was the automotive sector, with a several credit availability reduction and sales losses. This industry was highly expose to liquidity and insolvency risks when the crisis erupted. Since the vastity of automotive sector across the USA, considering also the relative

[50] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/credit-market-programs/sba7a/Pages/Program-Purpose-And-Overview.aspx.
[51] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/credit-market-programs/sba7a/Pages/Program-Status.aspx.

supplier and services linked to it, the Government decided to start up a specific program to save it.

There were 3 distinct programs:

a. "Automotive Industry Financing Program": launched in 2008 with the goal of helping mainly General Motors (GM), Chrysler and Ally Financial (GMAC). For what concern General Motors, Treasury provided about $ 51 billion under a loan agreement that required a guarantee to underwrite an efficient restructuring plan. The first plan proposed failed, and the company was forced to make a revised proposal. This second plan was successful and in June 2009 GM began an orderly restructuring process. It was able to avoid financial collapse just 40 days after program started and it began a significant inverse trend. GM completed an initial public offering in November 2010 from which the Treasury earned $ 13,5 billion in net proceeds. In December 2012 Treasury announced its intent to fully exit its remaining investment in GM within the following year. Treasury participated to restructuring program providing loans to protect warranties during the restructuring plan (see the Auto Warranty Commitment Program). After Treasury bought GM stock, GM agreed to repurchase 200 million shares of GM common stock from Treasury at $ 27,50 per share and closed on that transaction later the same month repaying taxpayers $ 2,1 billion. In December 2013 Treasury sold its final stake in General Motors exiting its investment in the company and it recovered a total amount of $ 39 billion from the initial investment. The government's actions enabled the industry to restart activity and the company got back making profit and growing. On Chrysler side, Treasury committed $ 12,5 billion and, as for what happened to GM, it was required to implement a viable restructuring plan. In March 2009, the Administration determined that the business plan submitted by Chrysler failed to meet that standard and, since it was not able to ongoing as a stand-alone company, the Administration decided that Chrysler could achieve viability by partnering with Fiat. Nothing could avoid the bankruptcy status to Chrysler and, as part of the planned restructuring, in April 2009 started the failure management procedures. In May 2009, Treasury provided $ 1,9 billion to Chrysler under a debtor-in-possession financing agreement for assistance during its bankruptcy proceeding. Chrysler emerged from bankruptcy in June 2009 as a newly formed entity, Chrysler Group LLC. Since then, Chrysler initiated a new business course making changes in its structural system, starting to make operating profit of April 2011 and positive net income in March 2011. More than $ 11,2 billion of the initial billion committed has been returned to taxpayers through principal repayments, interest, and cancelled commitments. And lastly, for Ally Financial (GMAC), Treasury invested a total

of $ 17,2 billion of TARP funds. Founded as GM's finance subsidiary in 1919, Ally has been a primary source of financing for GM's dealers and consumers. Given the close link with GM, Treasury determined that without government assistance, Ally would have been forced to suspend financing lines to creditworthy dealerships, leaving them unable to purchase automobile inventory for their lots. Consequently, without orders for cars, GM would have been forced to reduce its factories in order to match the drop-down demand. At the beginning of 2011, GMAC executed a substantial restructuring plan; the company sold its international operations for more than $ 9 billion and addressed legacy mortgage liabilities. In November 2013 Ally returned $ 5,9 of the total investment to taxpayers, that were approximately 70% of total investment. In December 2014, Treasury sold about 122 million shares of Ally common stock it retained through private offering, IPO, and two pre-defined written trading plans, and receive proceeds from the sale of about $ 6 billion. At the end of 2014, Treasury had sold all of its remaining 54,9 million shares of Ally common stock at a share price of $ 23,25, recovering an additional $ 1,3 billion for taxpayers[52]. In total, taxpayers recovered $ 19,6 billion on the, gaining almost $ 2,4 billion on the original $ 17,2 billion investment in Ally. Following this transaction, Treasury has fully wound down its equity investments through the Automotive Industry Financing Program.

b. "Auto Supplier Support Program" (ASSP): This program had the objective to assist the relative automotive sector, in particular for what concerned the supplier companies, to assure that they would receive the adequate compensations. Treasury has recovered all amounts invested under this program.

c. "Auto Warranty Commitment Program" (AWCP): With this program, Treasury provided loans to protect warranties on vehicles purchased from GM and Chrysler during their restructuring periods. Treasury has recovered all amounts invested under the warranty program.

4. **Investment in American International Group (AIG) program**, providing in total $ 182 billion, $ 70 billion of which committed by the Treasury and the others $ 112 billion from the FRBNY. *"The way to look at this is the following – it is great we were able to realize a profit . . . It was a $182 billion commitment. So, it is great that we've been able to recover that. But more importantly . . . we've learned a lot of lessons. We learned we can never let a company threaten to take down our financial system like this one did. And that's why things like regulatory reform are so important and those are really the lessons we should be focusing on*

[52] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/automotive-programs/Pages/overview.aspx

today."[53] In this interview, Tim Massad underlined the great success of AIG restructuring plan made by the Treasury in collaboration with FRBNY; since the financial crisis, AIG has undertaken a dramatic restructuring effort, mainly undermining the size of the company reducing the assets by about 46% (from $ 1022 billion asset value in 2008 to $ 551 billion in 2012[54] ; goal was to limit assets in the company just to that are focused on its core business (i.e. insurance sector) and sold non-core assets. In Table 5 are summarized the overall expenditure, repayments and gains obtained by both Entities in the period 2011-2012. The overall return was $ 22,7 billion, $ 5 billion of which gained by the Treasury and $ 17,7 from the FED.

Table 5: funds structure for AIG restructuring plan[55] (amounts in $ billion)

	Commitments	Repayments	Positive Return (Interests/Fees/Gains)	Total Recovered (Repayments + Interests/Fees/Gains)
Federal Reserve	**112,5**	**112,5**	**17,7**	**130,2**
Loans to AIG	35	35	6,8	41,8
AIA-ALICO SPV	25	25	1,4	26,4
Maiden Lane II	22,5	22,5	2,8	25,3
Maiden Lane III	30	30	6,6	36,6
Treasury	**69,8**	**69,8**	**5**	**74,8**
Common Stock	47,5	47,5	4,1	23,2
Preferred Stock	22,3	22,3	0,9	51,6
Total	**182,3**	**182,3**	**22,7**	**205**

Treasury received its proceeds selling AIG common stocks and preferred stocks that bought in the initial phase of program; in detail, Treasury realized a $ 4,1 billion positive return on common stock holdings and $ 0,9 billion positive return on preferred stock holdings; on the FED side, its $17,7 billion positive return to date were composed by $ 6,8 billion positive return on the Federal Reserve Bank of New York's (FRBNY) loans to AIG; initially the amount committed for loans was $ 85, later reduced at $ 60 and lastly to $ 35. During this program, FED started operations using three "off-balance sheet" entities; the AIA Aurora and ALICO, that held AIG's largest foreign life insurance subsidiaries, which guaranteed $ 1,4 billion positive return on preferred interests; Maiden Lane II, which purchased mortgage-related assets from AIG and Maiden Lane III, which held assets associated with credit default

[53] Tim Massad, Assistant Secretary for Financial Stability, interview on Bloomberg TV, December 11, 2012, https://www.treasury.gov/connect/blog/Pages/AIG-wrapup.aspx
[54] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/aig/Pages/status.aspx
[55] Source: https://www.treasury.gov/initiatives/financial-stability/TARP-Programs/aig/Pages/status.aspx

swap counterparties, that received proceeds respectively for $ 2,8 billion and $ 6,6 billion. Over the one year and half of the program, Treasury conducted six public offerings of AIG common stock, selling a total of 1.655.037,962 shares (originally 92 % of AIG's outstanding common stock) at an average price of $31,18 per share. The last operation made within the program was the sale of shares kept by the Treasury in December 2012, receiving a gain of $7,6 billion.

5. **Housing program**, providing about $ 46 billion. This program aimed at stabilizing the house market and helped house owners to avoid foreclosure. Considering as the principle cause of the crisis, the Government purpose was to hit the real estate bubble erupted and reduce house prices. Within the Tarp, Government established 2 different programs to fight this problem:
   a. "Making Home Affordable Program" (MHA): launched in 2009, MHA helped homeowners avoid foreclosure providing a series of solutions to modify or refinance their mortgages, without consider unemployment cases, or transition out of homeownership through short sale of foreclosure. The MHA program set new principles that have transformed the mortgage industry, modifying about 3,9 million private-sector mortgage contracts through October 2013. Both public and private efforts have helped more than 7 million Americans to prevent avoidable foreclosures. Some of the most important solutions were adopted in the "Home Affordable Modification Program" (HAMP), which aimed at helping people in possession of house to reduce their mortgage payments on a long-term basis, providing them with incentives and financial assistance. Started in 2012, MHA housing initiatives provided pay-for-success incentives to protect taxpayers; this means that funds are spent only when transactions are completed and only as long as those contracts remain in place. HAMP had specific eligibility requirements for homeowners and includes strict guidelines for servicers. In fact, this modification was introduced in 2013, when the former deadline for ending program were shift to 2016; eligible criteria to submit within the program were changed in order to involve more needy people. In the end, HAMP helped about 2 million of families.
   b. "Hardest Hit Fund" program (HHF): this program was initiated as an ongoing of the previous one, since in 2016 there were still more families that needed help with their mortgage's payments. For this program were committed additional $ 2 billion, distributing them in two tranches of $ 1 billion each. This investment allowed the Housing Finance Agencies[56] (HFAs) to continue aid homeowners in difficulty. The first phase allocated money using a formula based on: 1) state population; 2) HFA's utilization of

[56] HFAs are authorities established to help meet the affordable housing needs of the residents of their states. They vary widely in characteristics and can be independent entities; basically, they work with the States in order to aid house community.

their HHF allocation to date. The use of state population as a primary factor is consistent with previous HHF allocations, and consideration of utilization serve to understand states that effectively use funds. Instead, the second phase will utilize a different process, consisting in guaranteeing assistance to all States participating HFAs. This phase will allow Treasury to focus additional resources on that HFAs that have significant ongoing foreclosure prevention and neighborhood stabilization needs and successful program models to address those needs[57].

The Tarp program contributed in a significative manner to the overall US economic system, granting an ongoing process for every sector hit by the crisis (e.g. bank, automotive, insurance). This "direct" type of intervention cannot be considered as the only one made by the Obama Government. A series of important laws and legislative maneuvers were implemented to bring substantial changes in the operational processes of various entities, and they went to influence the entire regulatory environment, from individual agencies to the overall financial services industry.

One of the most important laws established is the "Dodd-Frank Wall Street Reform and Consumer Protection Act", known as "Dodd-Frank Act", whose aim is to promote a closer and more complete regulation of US finance to prevent the creation of new bubbles, while at the same time encouraging protection of consumers and the economic system and to avoid the accumulation of excessive risk at the expense of American taxpayers. An important goal declared was the desertion of "too bog too fail" concept. The name refers to Chris Dodd and Barney Frank, respectively the Chairman of Senate Banking Committee and the Chairman of Financial Services Committee, in charge over the financial crisis period. It has been considered as the more invasive intervention in the regulatory system and the most ambitious reform in financial sector. Signed into law on July 21, 2010 under Barack Obama Government, it has composed by 16 titles, each one regarding a particular face of financial system. Ones of the principle area of interventions are the monitoring activities of all type of financial institutions, consumers protection to guarantee their savings and investments, adjustments on rating agencies and derivatives sector (these latter more investigated in the following paragraphs). In order to meet the above-mentioned goals, this Act modified the existing regulatory structure, by creating a certain number of new agencies, in order to simplify the regulatory process, increasing the supervisory activity over specific institutions considered as a systemic risk, editing the Federal Reserve Act and working on transparency.

In particular, institutions affected by these changes include: 1) most of the regulatory agencies currently working in monitoring the financial system, such as the Federal Deposit Insurance Corporation (FDIC), U.S. Securities and Exchange Commission (SEC), Office of the Comptroller

[57] Source: https://www.treasury.gov/press-center/press-releases/Pages/jl0358.aspx

of the Currency (OCC), Federal Reserve (FED), the Securities Investor Protection Corporation (SIPC); 2) the final elimination of the Office of Thrift Supervision and 3) the introduction of new entities as the Financial Stability Oversight Council (FSOC), the Office of Financial Research (OFR), and the Consumer Financial Protection Bureau (CFPB).

With reference to the new entities introduced by the Act, they have been created to monitor and make researches about the economy state, respectively come to be held by the FSOC and the OFR; introduced in the Title I (called "Financial Stability Act of 2010"), the main tasks of the FSOC are to identify risks that could threat the US financial stability (for example, if identified as potential threats to the financial stability, shifting the supervision of such bank and non-bank institutions under the control of the Federal Reserve) monitoring both bank and non-bank financial institutions, such hedge funds, promote market discipline, and respond to emerging risks in order to stabilize the United States financial system; among the principal activities, it is required to report to Congress on the status of the financial system and may ask the OFR to conduct research; the Council may also provide for stricter regulation of a financial activity by issuing adjustments to the primary financial regulatory agency, which is obliged to implement, in case could be circumstances that the FSOC thought can undermined the safety of financial stability[58]; the Council reports to Congress on the implementation or failure to implement such recommendations. The FSOC has the faculty of treat as non-bank financial company any entity that was a bank holding company having assets for a total amount of $ 50 billion or more until January 1st, 2010; any bank that received financial assistance under the CPP established under the Tarp established by the Emergency Economic Stabilization Act of 2008 (EESA) or is a successor entity. The OFR makes supporting activity to FSOC in collecting data and research, and it can ask to each financial institution the necessary information required. These two new entities worked in a strict collaboration.

For what concern the consumer protection, the CFPB was instituted as a new agency to protect customers; it works in collaboration with the Department of Treasury. The CFPB can writes and enforce rules for all type of financial institutions (both bank and non-bank), monitors and reports on markets, as well as collects and tracks consumer complaints. According to the United States Treasury Department, and given its main task to protect consumers, the bureau has the responsibility to promote fairness and transparency for mortgages, credit cards, and other consumer financial products and services, and make markets for them helping consumers to direct with a path towards the most appropriate choice according to their needs.

Another important point to underline in the Dodd-Frank Act is the Title 6, known as the Volcker Rule, an important amendment that aimed at reducing the speculative investments made

[58] Source: "Dodd-Frank Act". Title I, section 120, pp. 1408-1409.

by big company, specially "bank holding companies"[59]. The rule was originally proposed by the United States Federal Reserve Chairman Paul Volcker to restrict United States banks from making certain kinds of speculative investments that do not benefit their customers and that contributed in a significative manner to the financial crisis eruption. The problem is that some kinds of these investments are made using the deposit account of customers. In the beginning, banks could not own or invest in private equity and hedge funds and limit their activity of proprietary trading[60]. A series of modification have been implemented, since more financial institutions criticized the extreme constraints developed; at a later time, the Volcker rule was amended to allow bank holding companies to invest in hedge funds and private equity funds with the constraint to receive interest no more than 3% of Tier 1 capital[61]; other exceptions were extended to banks allowing them to make proprietary trading in Treasuries, bonds issued by government-backed entities like Fannie Mae and Freddie Mac. In the end the result was that of dividing the activity of investment banks and commercial banks to guarantee the customers' protection.

In Europe, the outbreak of the crisis, as already highlighted above, has widened and has invariably invaded the European economy, requiring the community to intervene massively to rehabilitate the economic context. As happened in USA, the maneuvers of intervention in Europe regards not only the implementation and improvements of laws and rules to set financial system, but also monetary interventions finalized to fight the liquidity crisis in order that financial system start working again.

In a similar way as happened in USA with the quantitative easing, in the eurozone the European Central Bank (ECB) carried out the Long-Term Refinancing Operations (LTRO), an economic maneuver by which the ECB provides financing to eurozone banks. It started in 2008 and finished in 2011. The main objective of the LTRO was to maintain a portion of liquidity for banks holding illiquid assets, and thus prevent interbank lending and other loan origination from stop existing as succeeded in 2008 with the credit squeeze. Moreover, this program wanted to guarantee access to cheap capital to encourage eurozone banks to increase lending activities, as well as invest in higher yielding assets in order to generate a profit and improve a problematic balance sheet.

The ECB normally provided liquidity to banks through its main refinancing operations, which have two or four weeks as maturity, up to arrive at three months in the early 2008. Since then the ECB has successively introduced longer deadlines, setting up to 36 months terms for LTRO finance. Liquidity injections there have been in two tranches in 2011 and 2012, providing liquidity

[59] A company, not necessarily bank, that have control over other banks.
[60] Pool of operations (stocks, derivatives, commodities trading, etc.) that a bank make to earn money for itself.
[61] Tier 1 capital is the core measure of a bank's financial statement. It is composed by the core capital, which is common stock and retained earnings, sometimes including also non-cumulative preferred stock; it is an important factor for Basel Accords in terms of bank regulation.

for a total amount of about € 1000 billion. The banks in Countries most hit by the crisis and with highest level of public debt took the longest loan maturity available, in particular Spain, Greece, Italy and Ireland. Eurozone countries used public bonds as collateral, which increases their demand and lowers yields. For instance, Spain and Italy used this technique in 2012 to lower their debt yields. Collateral used are assets with the following characteristics: the collateral valuation posted to the ECB is made by cutting its market value, where the size of the cut depended on three factors: 1) the type of asset; 2) time until maturity; 3) its credit rating.

As already explained, credit ratings can be divided into three classes corresponding to senior, mezzanine or junior class. In addition, asset-back securities having a rating as single A are eligible for Euro system operations; the cash flow generating assets backing the ABS must all belong to the same asset class, i.e. assets containing only residential mortgage or only loans etc.; but some kind of loans cannot be included in the ABS as collateral, that is loans that didn't performed at the time of issuance.

Other important characteristics referred to the counterparty is that it could not enter in an interest rate swap as a provider in relation to the ABS submitted; documents of ABS transactions had to contain dispositions on ongoing services[62].

