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**THE IMPACT OF THE EUROPEAN BANKING UNION SYSTEM AND THE CAPITAL REQUIREMENT DIRECTIVE (CRD IV) REGULATION.**



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## **INTRODUCTION**

The financial crisis 2007-08- so-called subprime mortgage crisis causes the collapse of the entire financial system in the world that it was considered the worst economic depression since 1929 financial crisis. The richest countries responded to the crisis by making regulations that allow to deal with the crisis and lay the basis to deal with the future financial crisis through greater resilience by the states. In particular, the European union has created the European banking union to which lay an important regulation to be more resilient towards an economic and monetary union. Furthermore, the European Union has approved the CRD IV regulation to implement the Basel III accord so that all banks in the euro zone can adapt such regulation to give the banks the capital standards.

## **The regulations post financial crisis 2008**

The shock economy is a change to which drive an effect on macroeconomic and economic performance. This regard in particular, unemployment, consumption and inflation. In other words, the shock economy are events that are being caused by external factor outside the scope of economic model (Klein N., 2008). There are some shocks:

A supply shocks: is an event that change the price's balance of the good, service and economy's price level.

A demand shocks: is an event to which increases or decrease temporarily the demand of product or service

A policy shock: the policy shock regard any changes by government that bring up a huge economic effect

A financial Shock: the financial shock is an event that can impact both in every industry and in entire economy. The financial shock so-called financial crisis drives towards a stock market crash, a liquidity crisis in the banking system, a devaluation of the currency and a huge impact in monetary policy. The financial shock could have a big impact on the real economy.

In 2008 the financial shock was sparked from deregulation in the financial industry which has allowed to the banks to trade in the hedge funds trading through the derivatives. Subsequently, the banks to support the profitable sales of these derivatives demanded more mortgage on this purpose. The financial crisis caused a negative effect on the financial regulation to which required a long time to be overcome. The regulations of numerous countries underwent deep changes to deal with the financial crisis.

In the UK, the first issues from the financial crisis came from the northern rock Bank. After The British broadcasting corporation(BBC) leaked the financial difficulties of the bank, the share plummeted by a lot and by then began the first run on the UK. The Northern rock bank possessed 22.4