Further programs were developed by Europe as incremental subsidies to banking system called "Target Long-Term Refinancing Operations" (TLTRO); differently from the LTRO, the TLTRO provided financing for longer periods, up to four years. As specified in the formal document signed in July 2014, with this initiative the ECB wanted to support bank lending to non-financial private sector, that is corporations and households, but not for the purpose of house purchase. It offers addition long-term funding at attractive conditions to banks in order to further help them to reach the credit conditions and stimulate bank lending to the real economy. Moreover, this program reinforces the ECB's monetary policy stance and strengthen the spread of this one. As for the LTRO, the TLTRO provides financing in two distinct tranches, one announced in 2014 and the other in 2016. Operations included in this program are targeted with specific conditions, in that the amount banks borrow is directly linked to loans made to households or non-financial corporations, and the interest rate to be applied to these financing depend on the lending patterns.

More specifically, banks were entitled for the first part of the program in 2014 to an initial borrowing allowance equal to 7% of the total amount of their loans to the euro area non-financial private sector outstanding on April 30th, 2014. In the two successive TLTROs conducted in September and December 2014, financial institutions were able to borrow an amount that cumulatively did not exceed this initial allowance, while, in the following two years, banks could borrow additional amounts in a series of TLTROs on a quarterly basis whose level could not

[62] Source: https://www.ecb.europa.eu/press/pr/date/2011/html/pr111208_1.en.html

exceed three times net lending. The interest rate applied to these financing was the same used by the ECB in the main refinancing operations plus a spread of 10 basis points that would be eliminated in 2015. Interest will be paid in arrears when the borrowing is repaid. Twenty-four months after each TLTRO, banks could start to repay the amount received.

For the second part of the program (TLTRO II, conducted from 2016 to 2017), ECB provided further financing with maturity of four years. Disbursement were made in four tranches between this period. This time, banks could borrow higher level of financing, corresponding up to 30% of their eligible loan (the same loans of the TLTRO I) as at January 2016, without considering any amount which was previously borrowed in the TLTRO I and is still outstanding[63]. Financial institutions can start to repay on a quarterly basis starting two years from the settlement of each operation.

Among the main rules that have regulated the banking market for years, there are the Basel Accords, in force since 1992 with Basel 1; modifications were implemented in 2004 with new accords called Basel 2, further modified due to the 2007 financial crisis eruption, in that they couldn't prevent the crisis, and took the name of Basel 3. Today regulators are working on modifications and new improvements in order to compose a new set of rules called Basel 4.
Basel Accords are considered as a milestone in the banking and regulation system, given its large-scale approach; its effect impacts banks firstly, but since the high interconnection inside the overall economy system, they have unavoidably influenced also the overall economy. The objective that prescribe to follow is the prosecution of financial and monetary stability. As anticipated, in the last 25 years Regulators have changed some aspects of Basel Accords, since not efficient in provide and guarantee sufficient protection. First of all, Basel Accords are guidelines, standards and recommendations prepared by the "Basel Committee and Banking Supervision", founded in 1974 from the collaboration of the Central Banks Governors of the G10 (Group of the 10 most important countries). Member States are Belgium, Netherlands, Luxembourg, France, Germany, Italy, Spain, Japan, United States, United Kingdom, Sweden, Switzerland (Spain and Luxembourg later added).

Basel Committee birth is placed in a context where the deutsche bank Bankaus Herstatt declared bankruptcy, and it started from here to move towards support and regulation signals. Among its responsibilities, the Committee works in three areas: 1) banking supervision; 2) national supervisory authorities' coordination; 3) enforcement of regulatory standards with particular attention to financial institutions solvency.

An important aspect is linked to the authority hold in the Committee, in that even if it theoretically does not have autonomous regulatory capacity, it gives effectiveness to the activity it carried out; work made by the Basel Committee can result in regulatory standard, that implicitly

[63] Source: https://www.ecb.europa.eu/mopo/implement/omo/tltro/html/index.en.html

involved both states joined and states not conform; in this way the Committee encourages convergence towards common approaches and standards[64].

Basel 1. In 1988 the Basel Committee issued an agreement called "International Convergence of Capital Measurement and Capital Standards", known as Basel 1. It was born in a context in which dimensional growth and market shares increase were favored rather than think about improve investment capital. Basel 1 had the goals of create a common rules approach in international field, stabilize international banking system to prevent the financial crisis eruption, improve risk hedging and impose banking to use its capital in a more prudent way considering the credit risk. In this way, it took form the concept of regulatory capital (or capital requirement), that measure the quantity of capital that a financial institution had to maintain in its financial statement in order to prevent insolvency risk and ensure the ongoing activity. With Basel 1, the capital requirement is divided in 2 blocks, called Tier 1 and Tier 2.

Tier 1 capital is defined as the core capital present in the financial statement, involving *"issued and fully paid ordinary shares/common stock and non-cumulative perpetual preferred stock (but excluding cumulative preferred stock)"*[65] and the disclosed reserves that consist in surplus such as share premiums, retained profit, general reserves and legal reserves. Within Tier 1 there is a stricter separation, identifying the Core Tier 1 (or Common Equity Tier 1), in which are excluded the preferred stocks, and the Additional Tier 1.

Tier 2 capital is defined as the supplementary capital, that is, as for Tier 1, divided in Upper Tier 2 and Lower Tier 2; the first part involved undisclosed reserves, asset revaluation reserves, general provisions/loan-loss reserves and hybrid capital instruments; in Lower Tier 2 there is subordinated debt. Basel 1 Accord enforced that the total capital (Tier 1 plus Tier 2) must be at least 8% of total assets and Tier 1 must be not less than 4%[66].

This is the formula applied:

$$\frac{Capital\ Requirements}{\sum(Ai\ \cdot RWAi)} \geq 8\%$$

where *Capital Requirements* is the sum of Tier 1 and Tier 2; *Ai* represent each asset and *RWAi* is the weighting coefficient to be applied to assets based on its nature.

[64] Mario Petrulli, *"Basilea 2. Guida alle nuove regole per le piccole e medie imprese"*, Ed. Halley, 2007, pp. 15-18.
[65] Source: "International Convergence of Capital Measurement and Capital Standards", p. 3. The difference between cumulative and non-cumulative is that in case of cumulative preferred stock, the Entity is obliged to pay past suspended dividends; in case of non-cumulative, this obligation is not contemplate and the Entity pay dividends just for the current year.
[66] Source: "International Convergence of Capital Measurement and Capital Standards", p.13.

Analyzing data in Table 6, it is possible to understand what kind of investments banks preferred doing: for example, since the very low risk in hold government securities and OECD banks, banks prefer to maintain this kind of credit, but this situation favored the development of systemic risk, given that banks preferred borrow/lend money each other. Moreover, the zero-risk associated to governments brought the financial institutions to hold a large number of public securities. But the adopted approach started to raise doubts and some limits of Basel 1 emerged: it was considered credit risk alone, and above all, weighting coefficient was not sufficient differentiated depending on nature of businesses (for example, there were no distinction among companies in considering some more profitable than others); all the guarantees and mitigation instrument were not sufficient considered and regulated; moreover, no residual life of risk exposition were treated.

Table 6: RWA coefficient under Basel 1[67]

Type of Credit	Weighting coefficient
Government and central banks	0%
OECD banks and securities firm	20%
Residential mortgage fully secured	50%
Retail lending or Corporate RE	100%
Non-OECD banks and securities firm	100%

In ’90s it was developing the financial risk management, a new discipline that took care of managing financial risk, which brought new ways of thinking and managing every aspect of financial risks that could occur also for banks and every financial institution. In this way, Basel Committee started to think at a new approach and new rules, whose implementation seemed necessary to fix some missing in Basel 1.

Basel 2. In June 2004 the Basel Committee published the new Basel Accord formerly called “International Convergence of Capital Measurement and Capital Standards. A Revised Framework”, commonly known as Basel 2. Before 2004, other activities and studies were made between 1990 and 2000. In 1996 Basel Committee started to find a solution to introduce also the market risk for securities held with trading purposes. Moreover, a new approach to calculate the credit risk started to be implemented since 1996 and first results were published in 2001 in the

[67] Source: Adrian Blundell-Wignall and Paul Atkinson, *“Thinking beyond Basel III: Necessary Solutions for Capital and Liquidity”*, OECD Journal: Financial Market Trends, 2010, p. 11.

document "The New Basel Capital Accord". Basel 2 approach involved more actors than what done in Basel 1, in that considered also the market and Regulators as important factors to insert within the regulatory standards. The main goal of Basel 2 is to consider not only a quantitative data that refers to credit risk, but also to consider other variables that unavoidably impact on the banks' insolvency risk. Basel 2 is divided in 3 pillars, each one facing a different scope:

- Pillar 1: "Capital Adequacy": it refers to capital requirements definition to faced credit risk, market risk and operational risk; the same formula of Basel 1 is applied, with the addition of risk associated to market and operating activities. This is the formula of total RWA:

$$RWA = \{12{,}5 \cdot (MR + OR) + 1{,}06 \cdot \Sigma[w(i) \cdot A(i)]\}$$

  where *MR* and *OR* are directly measured, and grossed up by 12,5 for 8% equivalence; *CR* is the sum of the various asset classes, each weighted by its appropriate risk weight, multiplied by a scaling factor applied to this latter term, estimated to be 1,06; *w(i)* is the risk weight for asset i and *A(i)* is asset i[68];
- Pillar 2: "Supervisory Review": identified the keys principals that Regulators have to follow for control;
- Pillar 3: "Market Discipline": information requirement to public for banks that comply with this accord.

Pillar 1. The main role is played by the Pillar 1, while the others Pillars work as support for the correct functioning of it. As already written, it distinguishes three different risks: credit risk, market risk, operational risk;

- Credit risk: possibility that banks could not receive back the amount lend due to insolvency of borrower; with the new accord, Basel Committee introduced rating as insolvency risk valuation system; differently from Basel 1, whereby weighting coefficients were more standardized and covered a high variety of counterparties, with Basel 2 the intent was to provide a more subjective counterparty risk valuation, based on internal factor in order to better address and analyze the associated risk. The valuation process moved from using a generic parameter to a more customize model, analyzing in detail each single counterparty and considering other factors as ability to generate future revenues and solidity in the market[69]. According to Basel 2, rating valuation can be done internally by financial institutions; this means that, together with rating made by ECAI (External Credit

[68] Source: Adrian Blundell-Wignall and Paul Atkinson, *"Thinking beyond Basel III: Necessary Solutions for Capital and Liquidity"*, OECD Journal: Financial Market Trends, 2010, p. 11.
[69] Source: Mario Petrulli, *"Basilea 2. Guida alle nuove regole per le piccole e medie imprese"*, Ed. Halley, 2007, p. 21-22.

Assessment Institution), banks have the possibility to develop internal systems to assess better the risk associated to counterparties. Two methods can be applied for rating valuation; a Standard Approach, which results in similar way at Basel 1, but the scheme is more complex, in that consider the counterparty's nature and technical characteristics of the deal; the new additional approach is that banks used risk coefficients provided by the rating agencies. This system allowed banks to avoid the risk of considering different counterparties under the same coefficient, in particular with reference to companies.

In Tables 7 and 8 are summarized the new weighting coefficients proposed by rating agencies and used by financial institutions; in case no coefficient is applied to a debtor, banks adopted a high degree of coefficient following a prudential approach.

Table 7: RWA coefficient applied to States and Central Banks under Basel 2[70]

Rating	Weighting coefficient
From AAA to AA-	0%
From A+ to A-	20%
From BBB+ to BBB-	50%
From BB+ to B-	100%
Less than B-	150%
No rating	100%

Table 8: RWA coefficient applied to companies under Basel 2[71]

Rating	Weighting coefficient
From AAA to AA-	20%
From A+ to A-	50%
From BBB+ to BBB-	75%
From BB+ to B-	100%
Less than B-	150%
No rating	100%

[70] Source: *"The New Base Capital Accords"*, Bank for International Settlements, January 2001, p. 7.
[71] Source: *"The New Base Capital Accords"*, Bank for International Settlements, January 2001, p. 10.

In addition to the standard methodology, the method used is the Internal Rating Based Approach (IRB); with this method, biggest banks (basically that ones with a strong risk management area), used internal valuation methodologies to assess the risk associated to specific debtors. The IRB approach requires banks to specify the following risk factors: the probability of default (PD) for each individual credit, which is the possibility that the subject would be insolvent during the year (PD is expressed in %); loss-given-default (LGD), that is the amount that financial institution would lose in case of debtor insolvency through which the bank is exposed, considering also factors as market conditions, geographical area, financial costs (LGD is expressed in % too); the exposure at default (EAD), that is the estimated amount that the debtor still has to pay back at the time of insolvency; maturity (M) of the financing[72]. The combination of these factors will determine the expected loss (EL) associated to each activity; in fact, the formula is:

$$EL = PD \cdot LGD \cdot EAD$$

Inside the IRB approach, there are 2 more distinctions: the IRB Foundation (FIRB) and the IRB Advanced; the difference between these two methods is that in the FIRB the LGD, EAD and M are provided by the Committee and banks calculate themselves the PD; in the IRB Advanced method, all the factors are calculated by the bank internally, using their internal systems.

- Market risk: defined as the risk of losses deriving from trading of financial instruments on the markets, regardless of their classification in the financial statements; this risk typology is linked to market trends and macroeconomics variables, not directly attributable within bank activity; basically, it refers to exchange rate risk, interest rate risk and counterparty risk;
- Operational risk: pool of risk deriving from operating activities, i.e. linked to internal procedures or risk deriving from external environment. Three methodologies can be applied: i) Basic Indicator Approach (BIA), through which banks hold capital to cover this risk as a fix percentage of 15% of the gross income; ii) Standardized Approach, through which banks divide internal business units in different business line; for each one, banks stabilized an indicator (can be gross income, annual average assets) that underlined the volume of activity made by the bank in that area and this indicator is multiplied by a factor β whose value is given by Supervisors. The amount to be consider in the end is the sum of

[72] Source: *"The New Base Capital Accords"*, Bank for International Settlements, January 2001, p. 34.

each indicator multiplied by the correspondent capital factor; iii) Internal Measurement Approach, whose approach is similar to the standardized method: the difference is that for each business line are associated specific operational risks. Supervisors provide an exposure indicator γ measuring the size of risk exposure combination of business line and risk type. In addition, banks measure a parameter representing the probability of loss (PE) and a parameter representing the loss given that event (LGE). Multiplying these three factors the result is the expected loss. Multiplying γ to the expected loss banks obtain the amount of capital to hold for that business line; as in the standardized approach, the total amount represents the capital charge to hold[73].

Pillar 2. Relevant aspect introduced in Basel 2 is the role of Supervisory control; goal is to constantly monitor that banks respect the minimum capital adequacy. Supervisory Authority have to control that banks applied internal procedures to assess risk exposure and that financial institutions adopt strategies that guarantee adequate capitalization level over time. Moreover, in case of a bank is going to work with capital level lower than minimum requested, Authorities have to intervene increasing monitoring activity or adopting measure as interruption of dividends payments.

Pillar 3. This pillar has the goal of enforce market role and regulate banks behavior; in order to favor the access to capital market, Pillar 3 establish more information transparency. Information distinguish in core and supplementary disclosure recommendations: the first one refers to crucial information necessary for the correct functioning of market and the second one refers to relevant information for particular financial institutions.

Banks have to follow two principles: 1) materiality, that means that banks have to properly disclosure those information whose omission can influence external decision; 2) frequency, meaning that banks have to disclose information on a six month basis; "*information is expected to be subject to a proper verification process on at least an annual basis, probably in the context of the annual report and financial statements. In certain categories of disclosure that are subject to rapid time decay, for instance risk exposure, and in particular for internationally active banks, quarterly disclosures are expected"*[74].

With the 2007 financial crisis eruption, certainties deriving from Basel 2 started to falter, given that all the Regulatory structure was not able to prevent and dismiss this catastrophic situation. Lot of public figures expressed their doubts related to the correct functioning of Basel 2, above all because, instead of protecting and guaranteeing, it brings the entire economic system to collapse.

[73] Source: *"The New Base Capital Accords"*, Bank for International Settlements, January 2001, pp- 94-96.
[74] Source: *"The New Base Capital Accords"*, Bank for International Settlements, January 2001, p. 115.

Some critics were made against on the adequacy of Basel 2 structure for each pillar. One of the critics made to Basel 2 refers to the level of capital requirement imposed to banks defined as inappropriate considering their risk exposure. Basel Committee had the goal of maintaining the same capital level of Basel 1, but this purpose was used just to drive the regulation transition towards the new accord. If new capital level were set up, a risk incurred could have been the credit line reduction with possible effects on the real economy. It was considered as a compromise made by each Member State, considering also the different characteristics of banking system in each country.

Another critic made was that Basel 2 rules have badly interacted with the international accounting standards that introduced the fair-value accounting for trading book assets. According to these rules, those assets are to be marked-to market, in the case there is an active market, or marked-to-model, i.e. registered at the value that results from the application of pricing models. The contemporary implementation of Basel 2 and the new accounting standards has made banks' assets more vulnerable to value fluctuations. Regarding minimum capital requirements, differences in these two regulations has been partially covered with the injection of prudential filters in order to protect the quality of supervisory capital. However, such a mechanism has been designed asymmetrically: while fair-value valuations are not considered for prudential purposes, fair-value devaluations are generally required to contribute to the calculation of supervisory capital[75].

Cyclicality effects caused by capital requirements was considered another negative factor, meaning that capital requirements are strictly linked to the economic cycles; in case of recession, borrowers unable to repay their debts increase, profits decline and banks are obliged to raise loan-loss provisions. If profits are not sufficient to cover loan losses, own funds reduce. Basel II provides greater sensitivity to risk of minimum capital requirements, but cyclicality comes from both changes of capital levels and volatility of risk-weighted assets.[76]

With the new approach adopted, rating agencies provide judgements on credit risk and this could bring to conflict of interest; the assignment of ratings is subject to many challenges. In order to evaluate complex financial instruments statistical models seemed to be restricted, since their high illiquidity grade and difficulties to assign them the correct market price.

Considering the risk valuation model, critics arose addressed to internal risk valuation model used by banks, in that not considered efficient because banks tend to underestimate their risk

[75] Francesco Cannata, Mario Quagliariello, *"The role of Basel II in the subprime financial crisis: guilty or not guilty?"*, Carefin Working Paper, p. 7.
[76] Francesco Cannata, Mario Quagliariello, *"The role of Basel II in the subprime financial crisis: guilty or not guilty?"*, Carefin Working Paper, p. 8.

exposure, even if Basel 2 give the same importance level both to internal and external model, since both work with the same model and have the same importance.

Basel 3. Starting from these critics and crisis eruption, Regulators retained necessary introduced a new framework that could guarantee more stability and effectiveness on the banking system. In 2010, Basel Committee approved the new Accord known as Basel 3 whose implementation period is between 2013 and 2019, in order to allow banks to properly adequate to new principles. The most important aspects introduced by Basel 3 Accords (formerly called "Basel III: A global regulatory framework for more resilient banks and banking systems") aimed at improving liquidity standards, stricter definition of capital requirements, better hedging against market risk and counterparty risk, better containment of leverage ratio and reduction of cyclicity effect.

In order to increase the safeguard of banks, Basel 3 introduced two ratios to be maintained by banks. A strong liquidity was considered necessary to enforced supervisory standards; in fact, by that period there weren't internationally harmonized rules in this area. "*As with the global capital requirements, the liquidity standards will establish minimum requirements and will promote an international level playing field to help prevent a competitive race to the bottom"*[77]. The Liquidity Coverage Ratio, that requires that banks maintain a stock of liquid resources that allows them to overcome a phase of accentuated outflow of funds lasting 30 days without having to resort to the market or refinancing at the central bank. The formula is the following:

$$\frac{High\ quality\ liquid\ assets}{Total\ net\ cash\ outflows\ over\ 30\ days} \geq 100\%$$

The second ratio is the Net Stable Funding Ratio, that "*requires a minimum number of stable sources of funding at a bank relative to the liquidity profiles of the assets, as well as the potential for contingent liquidity needs arising from off-balance sheet commitments, over a one-year horizon"*[78] which is so calculated:

$$\frac{Available\ amount\ of\ stable\ funding}{Required\ amount\ of\ stable\ funding} \geq 100\%$$

[77] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, p. 8.
[78] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, p. 9.

Another important aspect modified with Basel 3 Accords refers to the capital requirements; each state and jurisdiction have different definition of capital and this mismatching could not allow the market to fully compared capital among banks. In order to move towards a unique approach and a better comprehension of capital structure, Basel 3 enforced Tier 1 capital concept and defined new requirements; Tier 2 capital instruments was harmonized too, and Tier 3 capital instruments was deleted. Finally, to improve market discipline, the transparency of the capital base improved, with all elements of capital required to be disclosed along with a detailed reconciliation to the reported accounts. The limit of 8% is unchanged, instead the percentage of Common equity Tier 1 has increase from 2,5% to 4% and Tier 1 limit move from 4% to 6%.

In addition to raising the quality and level of the capital base, there was a need to ensure that all risks are captured in the capital framework, given that failure to capture all risk exposures in financial statement contributed in a crucial manner to crisis eruption.

Main intervention and change made were implemented in facing the counterparty risk, applying new parameter and new coefficient to better assess risk exposure. The new necessary condition is that capital requirement for counterparty credit risk has to be calculated using data as working in stress conditions that can help to remove cyclicality that might arise with using current volatility-based risk inputs, in that it is too influenced by external market trends. The bank must use current market data to calculate exposures currents and historical series of at least three years to estimate the parameters of the model. In alternatively, the model parameters estimated can be based on the information implicit in market variables. Data to be used to calculate the effective risk exposure have to be updated at least on a quarterly basis, and banks should use historical data of maximum three years and that a period of stress on credit default spread is included in this time frame[79]. Similar disposition was made to increase coverage on the so-called wrong-way risk.

In fact, Basel 3 accords implement a pillar 1 capital charge for transaction considered as wrong-way risky that are transactions with counterparties whose PD is positively correlated with the amount of exposure. This capital charge will be calculated by adjusting the multiplier applied to the exposure amount identified as wrong-way risk.

Basel 3 provides an additional tool, not dependent on complex statistical models, able to prevent banks from developing excessive debt levels. The Committee refers to this as an alternative measure to use as complementary to the risk-based approach. It is proposing a simple leverage ratio based on Tier 1 capital, with a 100% treatment to all exposures net of provisions, including cash and cash-like instruments. It has been decided that Tier 1 have to be 3% of total

[79] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, p. 30.

debt. Calculation method should be neutral considering the difference accounting standards applied in each Member State.

Another important announcement regards the cyclicality effect, identified as one of the main problems arisen in Basel 2. The trend of operators to behave in a pro-cyclical manner was accentuated by a multiplicity of channels, including the accounting principles applied to assets valued at market value and loans held to maturity, margin adjustment practices and accumulation and declining of leverage by financial institutions, businesses and consumers.

The Basel Committee introduces a series of measures aimed at strengthening banks' solidity in the face of these pro-cyclical dynamics. These measures will help ensure that the banking sector absorbs shocks rather than transmitting the risk to the financial system and to the overall economy.

The objectives proposed are: 1) *to mitigate* any excessively cyclical nature of the capital requirement minimum; in this sense, the Committee decided to focus on longer-term calibration of the probability of default in the modelling of risk, the introduction of loss estimates for insolvency during adverse economic conditions (LGD downturn) and an adequate calibration of regulatory functions that convert loss estimates into capital requirements; 2) *to promote* anti-cyclical provisions (i.e. forward-looking approach); the Committee intends to promote more robust methodologies for estimating provisions by banks encouraging a change in accounting principles in favor of an expected losses approach proposed by International Accounting Standards. The Committee strongly supports the IASB initiative aimed at moving to the EL approach, instead of remaining to the current approach of incurred loss, with the aim of improving the usefulness and relevance of financial reporting for the benefit of stakeholders, including prudential supervisory authorities, and moreover, IASB method detects actual losses in a more transparent manner and is also less pro-cyclical. 3) *to preserve* capital resources in order to establish reserves at the level of individual banks and the banking system in the phases of tension; the Committee introduced a scheme that promotes the preservation of capital and the creation of adequate capital resources in excess of the minimum requirements to be able to draw in the phases of tension.[80] At the beginning of the financial crisis, several banks continued to make large distributions of profits in the form of dividends, repurchases of treasury stock and generous remuneration policies also in the face of the deterioration of their financial condition and the prospects of the sector. This is attributable to a problem of collective behaviors, for which a reduction of these supplies was perceived as a sign of fragility.

However, these practices have made the individual banks and the sector as a whole less solid. Many institutions have quickly returned to earnings but have not done enough to replenish their

[80] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, pp. 5-7.

capital reserves in order to support the provision of new funding. On the whole, these dynamics have accentuated the procyclicality of the system. To remedy this market failure, the Committee introduces a prudential regime that provides supervisors with more effective instruments to promote capital preservation in the banking sector. Its implementation through internationally agreed principles will contribute to increasing the strength of the sector in the downturn and will provide a mechanism to rebuild capital resources during periods of recovery. Banks are subject to a countercyclical buffer that varies between 0 and 2,5% to total risk weighted assets. The buffer that will apply to each bank will reflect the geographic composition of its portfolio of credit exposures[81]. In addition, banks have to cumulate other money in capital; in Table 9 are identified the banks minimum capital requirements when banks required to buffer 2,5% capital, depending on their Common equity Tier 1.

Table 9: bank minimum capital conservation standards when bank is subject to 2,5% buffer[82]

Common equity Tier 1 ratio	Minimum capital conservation ratio
4,5% - 5,75%	100%
>5,75% - 7%	80%
>7% - 8,25%	60%
>8,25% - 9,5%	40%
>9,5%	0%

4) *to achieve* the broader macro-prudential objective of protecting the banking sector in times of excessive credit growth; as noted during the financial crisis, the losses suffered by the banking sector during a period of recession preceded by a period of excessive credit expansion they can be extremely large. They can destabilize the banking sector, causing or accentuating a contraction of the real economy, which can in turn further destabilize the banking sector. These interconnections highlight the particular importance for the banking sector to acquire capital reserves in periods when credit growth reaches excessive levels. The purpose of the countercyclical buffer is to achieve the broader macroprudential objective of protecting the banking sector in the phases of excessive expansion of aggregate credit.

[81] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, p. 55.
[82] Source: *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements, December 2010, p. 60.

2.2 The role of rating agencies

As already explained in Chapter 1, credit rating agencies (CRAs) had an important negative influence on the financial crisis, since their wrongly valuation of financial instruments on the market, specially CDO. The above mentioned private institutes have been under the radar of Regulators and Supervisory Authorities because, given their central role in the prevention and risk valuation, they could not carry out tasks of source of judgement. In fact, rating agencies have a precise role in providing judgments on each actor that issue debt instruments in the market, from States to companies, about their creditworthiness and probability of default. This underlined the great importance of these agencies, in that their activities reduce asymmetry information and prevent phenomena of adverse selection and moral hazard.

Starting from 1930s, Authorities decided to "invoke" rating agencies help in valuation and analysis of market information through their ratings. Over the years, CRAs started to acquire a central role as the main source of information about actors in financial market. Since their institutions, rating agencies considerably grew in importance in that put in contact, through their judgments, the various actors in the financial market, becoming more and more a point of reference for the investment choices. This operational way has led to an ever-increasing authority and consequent independence of the agencies that have always acted as if they were over-regulation entities. Although in many cases regulators were based on ratings work, actually for many years the CRAs were not regulated. The main approach involved a self-regulation based on best practices that are accepted as developed by the International Organization of Securities Commissions[83] (IOSCO), recognized as the international standardization body for the securities sector. IOSCO designed a series of guidelines that CRAs had to follow and important announcements were made in 2004, developing two distinct documents: the "Statement of Principles Regarding the Activities of the Credit Rating Agencies" in 2003, through which IOSCO set up the main principles to be adopted:

1) rating agencies actions should reduce asymmetry information;
2) rating agencies action should be independent and objective;
3) rating agencies should pursue transparency and disclosure;
4) rating agencies should maintain in confidence all non-public information.[84]

In 2004 the "Code of Conduct Fundamentals for Credit Rating Agencies" which prescribes the code of conduct each rating agencies should adhere and consist in behaviors in order to maintain:

- quality and integrity of rating process;

[83] Born in 1983, it is an organization that regulate securities and future markets in the world.
[84] Source: Herwig Langohr and Patricia Langohr, *"The rating agencies and their credit rating; What they are, how they work and why they are relevant*", Wiley Finance, March 2009, p. 443.

- rating agencies independence and avoidance of conflict of interest;
- rating agencies responsibilities to the investing public and issuers;
- disclosure of the code of conduct with market participants.[85]

As previous mentioned, these practices are not to be intended as mechanism, but simply goals to achieve according to each legal and market circumstances in which CRAs operate. This grade of flexibility was applied considering the differences among rating agencies in terms of their characteristics.

Another important factor that was under valuated and that influenced a lot the assumptions of the crisis was the double role played by the agencies; from one side, CRAs provide rating on issuer that issue an instrument, but, on the other side, the same issuer pays the rating agencies to fix rating of securities. In this way it creates a conflict of interest (already mentioned talking about Basel 2 reforms), because at the same time CRAs has the financial incentive to indulge the issuer and has the task of providing an objective opinion on the issuer.

The best rating agencies (i.e. Standard and Poor's, Moody's and Fitch Ratings) were born in the USA and began legitimate thanks to the Security and Exchange Commission (SEC) in 1975, which established what criteria had to be observed by them. These agencies took the name of "National Recognized Statistical Rating Organizations" (NSROs), a new exclusive category of rating firms whose judgments had recognized in the overall financial market and the only ones able to determine capital requirements. In this way, SEC addressed a regulatory delegation only to this agencies' category. The role of these NSROs gained importance during the year, especially in 1980s and 1990s, and other financial regulators besides SEC started to adopt this category as the only one to follow in judgement rating. Goal of this maneuver was that of capture market information through rating agencies as the market make, with an impersonal mechanism; the choice of concentrate this task only the restrict NSROs was designed to restrict number of relevant CRAs. This particular situation led to the creation of a sort of barrier to entry in rating sector, bringing to a high concentration that consequently raise level of risk associated (that is what happened in case of financial crisis after the extension of range to mortgage securitize bond rating).

The event considered as assumption to the enforcement of regulatory statements for rating agencies was the bankruptcy of Enron, a US multinational company that operated in energy sector. Its failure was a shock in the USA market, since no signal of something wrong were launched in the previous years. The problem linked to the rating agencies was that CRAs continue to provide high rating grade on the creditworthiness of this company even some days before the financial crack. No oversight interventions were made by SEC or other supervisory authorities. Enron case

[85] Source: Herwig Langohr and Patricia Langohr, *"the rating agencies and their credit rating; What they are, how they work and why they are relevant*", Wiley Finance, March 2009, p. 443.

gave the push to recognize the necessary establishment of new accords on CRAs sector. Rating agencies started to be mentioned for building a progressive structure of regulation, in that, considering also Basel 2 Accords, they assume an important role in determining and valuating credit risk factors and capital requirements.

In the USA was amended the "Credit Rating Agency Reform Act" in 2006 through which the SEC established clear guidelines for determining which credit rating agencies qualify as NRSROs, therefore fixed criteria for admission in the register. It also gave the SEC the power to control NRSRO internal processes regarding record registers and measure to avoid conflicts of interest. CRA that want to become NRSRO are subject to a Commission vote. The law specifically prohibits the SEC from regulating a NRSRO's rating methodologies, but NRSROs are obliged to disclosure all relevant information about methodologies and statistical approach adopted to SEC. Moreover, the law prohibits the behavior of influencing and compromising the rating judgement, in that CRAs should not affect with their judgment those entities that are engaged in the purchase of services or influence a rating on a security that have also for themselves with an underlying asset. The primary purpose was encouraging competition, transparency and improve rating quality.

The problem of conflict of interest is at the root of the crisis, in fact bills and laws emanated by 2008 did not serve as solution for the problem. On this theme the Dodd-Frank Act (already mentioned in the previous paragraph) dedicates a specific section (i.e. Title IX – Subtitle C) providing new approaches to regulate and manage the rating agencies power and their operational activity. Credit ratings are considered important from individual and institutional investors, since the great relevance and crucial role that have their activities and performances. In this sense, CRAs activity and structure are matters of national public interest, and they protect debt market as securities analyst made in assessing the quality of securities in the equity market, and auditors, who review the firms' financial statements. These are the reasons why public oversight had a high focus on CRAs industry. This Act enhances the SEC's enforcement mechanisms and adds requirements on NRSROs that are immediately effective.

The area on which the act mainly entered in force are so written in the Act:

- recurrent internal controls on rating procedures;
- separation of ratings from sales and marketing;
- annual reports on the compliance with laws;
- disclosure on due diligence process for asset-back securities;
- transparency of credit rating methodologies;

- consistent application of rating symbols and definitions, specific and additional disclosure for ratings related to ABS products.[86]

Moreover, every Federal Agency have several tasks to comply with the new regulation approach, among which review existing regulations that require the use of an assessment of the creditworthiness of the securities and any references to credit ratings in such regulations, modify such regulations identified in the review to remove any reference to, or requirement of reliance on credit ratings and substitute with a standard of creditworthiness as the agency shall determine as appropriate for such regulations. An important aspect goes to modify the governance of NSROs, imposing to these ones to constitute a board of directors composed to independent directors that have the task of monitoring and controlling the conflict of interest maneuvers and the effectiveness of internal control. In this context the SEC has the task of creating the Office of Credit Ratings that have the goal of oversight and enhanced regulation on this.

In EU, in the wake of the financial scandals of the early 2000s and following on US Government maneuvers, the European Parliament decided to invest the European Commission in the task of preparing a series of legislative proposals on a possible regulation of rating agencies, taking into consideration the role of these carried out within the financial markets and the need for greater transparency with regard to the market for content and the characteristics of their activity.

Before crisis eruption, the European Commission believed that the rules in force up to that time were sufficient to monitor rating agencies work. First signal of mortgage subprime crisis and the following sovereign debt crisis (see Chapter 1) underlined the weaknesses of financial market and the needs of interventions by European Authorities. European Commission presented a proposal for a regulation of the European Parliament and of the Council on credit rating agencies, with which it aimed to introduce a series of measures to restore confidence in the financial markets, encouraging transparency of rating activities and providing for among other things, mandatory registration of rating agencies operating on European markets. In 2009 was presented the European Regulation n. 1060/2009; the most important points that European Regulators wanted to emphasize were related to methodologies of rating analysis and internal organizational structure of agencies. The initial intent was to align the European principles to that one's designed in the USA with the Credit Rating Agency Reform Act. Regarding the methodologies, European disposition inserted in this regulation aimed at underling the importance on the methodologies applied by CRAs to arrive at their rating assessments, with a depth analysis of all necessary data and information available to build the correct result[87]. It is important that input data come from reliable sources; the importance of stressing on organizational structure aimed at preventing the

[86] Source: "Dodd-Frank Act". Title IX, Subtitle C, section 932, pp. 1872-1877.
[87] Source: www.eca.europa.eu. – *"La vigilanza dell'Unione Europea esercitata sulle agenzie di rating del credito è adeguatamente consolidata, ma non ancora del tutto efficace",* Corte dei Conti Europea, 2015, p. 9.

conflict of interest issue, considered one of the input problems for inaccurate valuation. The regulation requires the adoption of some measures aimed at increasing the agency's independence not only from its own customers, but also from its own ownership structures (that is what Dodd-Frank Act require).

For what concern the Supervisory activity, the Regulation n. 1060/2009 required that supervisory actions were transferred to Member States Authorities through a coordination mechanism among each State. A new approach was proposed in 2011 with adoption of a new European Regulation n. 513, through which the Supervisory activity were assigned to the "European Securities and Markets Authority" (ESMA). It was instituted in 2010 with a specific Regulation and it is part of the overall structure of the oversight and supervisory European authorities (i.e. European System of Financial Supervision – ESFS). The main objective of the ESMA is to protect the interest public, ensuring integrity, transparency, efficiency and regularity functioning of financial markets[88]. The ESMA has a centrality role in the oversight of CRAs actions and the main responsibilities of ESMA are:

- CRAs are required to register at ESMA if they are assigned rating to EU financial products;
- the CRAs are subject to supervision continuation of ESMA;
- CRAs are subject to penalties from part of ESMA if they do not comply to the regulation.

Other important aspects have been introduced with regard to the responsibilities within CRAs towards investors. A new Regulation were acted in 2013 (i.e. Regulation n. 462/2013) that was addressed to investors protection, in that up to that year investors could not ask for protection or compensation. Goal of this new regulation was to guarantee the right of appeal for investors, since up to 2013 this right could not be exercised by users of ratings that have suffered losses in relation to a rating wrongly issued by an agency due to its violation of the regulation on credit rating agencies. In this way, Authorities intended to stop the persistence of an economic system in which the credit rating agencies acted in (almost) total autonomy in the financial markets without taking responsibility towards investors and without collaborating in the functioning of the markets with principles of transparency and fairness. Each Member State is expected to integrate this regulation in national legislation.

This series of regulation for sure contributed to address the work of rating agencies, bringing more transparency in financial markets, thanks, above all, to the series of Supervisory interventions made that acted as a sort of watchful eye. A question that can rise is linked to the functionality of regulations to be adopted. It is clear that in the recent crisis, this rating system has shown some shortcomings. Firstly, the valuation models adopted may contain errors, as shown by

[88] Source: www.eca.europa.eu. – *"La vigilanza dell'Unione Europea esercitata sulle agenzie di rating del credito è adeguatamente consolidata, ma non ancora del tutto efficace",* Corte dei Conti Europea, 2015, p. 10.

the great underestimation of the correlation of defaults in the real estate mortgage sector: as it is always possible that an unforeseen event may occur, or a correlation occurs adequately weighted, the risk of imperfections in the models is and will always be present. It is therefore advisable not to be deluded about the possibility that a more stringent regulation is able to prevent the emergence of problems in the future, in this as in other sectors: a sensible approach for regulators can be not to deceive themselves in their turn by imagining infallible ratings, thereby increasing the expectation gap from which agency assessments were afflicted.

2.3 Derivatives market: a deeper explanation

Sectors involved inside the eye of the storm of 2007 financial crisis could not limit to that of financial intermediaries. For sure it is considered the biggest on which ascribe the main responsibilities, but a significative importance can be attributed to the role played by rating agencies (already explain in previous paragraph) and to the functioning of derivatives market; in this chapter will be present an explanation of derivatives market, its working and its evolution in the history, underlined changes before and after the Great Recession in 2007.

The bursting of the 2007 housing bubble caused a recession that can be compared to that of the Great Depression in 1929. Unlike that crisis, financial innovation played an important role in the 2007 crisis, as was the case in other financial crisis related to the bursting of speculative bubbles between the 17th and early 20th century. These crises also triggered very serious recessions and led some European countries to adopt the first measures aimed at countering the use of derivatives for speculative purposes. The reforms launched after the 1929 crisis did not have a specific impact on financial innovation, while in the post-war period and until the whole of the 20th century a strongly liberalist regulatory approach prevailed, which contributed to the exponential growth of the derivatives market. After 2007 there was a radical reversal of trend that reflected the awareness that financial innovation and derivatives, although not the root cause of instability, can exacerbate the systemic effects, because they amplify the crisis of confidence and make the system more interconnected. These aspects have contributed to bringing the new perspective of systemic risks and macro-prudential supervision to the attention of international regulators. The wave of regulatory reforms that triggered had a different aspect if compared to the previous big crisis; in this regulation process an important role was given to the financial innovation and derivatives market. In fact, securitizations and credit risk derivatives played a key role in making possible the credit expansion that characterized the real estate bubble that broke

out in 2007. In addition, they dilated the systemic effects of the bursting of the real estate bubble, amplifying trust and making the system more interconnected.

Before explaining modifications and regulations developed, it is necessary introduce, for clarification, derivatives and how this market works.

Derivatives are financial instruments whose value depends, on the basis of more or less complex formulas, on the performance of the value of other financial instruments or other "economic entities" such as exchange rates, interest rates, raw materials, financial instruments.

Derivatives are random contracts as a result of which the performance of one, or both parties, is determined in relation to the future evolution of a specific financial variable (or a set of variables), whose trend it is, by definition, not manageable by the parties that stipulate the contract. The economic and financial function of a derivative (the so-called function of the operation) is to assure the parties a certain result with respect to the future evolution of the value of the underlying instrument or even to the evolution of a relationship. This result is obtained by modifying the economic situation of the parties with respect to the condition in which they would have been found in the absence of the stipulation of a derivative or its subsequent purchase. Therefore, it is not a contract through which parties exchange, for example, a good, but instead it is a contract with the effect of managing a financial risk (i.e. market risk, counterparty risk and issuer risk). Actors that used derivatives can have two specific purposes: 1) hedging purpose, that means a party want to protect itself by adverse market situation or transfer the risk of specific situation to the counterparty and 2) speculation purpose, meaning that agent try to make profit waiting for changes in market variables over time or to enhance returns.

Typologies of derivatives products can be divided in four categories; forward and future contracts, options, swap.

A forward is a contract settled as private agreement between two parties, where one purchases an asset at a future date called expiration date; price of the asset (i.e. forward price) is set at the time of stipulating contract. A forward contract requires no initial payment or premium between the two parties. At the expiration date, cash is exchanged for the asset; party who have to buy the asset at the expiration date is in long position and party who sell is in short position. Since it is a private agreement, terms and conditions of the contract are stabilized by the parties and are flexible[89].

A future contract is similar to the forward on, in that parties agreed on buy/sell an asset at a specific price at a specific date: differently from forwards, futures are standardized contract and

[89] Forwards contract are traded “Over the Counter” (OTC), meaning that they don’t have a fix and standard structure and can be edit depending on the parties’ needs.

are always guaranteed by clearing houses[90] that cover the counterparty risk. Future contracts are traded at marked-to-market, so different from forwards, they can change settlement day by day depending on external conditions.

Options are financial contracts which gives the buyer the right to buy or sell the underlying asset at a specified price (i.e. strike price) and at a specific date; expiration date is specific for what concerned European options, instead in the USA for the American options this contract can be settled before a specified date; the seller has the obligation to fulfill the transaction if the buyer decide to exercise the option; the buyer pays a premium to the seller for this right. Options divide in call and put: the call option gives the right to the buyer to buy the underlying asset; the put option give the right to the buyer to sell the underlying asset. The right of exercise the option depend of the economic condition of the asset at the expiration date are favorable or not to the exerciser.

A swap is an agreement between two counterparties that, taking as a starting point a monetary value and applying to it two different parameters (e.g. different interest rates or exchange rates), they exchange cash at specific future dates (can be one or more) a sum of money equal to the differential in the monetary value achieved using the aforementioned parameters.

There are various types of swaps such interest rates swap, currency swaps, commodity swaps, and equity swap. One of the most common swap contracts is the 'interest rate swap' (IRS), in which the parties, taking as a reference a given notional amount, mutually agree to pay a sum of money equal to the differential of the different value of this amount calculated on the basis of different interest rates taken as a reference (e.g. fixed rate and floating rate). Another type of swap contract is the 'credit default swap' (CDS), that is a contract through which a party (i.e. protection buyer), protects itself from credit risk associated with a specific underlying asset through constant and periodic payments in favor of the other party (i.e. protection seller). The asset can be represented either by a specific issue of securities or by an issuer (company or sovereign State) or by a portfolio of financial instruments.

Another distinction inside derivatives products can be made considering exchange traded derivatives and OTC derivatives; the exchange traded derivative contracts are standardized, uniform and incorporated into financial instruments traded on regulated markets, which normally provide for the presence of a central counterparty (clearing house) that interposes between buyer and seller to ensure the successful completion of the transactions. Its presence reduces the counterparty risk, through the management of a guarantee margin system.

[90] A clearing house is a financial intermediary between buyers and sellers of financial instruments. It acts as third parties to all futures and options contracts, as buyers to every clearing member seller, and as sellers to every clearing member buyer.

Instead, OTC derivatives are contracts that are not necessarily standardized and are settled without intermediation outside regulated markets, so that the parties are free to structure the related transactions according to their needs. Nevertheless, by virtue of the standardization work carried out over the years by the International Swaps and Derivatives Association[91] (ISDA), many OTC derivatives are characterized by a high degree of uniformity. In any case, what inevitably differentiates OTC derivatives from those traded on regulated markets is the fact that while the latter are the result of the fragmentation of a single economic operation, each OTC derivative represents a single operation that is neither fractionated nor divisible. Furthermore, since there is no central counterparty in general, OTC derivatives normally involve a higher counterparty risk than those dealt on regulated markets; moreover, like what can happen in relation to any other contract, the contracting parties can mitigate the risk by exchanging adequate guarantees.

OTC derivatives are not necessarily less liquid than exchange traded ones, also because the OTC market is a sort of wholesale market where large intermediaries and institutional investors operate, while derivative transactions on regulated markets are normally more limited average amounts transactions; for example, the IRS market, although predominantly OTC, is one of the largest and most liquid financial markets in the world. This allows the holder of an IRS contract to easily close his position by entering into a contract with the opposite sign. It is also possible, although more complex and infrequent, to replace a new subject to one of the two contractors (so-called subjective innovation).

In the financial crisis context, all the financial contracts and products played a specific role that bring regulators and many economists to discuss about the great expansion of this market. Although the crisis has its most depth reasons for excessive monetary and credit expansion, it is particularly linked and amplified by the phenomenon of exponential growth of the derivatives market.

The evolution of derivative markets starts lot of years ago, maybe already in the Middle Age period, when people already felt the need of hedge themselves against risk and transfer it to other parties[92]. For what concern this thesis, the focus will be on period between the last years of 20th century and today, to see how financial innovation changes with the upcoming of computer and digital world. Derivatives products on financial instruments started to be developed since 17th and 18th century in Europe, and in 19th century, thanks to increase of international trade, expand its range also in USA. However, the need to create a regulated derivatives markets on financial instruments was felt only in the last century starting from 70s, stimulated by the occurrence of a

[91] ISDA is a trade organization of participants in the market for over-the-counter derivatives. It has created a standardized contract (the ISDA Master Agreement) to enter into derivatives transactions.

[92] Source: S. Alvaro, G. Siciliano, *"Crisi sistemiche e regolamentazione finanziaria: dai bulbi di tulipani a mutui sub-prime"*, CONSOB 10 luglio 2016, p. 16.

plurality of simultaneous events, among which the abandonment of the gold standard and the gold convertibility of the US dollar (currencies were linked to dollar with a fix exchange rate) making room to a system of flexible exchange rates. Another relevant factor was the development of digital world and the birth of new calculation modeling for pricing.

In 1970s in the USA were established the first market of futures products on currencies and options and the Commodity Futures Trading Commission[93] (CFTC) was born. In 1980s the already mentioned ISDA developed documentation for standardized products and the Master Agreement.

All these series of event and the creation of structural basis of this system brought to a strong development of derivatives market, with lot of typologies underlying asset used. The heavy growth of derivatives market was possible mainly thanks to the liberalist economic policies that had taken hold during the 1980s and 1990s, as already mentioned in the preceding paragraphs. Since there was therefore a system that imposed few restrictions, derivatives products began to develop more and more widespread that was the relevant factor that distinguish the impact of 2007 financial crisis compared to other previous crisis. In 1929 or other crisis such that of tulips in Nederland's in 17th century, the financial innovation was not strong, and derivatives products were concentrated in a limit range of people. The phases of creation and emergence of the crisis, comparing the various ones in history, have a similar process and development structure, with the birth of a financial bubble dictated by strong expansion policies, until reaching a maximum point where the collapse is inevitable. Analyzing the 2007 crisis, the strong credit expansion mainly linked to the real estate market has led to the creation of a bubble that has encouraged price increases, and then turned out to be a weak system based on fictitious bases. The great upheaval is given precisely by the strong development of the derivatives market with which a multitude of products had been created and disseminated with strong ties to the real estate system: the derivatives market in this sense has spread the damage of the crisis in an exponential manner to the economic context.

As already said, financial innovation was a primary factor for the derivatives spread: it was a process innovation, as well as a product innovation, deeply linked to the evolution of the banking business model and the development of information technology. Process innovation led to an exponential growth in the bank securitization market, which was followed by an ever-increasing sophistication and complexity of derivative and structured products linked to these securitization processes.

Even if there are differences of impact at macro and micro level, it can be noticed that behaviors of individual operators, even if legitimate and perfectly rational at the micro level can, however, result destabilizing at the macro level and can contribute to amplifying the effect of

[93] Independent US agency that regulates options and futures market. It works to ensure transparency, competition and the correct functioning of the market, avoiding frauds and systemic risk.

systemic shock. It creates an unavoidable link between them, and in this sense, Regulators decided to move towards an approach that aimed at supervising not only market actors at micro level as investors, depositors, but also at creating a new regulation system that protect economic system from financial crisis with negative impacts on public finances[94].

This supervisory at macro level were interpreted by USA with the introduction of new entity called "Financial Stability Oversight Council" (FSOC) that monitor system risk.

In Europe, in 2010, were instituted the "European Systemic Risk Board" (ESRB) through the introduction of Regulation n. 1092/2010. As previous mentioned, countries deemed necessary introduced new laws to better control the derivative markets work, since the high influence in the crisis eruption. New principles were introduced aimed at designing again the market structure, with the following goals: 1) increase of standardized OTC products; 2) reporting of operations to trade repositories[95]; 3) obligation to offset transactions in standardized derivatives at one central counterparty called "Central Counterparty Clearing House" (CCP); 4) the obligation to use transparent trading places for transactions in standardized and liquids derivatives; 5) increase in capital requirements for derivatives not offset by counter-central parts (so-called uncleared).

All these objectives were discussed during the G20 meeting at Pittsburgh in 2009, and in the following years States involved these objectives with national laws.

In particular, in the USA the already mentioned Dodd-Frank Act has a dedicated section on Title VII, Subtitle a, section from 701 to 774: within this section are regulated all derivative market players and all types of OTC derivative contracts, derivative dealers and the largest market participants by placing them under the same legal regime. Previously some derivatives were regulated by the SEC while others by the CFTC, while others, finally, were not regulated at all. In particular, those who trade in derivatives professionally or hold important derivative positions have been placed under federal control and have been obliged to register within the CFTC or the SEC.

In Europe, a series of Regulation and laws were issued to comply with principles discussed during G20, among which the principal are the Regulation n. 648/2012 called EMIR, which came into force in August 2012; European Directive 2014/65 called MiFiD II related to markets for financial instruments and went to substitute previous Directive 2002/92 and Directive 2011; Regulation n. 600/2014 called MiFiR that substitute Regulation n. 648/2012; both MiFiD and MiFiR came into force in all European Union from January 3, 2018.

[94] Source: S. Alvaro, G. Siciliano, *"Crisi sistemiche e regolamentazione finanziaria: dai bulbi di tulipani a mutui sub-prime"*, CONSOB 10 luglio 2016, pp. 33-34.

[95] Register on which are reported derivatives contracts and operation made; figure introduced with the European Regulation 648/2012 called "European Market Infrastructure Regulation" (EMIR).

In general, it was required to intermediaries and supervisory authorities to implement a standardization process that was considered as a necessary step to have more transparency on trading markets (i.e. trading venues) and a more correct price settlement process.

In detail, MiFiD II requires intermediaries to operate with transparency and to respect the so-called rules of product governance[96]; for the pursuit of the best interest of the customer and, therefore, and also a more custom financial products that comply with customers' interests, in order to reduce creation and spread of derivatives products that are riskier for the entire system.

In this way, the Supervisory Authorities have the important role of control and monitor that derivatives makers actions complying with the already mentioned principles and in respect of system stability. In order to ensure that the decisions taken by the Supervisory Authorities have a dissuasive effect on the general public, they should normally be published on a regular basis. In some cases, if ordinary oversight activities are not sufficient to prevent some risks, national and over-national Authorities can intervene directly on the market deciding also to limit the creation and distribution of particular derivative if considered particular risky.

According to Regulation MiFiR, this "product intervention" power (as called inside MiFiR Regulation) aimed at acting as prevention measure, or after a product is spread on the market, if subsist conditions that undermine investors protection and financial market stability.

For what concern trade repositories, MiFiR required the concept of "clearing obligation", consisting in a central authority (called Central Counterparty Clearing - CCP) that acted between parties and monitor the transactions made for particular derivatives instruments. It also allows central counterparties to constantly monitor the financial risks of each participant in the system, determining for each of them the guarantee margins necessary to cover the related exposure.

For the clearing exist two distinct approach: a "bottom-up" approach and a "top-down" approach.

The bottom-up approach starts from the action of CCP that proceeds to identify the categories of OTC derivatives with respect to which it intends to carry out its clearing services and notifies the categories of derivatives to the national Supervisory Authority competent for authorization. Then the national supervisory authority notifies ESMA of the authorization issued to each CCP and the categories of derivatives to which it refers. ESMA makes a sort of draft in which specify the category of OTC derivatives to be subject to the Clearing obligation, the date or the starting dates of it, with indication of any gradual application, and the categories of counterparties to which the obligation applies. Then the minimum residual duration of OTC derivative contracts that will be subject to the Clearing obligation. At the end of the consultation ESMA draws up the final draft

[96] Source: S. Alvaro, G. Siciliano, *"Crisi sistemiche e regolamentazione finanziaria: dai bulbi di tulipani a mutui sub-prime"*, CONSOB 10 luglio 2016, p. 42.

and carries out to send it to the European Commission in the form of a Final Report. Within 3 months, in case no objections made by European Parliament, the Commission approves the list and publishes it in the Official Journal of the European Union.

The top-down approach process, instead, start directly from ESMA, which identify the categories of derivatives to which applied clearing obligation and then notify that to European Commission that draw directly the list of derivatives subjects to compensation[97].

Another important aspect refers to trading obligation, that imposed to parties that trade derivatives to use negotiations markets.

Regarding Regulation on CDS, the Regulation n. 236/2012 aimed at cover and monitoring derivatives transactions which have as instruments the credit default swap; in Section 2 (i.e. *"Trasparenza delle posizioni corte nette"*), Article 5 (i.e. *"Notifica alle Autorità competetenti di importanti posizioni corte nette in titoli azionari"*) it declares the obligation for any natural or legal subject to report the individual net position "short" to the competent national authorities (including those made through derivative instruments) on listed shares, when these shares are equal or more than 0,2% of the share capital of the issuer (and at every 0,1% above this percentage), as well as on government bonds. According to Article 6 of the same Regulation, in case the net position is on shares representing the 0,5% of share capital, the disclosure must also be made to the public[98].

The most significative aspect that can be analyzed in this wave of regulatory process is the desired approach to modify and at the same time unify both micro and macro economies. Usually these two policies works in a separate way, but what bring out is that Authorities understand the importance of consider all the economic system and its sectors as a unique part of the overall context, promoting always idea of cooperation, transparency and fairness; the macro-prudential regulation is based both on the adaptation of typical micro rules on the capital requirements of banks towards objectives aimed at mitigating systemic risks, and on use, always in a macro-prudential key. On the other side, the micro-prudential policy, has as its ultimate objective the protection of the individual that act in the economy, which is achieved through the supervision of the stability of the single intermediary and through the supervision on the transparency and correctness of the subjects that operate on the financial market (so macro aspects). How can be noticed, the two policies are interconnected, both in substance and in operational terms, because one influence the other and without a strict complementary cooperation, no uniformity can be achieved.

[97] Source: https://www.esma.europa.eu/regulation/post-trading/otc-derivatives-and-clearing-obligation
[98] Source: https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:32012R0236&from=IT

3. CHAPTER 3: REGULATION EFFECTS: ANALYSIS ON CURRENT SITUATION

3.1 Beyond Basel 3 Accords

New regulatory approach introduced with Basel 3 Accords found a lot of consensus in European and American banks: the most important aspect achieved was a major coverage of risk that banking activities face (with the introduction of liquidity ratio) and the strengthening of preventive measures to counter credit risk (with a better definition of risk coefficients) with different models (Standard approach and IRB method approach).

In the last years, banking and supervisory authorities started thinking about new set of rules aimed at increasing regulatory efficiency to better enforce banking sector. In December 2017, European Central Bank, in accordance with Group of Governors and Heads of Supervision[99] (Ghos), announced with an official document that modifications to the Basel 3 Accords will be made (modifications that take the informal name of "Basel 4"). It is possible to affirm that Basel 3 Accords, come into force in 2010, were more focused on capital enforcement. This review made in 2017 wanted to focus on the opposite side of the balance sheet, bringing improvements on the risks associated with the bank's activities. Authorities consider these changes as the last ones to complete the regulation process started 20 years ago.

First change applied is the date on which new rules come into force, shifting the deadline from 2019 to 2022, in order to allow banks to fully comply with the new dispositions.

The main aspects to be considered in this last implementation refer to set new conditions within credit risk, in particular on standard approach model, enforcing and consolidating RWA coefficients to reduce the excessive variability that exist among banks, and on internal rating-based approach to reduce its effectiveness. Other adjustments were made in the calculation of operational risk, use of leverage ratio as fundamental risk requirement and introduction of new output floor.

For what concern the standard approach, the objective was to improve the treatment of credit risk to converge RWA level among banks, in order to better compare the level of capital ratio. As already mentioned in Chapter 2 about Basel 2 functioning, under this approach supervisors set the risk weights that banks apply to their exposures to determine RWAs meaning that banks do not use their internal models to calculate risk-weighted assets. The main changes Authorities made consist in: 1) *enhancing* risk sensitivity maintaining at the same time a simple approach on credit risk calculation; for example, about commercial and residential real estate sector, the change consists in a more detailed risk weighting approach instead of a flat one, so that having a more specific distinction. Both commercial and residential real estate loans played a crucial role in the

[99] Group of governors and supervisors of the main central banks in the world. It is the governing body of the Basel Committee for bank supervision.

2007 financial crisis and they were a recurring cause of troubled asset within banking system. Basel 2 Accords assigned a risk coefficient equal to 50% for residential real estate and 100% for commercial real estate, without making distinctions. Within the revised rule, the RWA coefficients applied to these categories depends on the loan to value ratio (LTV), which represent the total amount of the loan divided by the value of the property; the value of the property will be maintained at the value initially measured unless national supervisors require a reassessment if it goes downward. In Table 10 and Table 11 are illustrated the RWA coefficients for both categories depending on LTV ratio;

Table 10: RWA coefficient applied to residential real estate loan[100]

LTV	Weighting coefficient
≤ 50%	20%
50% < X ≤ 60%	25%
60% < X ≤ 80%	30%
80% < X ≤ 90%	40%
90% < X ≤ 100%	50%
≥ 100%	70%

Table 11: RWA coefficient applied to commercial real estate loan[101]

LTV	**Weighting coefficient**
≤ 60%	Min (60%; RW of counterparty)
>60%	RW of counterparty

2) *reducing* reliance on external credit ratings provided by ECAI and enforce internal due diligence process[102]. Due diligence process is necessary to assess the risk exposure for better managing it even if the risk weights provided by supervisors can be considered appropriate and prudent. Depending on the counterparty involved, banks should use the appropriate steps to assess their exposition in the best way. Moreover, counterparties have to provide banks on a periodical basis with the necessary information to properly complete the due diligence process. RWAs applied to

[100] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 21.
[101] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 23.
[102] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 1.

sovereigns, central banks and non-central government public sector entities are the same used in Basel 2 (see Table 7), and for these counterparties no due diligence process is expected.

Instead, RWA coefficients applied to corporates have different values depending on banks incorporation within jurisdictions that allow use of ECAI rating. In case of banks that work in a context that allow the use of external rating, coefficient applied are the same used in Basel 2 (see Table 8); differently to what established with sovereigns and central banks, due diligence process, in this case, should be performed to ensure that external rating agencies judgments are correctly made and reflect the real counterparty risk. If due diligence results in a higher risk exposure, bank apply coefficient of the following category (e.g. if external rating assigned A+ score and due diligence result in A-, banks will apply A- coefficient). In case of banks that work within a jurisdiction that doesn't allow external rating judgments, financial institutions apply 65% RWA coefficient to each corporate with rating A- or more (i.e. investment grade companies). For all the other categories, banks apply 100% RWA coefficient[103].

Regarding the internal rating-based approach for assess credit risk, this reform has the goal to limit the development of internal model for specific categories to which banks are exposed. In fact, the changes made remove completely the IRB approach for equity exposure and remove the use of advanced approach in case of exposure towards financial institutions and large companies[104].

A revision on methodologies used to calculate the operational risk are expected in 2017 reforms; in Basel 2 accords operational risk could be calculated using three different methods (see Chapter 2, paragraph 2.1). Within new accord the intent is to consolidate operational risk using only one method. This new "standardized approach" consist in calculating minimum capital requirements for banks operational risk exposure using the Business Indicator (BI), the Business Indicator Component (BIC) and the Internal Loss Multiplier (ILM).

Business Indicator is the sum of interests, leases and dividends components (ILDC, which contain interest income, interest expense and dividends), services components (SC, which contain fees and commission income, fees and commission expenses and other operating income) and financial components (FC, which contain net profit/loss on trading book and net profit /loss on banking book[105]). Values of items inserted in each of this component is the average over three years. Once calculated the BI, to obtain the BIC is necessary multiply Business Indicator for a marginal coefficient α that differs depending on the size of the BI; three different levels of BI are instituted, whose thresholds are illustrated in Table 12;

[103] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 13.
[104] The internal rating-based approach has two models: Fundamental based approach and Advanced based approach.
[105] Trading book refers to derivatives and securities instruments; banking book refers to asset and liabilities registered in balance sheet measured at fair value.

Table 12: BI levels and marginal coefficient[106]

Bi range (amount in $ billion)	Marginal coefficient
≤ 1	12%
1 < X ≤ 30	15%
>30	18%

The third factor is the ILM, whose value depend on Loss Component[107] (LC) and BIC; this is the formula:

$$ILM = \ln[\exp(1) - 1 + (\frac{LC}{BIC})^{0,8}]$$

From the equation results that in case LC is higher than BIC, it means that banks should hold more capital because losses incurred are high. In case LC is lower than BIC, banks can hold less capital to protect themselves by operational risk.

In the end, the final calculation of minimum capital requirements to cover operational risk is the product of BIC and ILM.

The other important innovation introduced in Basel 3 is the use of leverage ratio as a parameter to control the overall banks risk; during the financial crisis, among others causes, the excessive use of leverage was a determinant factor that contributed in a significant manner to banks problems. Financial institutions were subjected to deleveraging process in the following years, that created problems for the economic system (among which credit crunch, that lock the capital circulation).

The leverage ratio is defined as the capital measure divided by the exposure measure: capital measure, as written in Basel 3 Accords, refers to Tier 1 capital, and exposure measure refers to the total level of risk exposure of bank, as the sum of on and off-balance sheet exposure, derivatives exposure and securities financing transactions exposure[108]. Leverage ratio must be at least 3% at all times. Announcement introduced in 2017 reform regards the "global systemically-important banks" (G-SIBs), that, besides maintaining a leverage ratio at 3% level, are required to meet a leverage ratio buffer requirement. It means that this banks category have to add to their leverage

[106] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 129.
[107] LC is equal to 15 times average annual operational risk losses incurred over the previous 10 years.
[108] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 140.

ratio requirement the 50% of higher-loss absorbency risk-weighted requirements (e.g. in case G-SIB have a absorbency requirements of 4%, bank are subject to 2% buffer requirements).

As already mentioned at the beginning of Chapter 3, one of the goal set with "Basel 4" was the consolidation of RWA assessment with consequent limitation of IRB approach. The way to limit the diffusion of the internal model has been identified in the introduction of "output floor", a system through which banks are required to have total RWA whose at least 72,5% is calculated using standard approach. This percentage must be applied to all risk categories individually and not to RWA in aggregate. This rule serves to limit the obtainable benefit from banks that used internal model. The only RWAs to be calculated using standard approach regard credit risk, counterparty credit risk, credit valuation adjustments risk, securitization framework, market risk and operational risk.

As already mentioned before, given the difficulty to harmonize all Member States to these new approaches, the Authorities shift the deadline for new rules incorporation to 2022 and provide a gradual timeline to help banks to comply, especially to set new output floor thresholds, illustrated in Table 13.

Table 13: complete timeline for banks to comply with 2017 reforms[109]

Reforms		**Implementation date**
Credit risk revised standardized approach		01/01/2022
Credit risk revised IRB approach		01/01/2022
Credit valuation revised approach		01/01/2022
Market risk revised approach		01/01/2022
Operational risk revised approach		01/01/2022
Leverage ratio	Revised exposure	01/01/2022
	G-SIBs buffer	01/01/2022
Output floor	50%	01/01/2022
	55%	01/01/2023
	60%	01/01/2024
	65%	01/01/2025
	70%	01/01/2026
	72,5%	01/01/2027

[109] Source: *"Basel III: Finalising post-crisis reforms"*, Bank for International Settlements, December 2017, p. 2.

For sure, with reference to output floor, its implementation will result in a more difficult and slow manner for banks that currently used most internal methods to calculate their RWA. This is the reason why Basel Committee fixed that target will be reach in 2027, in order to allow banks to adapt gradually to new reforms. For the other banks, the effort to be made is exclusively linked to the modernization of the current standard methods used.

3.2 Economic bubbles: prevent their creation

Phenomena that cause global crisis as happened in 2007 have to find their origin in more than one economic sector. Since the strong interconnection in financial markets among different economic actors, pushed even further from digital area, the role of guilty it is not even in the hand of one single defendant. Financial institutions, rating agencies or whatever entities, whose behavior is detected as anomalous, can be certainly considered the main responsible for the eruption of the biggest financial crisis occurred in the past century. Their behavior, driven by an irrational logic in pursuit of an ever-increasing gain, has created a substantial impacts in the whole context, challenging fundamentals of economic system.

The phenomenon that collaborate to undermine the economic stability is the economic bubble. Historically, this event has accompanied the economic cycles, often marking their beginning and their end, moving equilibrium within markets. Tulip bubble, dot-com bubble, real estate bubble and many others in the history regard different sectors but all of them have a common growth process. It is possible to imagine its lifecycle as a parable and distinguish 3 phases.

First of all, an economic bubble is a particular phase in the economy where prices of a good increase without specific reasons, due to the increase in the demand of that good. Usually, economic bubble appears in capital markets and debt markets but can refer also to physical assets, as happened in tulip sector in the 17th century or real estate sector recently. The sudden and irrational increase in the demand for a certain asset is dictated by the confidence that the asset can have a strong success and development, particularly when a technological or product innovation is introduced into the market. Just as happened in 2004 with the American real estate bubble, common investors are attracted by the potential of the industry and, driven by the desire to obtain high profits, compulsively invest their savings. This is what can be compared to the left side of a parable, where the volume and price of that good increase; in this way, investors hope to buy the asset and sell it again in a subsequent moment, exploiting the ongoing growing of prices to obtain gains. Moving forward, this behavior has replaced by each actors and demand continue to increase together with prices; but this process doesn't continue to infinity; as in the parable, there's the top of the figure, after which there's the unavoidable downfall. As the values grow, more and more

individuals are usually reluctant to buy financial instruments or goods with a high risk. Everyone have a portion of that asset and each investor is ready to sell it to another entity to obtain its portion of profit.

But in this moment, nobody is prone to acquire that asset, considering its high risk and really high price. The mechanism undergoes a modification; people are no more prone to buy that asset, and the same people that got worked up to buy it, now they want to sell their asset. But everyone is in the same situation and there are no buyers on the market. The economic phase is in deadlock, and good price starts to decline. Investors are losing their money and in a brief time they find something in their hands that is worthless. This is the bubble eruption: there is a sudden shock in the market that bring good value and price to original level.

Since bubble involve many actors in the market, it is possible affirm that bubble shift the normal economic trend toward particular sector and investors, involved and influenced by the market and people behaviors, invest in sectors in which, in other circumstances, they would not invest heavily. A poor allocation of resources is created, that could be used more effectively elsewhere. Taking, for example, the events of tulip bubble in the 17th century, its evolution was the following. Everything started in the 16th century, when Europe, in particular Netherlands, began to import tulip bulbs from Turkey. The new product entered in European market, and it was considered really precious, in particular from merchants and people started to acquire it in a rapid manner (first phase: introduction of a new product in the market). Given its rarity in Europe, people wanted to have it more and more, and the tulip began to see its value and price increase. Merchants and rich people started to create a sort of future market on it, stipulating contract with which they acquired the right to purchase the product at a certain moment in the future. Everyone bought and sold it at a higher price, obtaining a profit. It triggered a mechanism for which the product itself is no longer the investor's goal, as the economic strength it has at that time and the possibility of speculating through its trade. Purchases with future delivery of the bulb were made only for the purpose of participating in the upward game of prices so as to be able to profit, through the sale, on the induced increase in the prices themselves. In other words, the "bulb rights" were negotiated, that is, the tulip futures, paying immediately only a down payment of the final price and paying the balance on delivery of the flowered bulb.

In this way, bulb prices soon had a trend completely disconnected from reality, as always happen in this case. At the half of the 17th century, the bulb reached the highest value ever recorded (second phase: good price reaches the highest level) and soon began the descent path that led to the drastic fall of its value (third phase: everyone wants to sell but no buyers are in the market, so good value drastically dropdown). The tulip market collapsed completely, and the negotiations were interrupted. In such a situation, those who had bought bulbs through the futures contracts

found themselves contractually bound to pay them a figure significantly higher than the real prices of the moment, to the benefit of the farmers (who owned the bulbs) that possessing futures contracts had the right to receive very high prices for bulbs that were now almost worthless. In this phase, many of the futures contract were transformed in options contracts, to give the merchants the possibility to do not exercise the right to buy the tulip, mandatory condition, instead, in the case of futures contracts. This event marked the fate of many investors and Dutch citizens in a negative way.

Another relevant and more recent episode that brought to the creation of an economic bubble was the so-called Dot com bubble, which born at the end of 1990s together with the birth of internet.

The development of computer technology and the spread of companies which based their activities on internet brought in short time to the creation of another bubble that laid, in some ways, the foundations for what will be the 2007 crisis; in economic language, it was born the "New economy", in contrast with the old economy which based its activities on manufacturing sector (among industries in the old economy, the development of car industry in the first year of 20th century). The term new economy refers to that economic phase that saw the development of new type of industries, mainly related to computer technology as mobile phone and internet. That period was characterized by the introduction of a disruptive technology[110], because of which the way of interpreting the industry and the entire economic sector has changed in a totally new and never seen before perspective. The new economy represented the evolution of countries economy from an industrial-productive perspective to an economy based on the immaterial products, deriving from globalization, leading to the computerization of production and exchange processes.

In this context, many new companies born and found their place in this new world, companies that nowadays are the main competitors in technology industry. The introduction of this completely new world brought in short time to the creation of a system of confidence in emerging sectors and companies so high that it generates a bubble. The new concepts expressed, linked more and more to globalization and therefore greater integration of the whole community, at costs of time and money less and less burdensome, have revealed a great deal of trust on the part of many, fueling expectations of future and continuous increases of the value of securities issued by companies in the sector, regardless of the information expressed by their KPI. This led to the massive purchase of numerous shares and bonds of new companies, triggering the first phase of the development of an economic bubble (i.e. irrational and illogical increase in the value and price of the asset in question). The top point of the bubble was reached in 2000, when values of each

[110] A disruptive technology is an innovation that creates a new market, disrupting an existing one.; new market-leading firms, products, and alliances are set. A disruptive product can be considered the birth of smartphones, that completely change the way to use mobile phones.

company stock arrived at the highest level, investors were ready to make their initial investment profitable. But the situation seemed to be different from what expected, in that many new companies they did not reflect the value given to them by the market, and a lot of data inside their financial statements did not reveal prosperous economic conditions. The demand for securities stagnated and the prices of equity instruments of these companies began to lose progressively. About the half of the companies listed in 2000 survived to that collapse and few solid companies managed to grow in the following years.

The same process was identified in the real estate bubble exploited some years later. As already said in Chapter 1, the US policy of low-cost money over a long period of time was among the main factors that brought to bubble creation, a mechanism that encouraged the granting of loans by financial institutions, which, in the event of debtor insolvency, could recover the money lent by foreclosing and reselling the house. This policy adopted were used as a response to the US economy after the dot com bubble, in order to re-launch the economy and put again trust in the American economic system (in this sense, the dot com bubble lay the foundations for the 2007 financial crisis).

The speculative bubbles are like these explained: often we do not even know the reasons that caused them. Bubbles are indistinct rumors but that induce cascading effects that at first enrich the lucky ones who have financial resources that allow them to invest in rising prices. At a certain point the bubble bursts and drags with it all those who are in the hands of the object of speculation, which are tulip bulbs, shares of large companies or derivatives. The common denominator in all the speculative bubbles born in economic history resides in the irrational behavior adopted by the commune investor/citizen. The latter typically have the attitude of implementing imitation behaviors, called herding behavior, inspired by common action and practices most widely used by other investors. In both the growth phase and the bursting of the bubble, market operators tend to make investment choices and, respectively, disinvestment ones induced by the euphoria of the moment and the widespread fear of losing the entire value of securities in their portfolio, the so-called panic selling, rather than by objective assessments on the prospects for future returns.

Governments, Authorities and every entity that can manage the economy have several ways available to prevent the formation of a bubble.

One of the possible solutions is simply to signal, through a speech or public announcement, the fact that politicians are worried about such an eventuality also indicating that measures will be taken to avoid it. However, as we have seen in the case of dot com companies, this is not enough to prevent the bubbles from forming.

A second option can be increasing interest rates and dampening the growth of the bubble, but at the cost of slowing down the performance of other sectors of the economy; the risk is to slow

down the economic trend of other sectors and damage their work; in an attempt to stop just one, risk of hindering many increases.

A third option can be imposing a more rigorous discipline on banks, so that they do not lend too lightly in good times and then, when a bubble appears, simply close the taps; approach of this type was the one undertaken after 2007 financial crisis, establishing limit on banking credit activity regardless of economic cycles and favorable economic situations, introducing a series of regulations, already deeper explained in Chapter 2.

It is no coincidence that these policies are called anti-cyclical, because they are aimed at preventing the economy from slipping from expansion into recession (in contrast to the pro-cyclical ones that favor bubbles and subsequent painful falls). However, economists are increasingly convinced that bubbles are an inevitable phenomenon of economic growth. As long as human beings are irrational and unpredictable, bubbles will be a permanent element of life. Up today, bubble phenomenon could not be read in advice, because it is not easy to distinguish if the sudden investment increase in a particular sector will bring to something concrete or will be just the result of another illusory economic trend that will lead to the collapse of thousands of investors.

3.3 The importance of European credit union

The birth of the European Union sees its roots in the 1957 with the Treaties of Rome, and over the years there have been a series of new rules and treaties that have stipulated the birth of various European institutions. In particular, since the advent of Monetary Union in 2002, the European community agreed that each state should orient itself towards the same direction in terms of investment and fiscal policies, in order to ensure stability on the European territory. With the sovereign debt crisis eruption (see Chapter 1, paragraph 1.3), European Member States have suffered a severe fiscal crisis in terms of public deficit, bringing their balance of payments to very high levels of deficit; many of the previously defined "peripheral" states (i.e. Spain, Portugal, Greece) have received European subsidies for the recovery of their balance sheets and fall in levels of debt to values under control. Monetary union brought Member States toward cooperation and common approach on adopting political and economic trend, as defined by Maastricht Treaty. Due to this link between the various countries, in the event that a country goes into default it is necessary that there is sharing of financial stability and an extended level of community interventionism, even it is not specified in a formal way.

In order to provide financial stability in the eurozone, it was launched the idea of issuing Eurobond on the market (also called ‘Stability bond’). The term Eurobond refers to a debt

obligation shared and guaranteed by all the eurozone countries together. Several proposals have been launched in the previous years, and nowadays countries are still assessing the possibility to introduce this type of "sharing debt".

A first proposal came from two economists Jakob von Weizsäcker and Jacques Delpla, who through a document published in 2010, explained the possibility to issue "blue bonds" together with "red bonds". The rationale behind this proposal have its starting point from the necessity for a country, which had the goal to face the sovereign debt crisis at that time exploited, to issue two type of bonds, one with lower yields that guarantee less cost of financing for each taxpayer, and the other one with higher yields that reflects the State internal situation, maybe linked to possible mistakes in fiscal policy. According to the two economists, the cost of borrowing could be significantly reduced by pooling government debt within the eurozone, creating a Eurobond.

The Eurobond would become a really high liquid resource with debt volume available similar to that made in the USA with US Treasury bond, with a total yield that would be lower than the average of European States national bonds yield. In this way, the Euro money could receive a push to become the second global reserve currency. On the other side, for countries that adopt debt policy too different from the European trend and laws, the cost of borrowing should be increased and treats in a detached way compared to the Eurobond. The path of historical evolution of the European Union and the succession of constant objectives that all aim towards an ever more union in many areas is considered so clear and rooted that it increasingly constrains member states. The sovereign debt crisis that led to the risk of failure of Greece (the most affected State), stressed that the necessary intervention of the European community is a fact that cannot be compensated in similar circumstances, also because in case of failure of Greece this would have led to a much wider crisis that would undermined the foundations of the European Union.

So, in light of this, the blue bond proposal consisted in the following procedure: the economists proposed to share debt in a measure equal up to 60% of States GDP in a common Eurobond called "blue bonds", and the exceeding part would be issued by national bonds called "red bonds". The blue bonds would be issue as senior tranches and red bond as junior tranches, so in case of default risk the first part of debt hit would be the junior tranche. In this case, interest rate applied to these tranches would be different, and the differentiation is due to the distinct liquidity characteristics: in blue bonds, since the seniority grade and risk sharing, the liquidity is more consistent rather than in red bonds with less liquidity due to high cost of debt. In this way, defaulting on the entire red tranche would be less disruptive, because in this eventuality, the borrowing capacity in the senior tranche would not be destroyed.

The problem that rose in this perspective is that each Member State adopt different fiscal policies, that, given the link among states with Eurobond, would process a strongest fiscal policy

to better address the risk on red bonds and reduce its borrowing cost[111]. The objective is also that of controlling the default risk of countries instead of suffering sudden shock that could undermine European financial stability.

According to the economists, the Eurobond allocation and supervision on fiscal policy should be assigned to an Independent Stability Council (ISC); "*in order to be admitted to the Blue Bond scheme, countries would have to convince the ISC that their fiscal policy is credible enough to be insured (via the joint and several liability) by the most credible countries of the euro area"*[112]. Once the council has made a proposal, it would be voted on by the national parliaments of all participating countries. If a country doesn't vote for the proposal, it will be excluded from the blue bond scheme, and no new blue bonds could be issued and no new guarantees for the blue bonds of other countries would be provided.

An important step was made by the European Commission that in 2011 issued a document in the "Green Paper" explaining the reasons behind the Eurobond and the political-economic implications and making a feasibility study on its implementation. It also served as a document in consultation at the end of 2011.

First of all, it resulted that a first initiative for coordinating the euro area debt were made in 1990s and considered again in 2008, when it was published a document called "A Common European Government Bond" by the European Primary Dealers Associations[113]. The idea of the Stability Bond was that it would differ from existing jointly issued instruments such issuance to finance external assistance to Member States and third countries. Eurobonds would be an instrument designed for the day-to-day financing of eurozone general governments through common issuance among States that agreed, and the scale of its issuance would be much larger and more continuous than that involved in the existing forms of national or joint issuance. A list of possible positive returns from Eurobond issuance can be identified in several factors, so described.

A common issuance could bring a better management of sovereign debt crisis, in that countries in economics difficult in terms of deficit and debt level can benefit from this type of sharing operation thanks to a better rating and creditworthiness of less risky countries (e.g. Germany). In fact, Stability bonds could be issue with a low yield that would therefore solve the problems of financing and the cost of the "peripheral" countries.

Another important point could be the financial stability enforcement within the European territory, in that thanks to the less risky induced by the Eurobonds, countries could individually suffer less crisis or adverse shock in future.

[111] Source: J. von Weizsäcker and J. Delpla, *"The blue bond proposal"*, Bruegel policy institute, May 2010, pp. 1-4.
[112] Source: J. von Weizsäcker and J. Delpla, *"The blue bond proposal"*, Bruegel policy institute, May 2010, p. 7.
[113] Source: European Commission, *"GREEN PAPER on the feasibility of introducing Stability Bonds"*, Brussels, 23/11/2011, p. 2.

Stability Bonds would help to lighten market volatility and reduce or eliminate the need of rescue measures for Member States temporarily excluded from market financing. Moreover, banks could benefit from this initiative, since they usually detain lot of sovereign debt bond, that are low risk and easy marketable with a certain grade of liquidity. If a bank had bond of a Member State which is facing fiscal problems and whose rating tend to upgrade, that bank could be forced to apply to the interbank market or other sources of financing. With the Eurobonds this problem can be solved because these instruments could reduce the vulnerability of each Member State. With Eurobonds issuance, the transmission of money could be facilitated thanks to a larger pool of safe and liquid assets. This would help in ensuring that the monetary conditions set by the European Central Bank would pass smoothly and consistently through the sovereign bond market to the borrowing costs of enterprises and households and into aggregate demand; market efficiency can benefit from Stability bonds and, lastly, the euro can acquire relevance in the overall market, acquiring similar conditions of dollar. In fact, stability bonds could facilitate investment in the euro area, always because its low level of risk; this investments increase could widen the range of money expansion and buy more and more stability.

Although it seems the most beautiful initiative taken in the last decades, a series of disagreement points have been made. As previously mentioned, the issuance mechanism should be accompanied by a substantially reinforced of fiscal surveillance and policy coordination, in order to avoid risks linked to moral hazard and ensure sustainable public finances and to support competitiveness and reduction of harmful macroeconomic imbalances (in a similar way to what proposed by Jakob von Weizsäcker and Jacques Delpla). Starting from these listed points, the following are the "potential downsides" identified in Stability bond issuance.

One of the risks associated is linked to the moral hazard risk, in that Eurobonds issuance would create a sort of protection status that will favor this phenomenon. States that are underperforming or have worse credit rating could benefit from this union upgrading their system, even their internal policy or situation is completely different; in fact, this problem would affect all countries that share the issuance. The problem related to fiscal policy is pretty important, considering that countries with less stringent fiscal and budgetary policies, exacerbated the discrimination between nations aggravating the status of the countries considered the most robust.

Non-rigorous behavior could also lead to an increase in interest rates on debt, with the risk of triggering inflationary phenomena. The fiscal policy thematic, analyzed and regulated by Stability and Growth Path (SGP), introduced a set of rules to address European State toward a common approach, in order to better monitor and assess draft budgetary plans and ensure the correction of excessive deficit in the euro area Member States. "*The functioning of Stability Bonds would under all discussed options require devising ex ante ceilings for national borrowing that would then*

frame or at least affect national budgets, especially in case of wide-reaching options where Stability Bonds would be expected to cover all or the bulk of new financing needs of participating countries. In this perspective, Stability Bonds may be regarded not only as a potential source of moral hazard, but also as a driver of better coordination of budgetary policies through the effective enforcement of a rule-based framework[114]".

Moreover, within the Green Paper it has written fiscal conditions that a State should met in order to be part of the Eurobond program: Member States that do not respect conditions settled by the SGP could not access to Stability Bonds. Furthermore, Member States that are in fiscal conditions so far as prescribed have to provide collateral for new Stability Bond issuance or might be subject to an interest surcharge. Countries could be limited the access depending on their degree of compliance, so more the GDP percentage is distance from the threshold, more the right to participate in Stability bond issuance can be limit.

Together with the political analysis made that drive the Stability Bond issuance decision, the Green Paper outlines three broad general approaches[115] to joint issuance of bonds, depending on the degree of substitution that is to be achieved with respect to national issues and on the basis of the underlying nature guarantees that the member states intend to provide:

- First option consists in Eurobonds that contemplate the full substitution of national bonds, with joint and several guarantees. With this approach, Member States would adopt a complete replacement of the issuance of national securities with Eurobonds, everyone responsible in toto. In this way, the full refinancing for all Member States is contemplated without considering the condition of national public finances and all the other benefit, some of which already listed before, would be reached (i.e. liquidity problem for riskiest States, common benchmark bond and better eurozone market efficiency). On the other side, this approach would extremely increase the probability of moral hazard diffusion, in fact it would be needed a more rigorous fiscal regulation that could guarantee the balancing of each country.
- The second option consist in Eurobonds that partially substitute national bonds, with joint and several guarantees. With this option, guarantees are the same set as in the first approach, but there's a less portion of debt shared. This approach is that explained before and proposed by the two economists Jakob von Weizsäcker and Jacques Delpla, with a portion of debt in a sharing issuance (i.e. blue bond) and the remaining part issue with national debt (i.e. red bond). As confirmed in the paper, this approach is less invasive than the first one, in that no total interdependencies among countries is expected, and the total advantages of the previous approach can be achieved with less probability (i.e. less liquidity certainty, less market

[114] Source: European Commission, *"GREEN PAPER on the feasibility of introducing Stability Bonds"*, Brussels, 23/11/2011, p. 22.
[115] Source: European Commission, *"GREEN PAPER on the feasibility of introducing Stability Bonds"*, Brussels, 23/11/2011, pp. 12-18.

efficiency). At the same time, the effect of moral hazard behavior can be reduced, and, depending on the threshold set as maximum debt percentage to be shared, the total risks analyzed can have a big or little impact.

- The third approach is equal to the second one in terms of partial substitution of national debt, but guarantees are not joint. In fact, Eurobonds cover partially the GDP percentage of Member States, but, in this case, they are personal responsible for the portion of debt shared, as happen for the national issuance. "*Due to the several, but not joint, guarantee, moral hazard would be mitigated. Member States could not issue benefiting from a possibly higher credit quality of other Member States. In addition, the continued issuance of national bonds would expose Member States to market scrutiny and market judgement that would be an additional, possibly and at times, strong deterrent to irresponsible fiscal behavior*[116]*"*. To better improve the conditions under this approach it would be necessary to enhance the quality of underlying assets. The absence of joint guarantees could impose restrictive conditions for the access of a smaller group of countries to share part of the debt and could allow the exclusion of countries that do not meet their fiscal commitments. A positive aspect that could be brought with third approach adoption is that, unlike the first two approaches, this one would imply proportional guarantees from governments and could therefore be implemented relatively quickly without the need to amend the Treaties on the European Union.

In fact, implementation time and influence on what approach to follow could be affected by probable modifications to do to European Treaties together with a revision of ECB tasks. The first approach would require the most radical changing inside the European Treaties, in particular to the latest Treaty of Lisbon where it is written that countries are not responsible for debt contracted by single State. In a decrease scale the other two approaches would require less and less changing and adaption on that Treaty.

[116] Source: European Commission, *"GREEN PAPER on the feasibility of introducing Stability Bonds"*, Brussels, 23/11/2011, p. 18.

CONCLUSIONS

The last ten years have been characterized by severe shocks, such as to question the whole system in which we live. The errors committed by the multitude of subjects who have transported everyone to the depths of the financial crisis are still under discussion, bringing the competent authorities to continuous revisions of the healing approaches. The regulatory plan implemented in this decade has been totally invasive and has shaken the foundations of the principles that until a few years ago were believed untouchables. This regulatory process has seen the introduction of numerous laws, in particular in the United States and in the European Union, financial aid plans in support of banks, companies and countries that were on the verge of collapse. It has not been possible to save everything, such as Lehman Brothers, whose failure has opened the door to the wave of crisis, generating problems not only of a financial nature but also political one (such as the sovereign debt crisis in 2010 in Europe, bringing to debate a series of political issues, especially regarding the strength of the European Union).

This regulatory process was unavoidable, Regulators were forced to make something to avoid the disaster and make rise again the overall system. For sure, the new laws introduced provide a better monitoring system, in that financial institutions and other actors work is more controlled by central authorities, and people have more trusty in the financial system if it is guaranteed and constantly monitored. On the other side, as always happen when new approaches are adopted, there are some negative points that could bring doubts on these big maneuvers. Regulation process is not something instantaneous, supervisory authorities and Central Governments need time and effort to find an adequate solution (it is no coincidence that regulations and laws are constantly monitored and subject to review). In fact, as often happens, a long time is necessary for target subjects to adapt to new approaches. An excessive volume of regulation and laws imply several compliance costs for companies, banks and organizations in order to adapt their structure and business strategy to the innovative changes. Another problem of regulation can be the creation of barriers to entry in a market, especially for what happen in rating agencies sector, where a multitude of agencies, in order to obtain a discrete market awareness, find difficult to comply and follow the several rules. If a lot of rules and procedures need to be followed, the bureaucracy volume increase, and more bureaucracy is present, more time would be necessary to adapt procedures and changes within a company.

History can help us to individuate the right balance, understanding and analyzing past situations (e.g. as happened with economic bubbles, a recurrence process that can be mitigate) to better assess when and how it is necessary intervene to modify system structures.

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16. https://www.sec.gov

ABSTRACT

The global financial crisis that broke out in 2007 in the USA was one of the biggest financial crises in the history, which, starting from the banking sector, has hit other branches of the economy in a capillary way, with a high range of action due to the use of digital technology. Nowadays the causes and the technical elements that have led to the development of the crisis have been analyzed by many experts, politicians, economists who have understood its roots and explained how it has branched around the world.

The social and economic context in the early 2000s has encouraged the development of an unprecedented crisis, incentivized by a deregulation system inappropriately exploited by all market players.

In the 1990s and early 2000s, the USA economy was based on deregulation principles (one of the key concepts of the modern finance) that is characterized by a little pervasive regulation, a system of capital allocation based on the market and an extensive use of leverage. Modern finance can be considered a successor of traditional banking, this latter a system in which banks, regulated by special authorities, lend money to trusted customers and hold the debt in their balance sheets. The development of modern finance has been fueled by deregulation, as well as by technological innovations and the increasing international mobility of capital, phenomena that have occurred since the 1980s, and have been very pronounced in the last years. It is widespread opinion that one of the main factors that allowed the occurrence of the financial crisis was the excessive degree of "laissez-faire".

Starting from 2000, American banks pursued an expansive credit policy to favor the purchase of housing, even to subjects that did not have sufficient and solid guarantees to repay the incurred debt.

The system that contributed to increase the insolvency risk and subprime mortgage loan growth is the securitization, through which financial institutions transformed mortgage loan in mortgage-back securities, called "Collateralized debt obligations" (CDO), and sold them to Special Purpose Vehicle (SPV); by doing so, banks collected immediately a good portion of the credit without waiting for the mortgage expiration. The SPV bought CDO through the offer of short-term securities to investors located both in USA and EU.

Since 2007, mortgage loan securities and CDO start losing their value suffering a credit rating downgrades by rating agencies. These securities, disseminated in the market, lost all their value and had a really low level of liquidity, forcing the SPV to ask for funds from banks that issued them and that had guaranteed lines of liquidity. Given the complex structure of the securities and being them widely distributed in the market, the financial institutions market experienced a strong increase in rates and each credit line suffered a contraction, especially in lending activity between

banks (i.e. credit crunch). Thus, a liquidity crisis developed in a consistent manner. The banks suffered heavy losses not only for the exposure to SPV, but also for the exposures to subjects hit by the crisis (e.g. funds that had invested in the securitized securities). These circumstances led some of the major US credit institutions to bankruptcy.

The crisis transformed in its systemic nature, that extended from the structured products market to equity markets, in particular to the securities of companies in the financial sector, and progressively to the entire financial system, highlighting a high degree of interconnection among sectors. As a result of the direct or indirect exposure of the banks of some European countries to the phenomenon of subprime mortgages, the impact extended also to European economy.

The link between the American mortgage market and the large international financial companies, including also European credit institutions, is to be found in the typical functioning of derivative finance, which tends to turn all financial instrument enters its availability into any credit. The default of subprime loans (and in a short time also that of revolving credit cards which will cause a further collapse of the American financial system and therefore worldwide) have forced the issuing banks to transfer the foreclosed houses onto the market, creating an inverse effect (i.e. a drastic reduction in property prices). These financial instruments (like all derivatives products) subsist alone and were therefore purchased not only by hedge funds (which are atypical banks that do not undergo any form of control), but also by multinationals and various institutions for the purpose of diversifying their financial investments. Companies and organizations, attracted by expectations to easy reach high returns, have therefore diverted resources destined for productive investments, firstly aimed at the real growth of aggregate demand, towards financial capitalizations that are toxic and without intrinsic value.

The real estate market and those connected to it paralyzed: layoffs began, banks, failing to return their loans, couldn't return deposits and finance investments, and therefore economic growth. The financial crisis became real. Consumption by households, investments made by businesses, public spending and net exports reduced, leading to a drastic decrease in aggregate demand and therefore in production, with negative effects on the labor market which necessarily involved related sectors. To better understand the events evolution, it is important to deeper analyze the GDP trends and inflation rate. The pre-crisis period (i.e. years 2000-2006), reveals a pretty stable level of GDP, whose trend value is around to 3% growth on average (considering both USA and EU); inflation rate followed a similar trend, staying between 2-3% in the EU and 2-4% in USA. In the following year (2007) the growth suffered a sharp decline, until reaching ever lower levels of growth in the subsequent years; in particular, it can be noticed that first warning from American economy was already launched, in that level of national production starting declined before than Europe, caused by internal policy decisions (FED raised interest rate levels).

The reference period from 2000 to 2006 underlines that 2007 was a year of economic overheating for the European economy, with values higher than those recorded on average in previous years. The situation changes sharply in the two-year period 2008-2009. In 2008, US GDP growth drop down until negative growth levels, around -2%, and, in parallel, inflation accelerated from 4% to 6%. Inflation trend is similar in Europe and United States, even if lying on different levels. The year 2009 was the worst period of the previous ten years, due to ongoing negative GDP growth, reaching negative growth around -2% in United States and -4% in Europe, overcoming it for a period. The US inflation rate also declined sharply, from 6% to -2,5%, and in Europe from 4% to about -0,5%.

In the second half of 2009, the recovery for both of the economies came: it translated into a very positive GDP growth for 2010 (USA GDP came back to grow at positive value, around 2% , that is more or less as in 2007, but in EU the growth was still negative, even if at higher level), in parallel to a return of inflation above 3%. The recovery in 2010 had removed fears that the Great recession was transforming into a depression, as happened in the 1930s. But the scenario changed again: the 2011-2012 data indicate American GDP growth at around 3%, a figure very similar to the pre-crisis average for the period 2000-2006, and European GDP at around 1%.

The growth in 2011-2013, however, was supported by higher inflation for about one percentage point, close to 4%. Each country suffers internally in a different way: considering the developed countries, GDP decreased on average of 3%, while it has continued to grow in emerging countries. Among the rich countries, the GDP of European countries, with -4% of the euro area, suffered the most marked reduction. Within the euro area, Germany and Italy recorded a dramatic 5%, similar to what happened (outside the euro area but within the European Union) to the United Kingdom (-4,18% reduction), while France product loss at -2,94% and Spain and Portugal stopped halfway with respectively -3,57% and -2,97%. Instead in the US economy, which was the epicenter of the crisis but also the place where the political responses to the crisis were more rapid and consistent, the reduction in GDP was more contained than the eurozone average (USA reduction was -2,77%, instead European average reduction was -4,21%). The crisis was felt even in emerging countries; to describe the way in which the Great Recession occurred in emerging countries, the term growth recession is used to indicate that in countries such as China, India, Indonesia, Brazil and the Republic of South Africa, in spite of economic growth continued, the development process suffered a significant but temporary setback; in fact, for these countries, the crisis effect arrived later and in different ways than USA and EU.

Problems arisen from the crisis spread to the state level. Crisis extended its range of action to public finance, damaging countries economy that increased national debt levels. The years 2010-2012 contained the so-called sovereign debt crisis, erupted as a consequence of 2007 financial

crisis, that pulled States involved in a worse spiral of poverty. But the causes that triggered this crisis cannot be found only in the subprime crisis; for sure the latter can be considered as a push towards the decline. The picture that stood before the coming sovereign debt crisis was the following.

As a result of the subprime crisis, many European financial institutions have experienced serious difficulties and have received monetary helps from public intervention. These kinds of interventions have enforced the balance of payments of the weakest countries, contributing to causing a global contraction of GDP by about 1% in 2009. In particular, while the main developing countries have experienced a significant reduction in their growth rates, the developed countries recorded a negative trend of gross domestic product. The eurozone countries had significant differences in public finance and growth rates; it is possible to distinguish in the so-called "core" countries (like Germany, France and United Kingdom) that in that period were characterized by contained levels of public debt and by a more solid economic activity; the second category is that of the "peripherical" countries (e.g. Greece, Ireland, Italy, Portugal and Spain), that were characterized by greater finance weakness, linked to high levels of public debt due to debt backlog over the years, uncontrolled increase in the public deficit and low GDP growth rates. The point that signed in a significant manner the start of debt crisis was the failure of the Greek public accounts, announced in October 2009, that marked the transition to a new phase of the crisis (that of sovereign debt), interrupting the already uncertain recovery. In 2009, Greek debt, due to high level of expenditure without constraints for a long time, has reached € 300 billion and the public deficit 15,1% of GDP. In May 2010, the European Central Bank and the International Monetary Fund (IMF) approved a rescue loan for Greece of € 110 billion. To prevent the Greek crisis spreading to other euro countries, the ECOFIN decided to set up a stabilization fund with a budget of € 750 billion, of which € 60 billion from the Commission, € 440 billion from the States and € 250 billion from the IMF: the European Financial Stability Fund (EFSF). In 2011 the eurozone States decided to grant Greece € 130 billion loan, subordinated not only to the implementation of another package of austerity measures, but also to the acceptance by all private creditors of a restructuring of the Greek debt, with a reduction in the debt burden expected from a 198% of GDP in 2012 to 120,5% of GDP by 2020.

In 2012, euro area finance ministers and the IMF approved the financing of the second economic adjustment program for Greece, amounting to € 164,5 billion, € 19,8 billion of which from the IMF and € 144,7 billion from the eurozone Member States, which will be provided through the EFSF. Due to a series of internal political maneuvers and radical changes, the country's economic situation worsened again, and investors trust faded. In 2015, an agreement was reached to provide the third session of economic subsidies, which consisted in a further loan of between €

82 billion and € 86 billion for the following three years. The loan was subject to the implementation of new measures by the Government of Athens to obtain the planned aid.

Crisis hit also the Irish banking system: the Irish Central Bank Governor revealed that the losses of the domestic banks amounted to € 85 billion (equal to 55% of GDP) and the European institutions with the IMF participation approved a support plan for the same amount between 2010 and 2013, not totally provided by European Authorities, in that Ireland contributed through the treasury cash buffer and investments of the national pension reserve funds. The economic adjustment program for Ireland was formally agreed in December 2010. Ireland successfully completed the EU-IMF financial assistance program at the end of 2013, together with the vast majority of policy conditions under the program. During its three-year assistance program, Ireland arrived to fix many of its problems.

Situation similar to Ireland happened in Portugal; in April 7th, 2011, Portugal Government requested financial assistance from the EU, euro area countries and the IMF, and an economic adjustment program was negotiated in May 2011 between the Portuguese authorities and the European Commission, ECB and the IMF. The agreement on the program was formally adopted in May 2011. It covered the period from 2011 to 2014 and included a joint financing package of € 78 billion, As happened in Ireland, Portugal completed its financial assistant program and nowadays is under the post-program surveillance (PPS), until at least 75% of the financial assistance received has been repaid, and it is expected to finish on 2035.

Spain situation was better compared to the other countries in crisis. The country entered a recession in 2011. The balance of payments deficit rose to 11% of GDP in 2009 and banks could no more borrow money or raise capital. The ESM provided Spain with € 100 billion in assistance, although, in the end, it was necessary used only € 41,3 billion; these moneys were disbursed in two tranches, one in December 2012 and the other in February 2013, and were given Spanish government. In return for the financial assistance, Spain carried out the objective of the program of restructuring governance structure and internal reforms, a process that had already started before the program but completed thanks to European subsidies. Spain successfully exited its program in December 2013 and start to repay the ESM loans earlier than required.

The outbreak of the crisis in 2007 highlighted important issues: in light of what happened, an instantaneous consideration is that some mechanism in the Supervisory and Regulatory System did not work as it should, bringing consequences that over the years have become increasingly heavy and risky (see the sovereign debt crisis, credit crunch and lock of entire economic system). Regarding the situation, it remains important to analyze the plans of interventions made by the US economy and the European community, considering the overall historical evolution of the

regulatory framework and the changes made to safeguard the entire economic system from the possible recurrence of these circumstances.

In the United States we can analyze that political interventions made were heading in two directions: first, adjusting and recovering the economic situation with important monetary maneuvers; second, changing and reassessing the regulation structure inside the banking and non-banking system. The main interventions adopted by the FED and the US Government consisted in the immediate re-introduction of liquidity into the economic system at very low interest rates. The FED adopted a Quantitative Easing policy, consisting in inserting in the overall economy about $1300 billion between the period 2008 and 2010. The characteristics of this very expansive monetary policy allow the reduction in the value of households' debts to financial institutions and the consequent greater propensity to spend of these families, which can lead to a net increase in consumption that will result in higher growth in the medium term. Exploiting this system, the United States Treasury initiated the Tarp (i.e. Troubled asset relief program), a bank rescue program expected in the Emergency Economic Stabilization Act of 2008 (EESA, created by the Treasury Secretary Henry Paulson) and started in October 2008, through which the Treasury bought and guaranteed the so-called "troubled asset". Initially, the program accounted an overall expenditure of $ 700 billion in repurchasing assets, but in the end the total expenditure was fixed at about $ 475 billion, as written in the "Dodd-Frank Wall Street Reform and Consumer Protection Act".

Tarp comprised five distinct programs; the first is the Bank investment program, aimed at stabilizing financial institutions, through which the Treasury provided about $ 250 billion; Treasury has recovered $ 268 billion through payment, dividends, interest and other income.

This program has been developed through five different bank programs: "Capital Purchase Program" (CPP) committing about $ 250 billion, later reduced to $ 218 billion in 2009; "Targeted Investment Program" (TIP) that was established in December 2008. Amount invested was $ 20 billion both in Bank of America and Citigroup. These investments were in addition to those received by banks under the CPP; "Asset Guarantee Program" (AGP) that was conducted by Treasury, FED and the Federal Deposit Insurance Corporations (FDIC). This program stopped existing thanks to subsidies provided by TIP; "Supervisory Capital Assessment Program & Capital Assistance Program" (SCAP & CAP), whose goal was to evaluate the ability of banks to restart the lending activities even in adverse external conditions. This program was divided in two parties: the first part (Supervisory Capital Assessment Program – SCAP) consisted in a sort of stress test made at the 19 largest banks holding companies (BHCs). No funding was provided by the second part called "Capital Assistance Program" (that consisted in supplying capital provisions to those institutions that needed additional capital but were unable to raise it through private sources). This

program was closed without providing any source of financing; "Community Development Capital Initiative" (CDCI), created on February 2010 to help viable certified Community Development Financial Institutions (CDFIs) and the communities they serve which coped with effects of the financial crisis. Department of Treasury financed these banks with about $ 570 million; in this program 84 institutions were involved, whose investments finished in 2010, but currently there are 15 banks that are still in program scope for an amount of $ 60 million.

The second is the Credit Market program, with the goal of restarting the flow of credit to meet the critical needs of small businesses and consumers, through which were provided about $ 27 billion; this program was launched in 2008 using three different programs: "Public-Private Investment Program" (PPIP), designed to support credit market functioning and facilitate price discovery for legacy Commercial Mortgage-Backed Securities (CMBS) and non-agency Residential Mortgage-Backed Securities (RMBS); Treasury invested $ 22,1 billion, after reduced at $ 18,6 billion ($ 6,2 billion in equity and $ 12,4 billion in debt). The program finished, and Treasury recovered $ 22,5 billion ($ 12,7 billion in debt and $ 9,8 in equity), involving a net gain of $ 3,8 billion so composed: $ 3,34 billion from dividends, $ 320 million in interest on debt and $ 86 million in warrants. "Small Business Administration 7(a) Securities Purchase Program": with the goal to help small businesses in the wake of the 2008 financial crisis; the initial investment was about $368 million in 31 SBA 7(a) securities between March and September 2010. "Term Asset Back Loan Facility" (TALF): objective of this program was to restart the securitization market that had contributed in a significant manner to credit supply before crisis eruption. Created by FED and Treasury together, this program consisted in the financing to subjects able to guarantee the loan with substantial collateral. Total funding commitment made by the Treasury was $ 4,3 billion, reduced in June 2012 to $ 1,4 billion.

The third is the Auto industry program, providing about $ 82 billion so divided: $ 51 billion for General Motors, $ 12,5 billion for Chrysler, $ 17,2 billion for Ally Financing; it consisted in three programs, but every disbursement was made in the first one (i.e. "Automotive Industry Financing Program").

The fourth is the Investment in American International Group (AIG) program, finalized to support ATG company, providing in total $ 182 billion, $ 70 billion of which committed by the Treasury and the others $ 112 billion from the FRBNY.

The last is the Housing program, providing about $ 46 billion. This program aimed at stabilizing the house market and helped house owners to avoid foreclosure. Government established two different programs to fight this problem: "Making Home Affordable Program" (MHA), launched in 2009, it helped homeowners avoid foreclosure by providing a mix of adapted solutions to modify or refinance their mortgages, without consider if they are unemployed, or

transition out of homeownership through short sale of foreclosure. “Hardest Hit Fund” program (HHF), that was initiated as an ongoing of the previous one, since in 2016 there were still more families that needed help with their mortgage’s payments. For this program were committed additional $ 2 billion, distributing them in two tranches of $ 1 billion each.

A series of important laws and legislative maneuvers were implemented to bring substantial changes in the operational processes of various entities, and they went to influence the entire regulatory environment, from individual agencies to the overall financial services industry.

One of the most important laws established is the “Dodd-Frank Wall Street Reform and Consumer Protection Act”, known as “Dodd-Frank Act”, whose aim is to promote a closer and more complete regulation of US finance to prevent the creation of new bubbles, while at the same time encouraging protection of consumers and the economic system and to avoid the accumulation of excessive risk at the expense of American taxpayers. An important goal declared was the desertion of “too bog too fail” concept. Ones of the principle area of interventions are the monitoring activities of all type of financial institutions, consumers protection to guarantee their savings and investments, adjustments on rating agencies and derivatives sector (these latter more investigated in the following paragraphs). In order to meet the above-mentioned goals, this Act modified the existing regulatory structure, by creating a certain number of new agencies, in order to simplify the regulatory process, increasing the supervisory activity over specific institutions considered as a systemic risk, editing the Federal Reserve Act and working on transparency.

Another important point is the Volcker Rule, an amendment that aimed at reducing the speculative investments made by big company, specially “bank holding companies”. The rule was originally proposed by the United States Federal Reserve Chairman Paul Volcker to restrict United States banks from making certain kinds of speculative investments that do not benefit their customers and that contributed in a significative manner to the financial crisis eruption. The problem is that some kinds of these investments are made using the deposit account of customers. The Volcker rule was amended to allow bank holding companies to invest in hedge funds and private equity funds with the constraint to receive interest no more than 3% of Tier 1 capital; other exceptions were extended to banks allowing them to make proprietary trading in Treasuries, bonds issued by government-backed entities like Fannie Mae and Freddie Mac. In the end, the result was that of dividing the activity of investment banks and commercial banks to guarantee the customers’ protection.

In a similar way as happened in the USA with the quantitative easing, in the eurozone the European Central Bank (ECB) carried out the Long-Term Refinancing Operations (LTRO), an economic maneuver by which the ECB provides financing to eurozone banks. It started in 2008 and finished in 2011. The main objective of the LTRO was to maintain a portion of liquidity for

banks holding illiquid assets. This program wanted to guarantee access to cheap capital to encourage eurozone banks to increase lending activities, as well as invest in higher yielding assets in order to generate a profit and improve a problematic balance sheet. Liquidity injections there have been in two tranches in 2011 and 2012, providing liquidity for a total amount of about € 1000 billion.

Further programs were developed by the Europe as incremental subsidies to banking system called "Target Long-Term Refinancing Operations" (TLTRO); differently from the LTRO, the TLTRO provided financing for longer periods, up to four years. As specified in the formal document signed in July 2014, with this initiative the ECB wanted to support bank lending to non-financial private sector, that is corporations and households, but not for the purpose of house purchase. As for the LTRO, the TLTRO provides financing in two distinct tranches, one announced in 2014 and the other in 2016. Operations included in this program are targeted with specific conditions, in that the amount banks borrow is directly linked to loans made to households or non-financial corporations, and the interest rate to be applied to these financing depend on the lending patterns.

Among the main rules that have regulated the banking market for years, there are the Basel Accords, in force since 1992 with Basel 1. Modifications were implemented in 2004 with new accords called Basel 2, further modified due to the 2007 financial crisis eruption, in that they couldn't prevent the crisis, and took the name of Basel 3. Today regulators are working on modifications and new improvements in order to compose a new set of rules called Basel 4.

Basel 1 had the goals of create a common rules approach in international field, stabilize international banking system to prevent the financial crisis eruption, improve risk hedging and impose banking to use its capital in a more prudent way considering the credit risk. In this way, it took form the concept of regulatory capital (or capital requirement), that measure the quantity of capital that a financial institution had to maintain in its financial statement in order to prevent insolvency risk and ensure the ongoing activity. With Basel 1, the capital requirement is divided in 2 blocks, called Tier 1 and Tier 2. Basel 1 stabilized that the ratio between capital requirements and the sum of RWA multiplied by each asset must be higher or equal to 8%, and moreover introduced the RWA to be applied depending on debtor's nature.

Basel 2 approach involved more actors than what done in Basel 1, in that considered also the market and Regulators as important factors to insert within the regulatory standards. The main goal of Basel 2 is to consider not only a quantitative data that refers to credit risk, but also to consider other variables that unavoidably impact on the banks' insolvency risk. Basel 2 is divided in 3 pillars, each one facing a different scope. The most important is pillar 1, through which Regulators modified the RWA formula introducing market risk and operational risk; rating

valuation can be done internally by financial institutions; this means that, together with rating made by ECAI (External Credit Assessment Institution), banks have the possibility to develop internal systems to assess better the risk associated to counterparties. Two methods can be applied for rating valuation; a Standard Approach, which results in similar way at Basel 1, but the scheme is more complex, in that consider the counterparty's nature and technical characteristics of the deal. An Internal Rating Based Approach, through which banks calculate RWA totally based on internal models. With the 2007 financial crisis eruption, certainties deriving from Basel 2 started to falter, given that all the Regulatory structure was not able to prevent and dismiss this catastrophic situation. Some critics were made against on the adequacy of Basel 2 structure for each pillar. One of the critics made to Basel 2 refers to the level of capital requirement imposed to banks defined as inappropriate considering their risk exposure. Basel Committee had the goal of maintaining the same capital level of Basel 1, but this purpose was used just to drive the regulation transition towards the new accord: if new capital level were set up, a risk incurred could have been the credit line reduction with possible effects on the real economy.

The most important aspects introduced by Basel 3 Accords aimed at improving liquidity standards, stricter definition of capital requirements, better hedging against market risk and counterparty risk, better containment of leverage ratio and reduction of cyclicity effect. In order to increase the safeguard of banks, Basel 3 introduced two ratios to be maintained by financial institutions. The Liquidity Coverage Ratio, that requires that banks maintain a stock of liquid resources that allows them to overcome a phase of accentuated outflow of funds lasting 30 days without having to resort to the market or refinancing at the central bank, and the Net Stable Funding Ratio. Other interventions and changes made were implemented in facing the counterparty risk, applying new parameter and new coefficient to better assess risk exposure. The new necessary condition is that capital requirement for counterparty credit risk has to be calculated using data as working in stress conditions; this can help to remove cyclicality that might arise with using current volatility-based risk inputs, in that it is too influenced by external market trends. Regards the cyclicality, the Basel Committee introduces a series of measures aimed at strengthening banks' solidity in the face of these pro-cyclical dynamics. These measures will help ensure that the banking sector absorbs shocks rather than transmitting the risk to the financial system and the economy more generally.

Banking operation cannot be considered as the only one guilty in all this situation, together with financial institutions, credit rating agencies (CRAs) had an important negative influence on the financial crisis, since their wrongly valuation of financial instruments on the market, specially CDO. These private institutes have been under the radar of Regulators and Supervisory Authorities because, given their central role in the prevention and risk valuation, they could not carry out tasks

of source of judgement. In fact, rating agencies have a precise role in providing judgments on each actor that issue debt instruments in the market, from States to companies, about their creditworthiness and probability of default. This underlined the great importance of these agencies, in that their activities reduce asymmetry information and prevent phenomena of adverse selection and moral hazard. A factor that was under valuated and that influenced a lot the assumptions of the crisis was the double role played by the agencies: from one side, CRAs provide rating on issuer that issue an instrument, but, on the other side, the same issuer pays the rating agencies to fix rating of securities. In this way it creates a conflict of interest (already mentioned talking about Basel 2 reforms), because at the same time CRAs has the financial incentive to indulge the issuer and has the task of providing an objective opinion on the issuer. The problem of conflict of interest is at the root of the crisis, in fact bills and laws emanated since 2008 did not serve as solution for the problem. On this theme, the Dodd-Frank Act dedicates a specific section (i.e. Title IX – Subtitle C), providing new approaches to regulate and manage the rating agencies power and their operational activity. CRAs activity and structure are matters of national public interest, and they protect debt market as securities analyst made in assessing the quality of securities in the equity market, and auditors, who review the firms' financial statements. These are the reasons why public oversight had a high focus on CRAs industry.

The area on which the act mainly entered in force are so written in the Act:

- recurrent internal controls on rating procedures;
- separation of ratings from sales and marketing;
- annual reports on the compliance with laws;
- disclosure on due diligence process for asset-back securities;
- transparency of credit rating methodologies;
- consistent application of rating symbols and definitions, specific and additional disclosure for ratings related to ABS products.

In the EU, the European Parliament decided to invest the European Commission in the task of preparing a series of legislative proposals on a possible regulation of rating agencies, taking into consideration the role of these carried out within the financial markets and the need for greater transparency with regard to the market for content and the characteristics of their activity. European Commission presented a proposal for a regulation of the European Parliament and of the Council on credit rating agencies, with which it aimed to introduce a series of measures to restore confidence in the financial markets, encouraging transparency of rating activities and providing for among other things, mandatory registration of rating agencies operating on European markets. In 2009 was presented the European Regulation n. 1060/2009: the most important points

that European Regulators wanted to emphasize were related to methodologies of rating analysis and internal organizational structure of agencies.

For what concerned the Supervisory activity, the Regulation n. 1060/2009 required that supervisory actions were transferred to Member States Authorities through a coordination mechanism among each States. A new approach was proposed in 2011 with adoption of a new European Regulation n. 513, through which the Supervisory activity were assigned to the "European Securities and Markets Authority" (ESMA): it was instituted in 2010 with a specific Regulation and it is part of the overall structure of the oversight and supervisory European authorities (i.e. European System of Financial Supervision – ESFS). The main objective of the ESMA is to protect the interest public, ensuring integrity, transparency, efficiency and regularity functioning of financial markets.

Significative importance in the financial crisis picture can be attributed to the functioning of derivatives market; derivatives are financial instruments whose value depends, on the basis of more or less complex formulas, on the performance of the value of other financial instruments or other "economic entities" such as exchange rates, interest rates, raw materials, financial instruments. Types of derivatives products are future, forward, option and swap. Financial innovation was a primary factor for the derivatives spread: it was a process innovation, as well as a product innovation, deeply linked to the evolution of the banking business model and the development of information technology. Process innovation led to an exponential growth in the bank securitization market, which was followed by an ever-increasing sophistication and complexity of derivative and structured products linked to these securitization processes.

Even if there are differences of impact at macro and micro level, it can be noticed that behaviors of individual operators, even if legitimate and perfectly rational at the micro level can, however, result destabilizing at the macro level and can contribute to amplifying the effect of systemic shock. It creates an unavoidable link between them, and in this sense, Regulators decided to move towards an approach that aimed at supervising not only market actors at micro level as investors, depositors, but also at creating a new regulation system that protect economic system from financial crisis with negative impacts on public finances. In Europe were instituted in 2010 the "European Systemic Risk Board" (ESRB) through the introduction of Regulation n. 1092/2010 with the following goals: 1) increasing of standardized OTC products; 2) reporting of operations to trade repositories; 3) obligation to offset transactions in standardized derivatives at one central counterparty called "Central Counterparty Clearing House" (CCP); 4) the obligation to use transparent trading places for transactions in standardized and liquids derivatives; 5) increasing capital requirements for derivatives not offset by counter-central parts (so-called uncleared).

Other laws made were the Regulation n. 648/2012 called EMIR, which came into force in August 2012. The European Directive 2014/65 called MiFiD II related to markets for financial instruments and went to substitute previous Directive 2002/92 and Directive 2011.

The Regulation n. 600/2014 called MiFiR that substitute Regulation n. 648/2012; both MiFiD and MiFiR came into force in all European Union from January 3, 2018. Regarding Regulation on CDS, the Regulation n. 236/2012 aimed at cover and monitoring derivatives transactions which have as instruments the credit default swap; in Section 2 (i.e. *"Trasparenza delle posizioni corte nette"*), Article 5 (i.e. *"Notifica alle Autorità competetenti di importanti posizioni corte nette in titoli azionari"*) it declares the obligation for any natural or legal subject to report the individual net position "short" on listed shares to the competent national authorities (including those made through derivative instruments), when these shares are equal or more than 0,2% of the share capital of the issuer (and at every 0,1% above this percentage), as well as on government bonds; according to Article 6 of the same Regulation, in case the net position is on shares representing the 0,5% of share capital, the disclosure must also be made to the public.

In the USA the already mentioned Dodd-Frank Act has a dedicated section on Title VII, Subtitle a, section from 701 to 774; within this section are regulated all derivative market players and all types of OTC derivative contracts, derivative dealers and the largest market participants by placing them under the same legal regime. Previously some derivatives were regulated by the SEC while others by the CFTC, while others, finally, were not regulated at all. In particular, those who trade in derivatives professionally or hold important derivative positions have been placed under federal control and have been obliged to register within the CFTC or the SEC.

Focusing on the current situation, in the last years banking and supervisory authorities started thinking about new set of rules aimed at increasing regulatory efficiency to better enforce banking sector; in December 2017, European Central Bank, in accordance with Group of Governors and Heads of Supervision (Ghos), announced with an official document that modifications to the Basel 3 Accords will be made (modifications that take the informal name of "Basel 4"). It is possible to affirm that Basel 3 Accords, come into force in 2010, were more focused on capital enforcement. This review made in 2017 wanted to focus on the opposite side of the balance sheet, bringing improvements on the risks associated with the bank's activities. Authorities consider these changes as the last ones to complete the regulation process started 20 years ago.

First change applied is the date on which new rules come into force, shifting the deadline from 2019 to 2022, in order to allow banks to fully comply with the new dispositions. New conditions set regard credit risk, in particular on standard approach model, enforcing and consolidating RWA coefficients to reduce the excessive variability that exist among banks, and on internal rating-based

approach to reduce its effectiveness; other adjustments were made in the calculation of operational risk, use of leverage ratio as fundamental risk requirement and introduction of new output floor.

For what concern the standard approach, the objective was to improve the treatment of credit risk to converge RWA level among banks, in order to better compare the level of capital ratio. The main changes Authorities made consist in: 1) enhancing risk sensitivity maintaining at the same time a simple approach on credit risk calculation; for example, about commercial and residential real estate sector, the change consists in a more detailed risk weighting approach. Within the revised rule, the RWA coefficients applied to these categories depends on the loan to value ratio (LTV), which represent the total amount of the loan divided by the value of the property; the value of the property will be maintained at the value initially measured unless national supervisors require a reassessment if it goes downward and 2) reducing reliance on external credit ratings provided by rating agencies and enforce internal due diligence process. Due diligence process is necessary to assess the risk exposure for better managing it even if the risk weights provided by supervisors can be considered appropriate and prudent.

Regarding the internal rating-based approach for assess credit risk, this reform has the goal to limit the development of internal model for specific categories to which banks are exposed. In fact, the changes made remove completely the IRB approach for equity exposure and remove the use of advanced approach in case of exposure towards financial institutions and large companies.

Moreover, a revision on methodologies used to calculate the operational risk are expected in 2017 reforms; in Basel 2 accords operational risk could be calculated using three different methods (see chapter 2, paragraph 2.1); within new accord the intent is to consolidate operational risk using only one method. This new "standardized approach" consist in calculating minimum capital requirements for banks operational risk exposure using the Business Indicator (BI), the Business Indicator Component (BIC) and the Internal Loss Multiplier (ILM). The other important innovation introduced in Basel 3 is the use of leverage ratio as a parameter to control the overall banks risk. Announcement introduced in 2017 reform regards the "global systemically-important banks" (G-SIBs), that, besides maintaining a leverage ratio at 3% level, are required to meet a leverage ratio buffer requirement meaning that this banks category have to add to their leverage ratio requirement the 50% of higher-loss absorbency risk-weighted requirements (e.g. in case G-SIB have an absorbency requirements of 4%, bank are subject to 2% buffer requirements).

The way to limit the diffusion of the internal model has been identified in the introduction of "output floor", a system through which banks are required to have total RWA whose at least 72,5% is calculated using standard approach. This percentage must be applied to all risk categories individually and not to RWA in aggregate.

The phenomenon that collaborate to undermine the economic stability is the economic bubble; historically, this event has accompanied the economic cycles, often marking their beginning and their end, moving equilibrium within markets. It is possible to imagine its lifecycle as a parable and distinguish 3 phases. Since bubbles involve many actors in the market, they shift the normal economic trend toward particular sector and investors, involved and influenced by the market and people behaviors, invest in sectors in which, in other circumstances, they would not invest heavily. A poor allocation of resources is created, that could be used more effectively elsewhere. One of the possible solutions to limit bubbles creation is simply to signal, through a speech or public announcement, the fact that politicians are worried about such an eventuality also indicating that measures will be taken to avoid it. A second option can be increasing interest rates and dampening the growth of the bubble, but at the cost of slowing down the performance of other sectors of the economy. A third option can be imposing a more rigorous discipline on banks, so that they do not lend too lightly in good times and then, when a bubble appears, simply close the taps.

In order to provide financial stability in the eurozone, it was launched the idea of issuing Eurobond on the market (also called Stability bond); the term Eurobond refers to a debt obligation shared and guaranteed by all the eurozone countries together. Several proposals have been launched in the previous years, and nowadays countries are still assessing the possibility to introduce this type of "sharing debt". The Eurobond would become a really high liquid resource with debt volume available similar to that made in the USA with US Treasury bond, with a total yield that would be lower than the average of European States national bonds yield. The path of historical evolution of the European Union and the succession of constant objectives that all aim towards an ever more union in many areas is considered so clear and rooted that it increasingly constrains member states; the sovereign debt crisis that led to the risk of failure of Greece (the most affected State), stressed that the necessary intervention of the European community is a fact that cannot be compensated in similar circumstances, also because in case of failure of Greece this would have led to a much wider crisis that would undermined the foundations of the European Union. Different proposals were made to create a European credit union, starting from the blue bond proposal (made by Jakob von Weizsäcker and Jacques Delpla), consisting in sharing debt in a measure equal up to 60% of States GDP in a common Eurobond called "blue bonds", and the exceeding part would be issued by national bonds called "red bonds". The blue bonds would be issue as senior tranches and red bond as junior tranches; important steps were fixed by the European Commission, that through the Green Paper asked for comments relating three alternative Eurobonds adoption. The issuance mechanism should be accompanied by a reinforced of fiscal surveillance and policy coordination, in order to avoid risks linked to moral hazard and ensure sustainable public finances and to support competitiveness and reduction of harmful

macroeconomic imbalances. Non-rigorous behavior could also lead to an increase in interest rates on debt, with the risk of triggering inflationary phenomena.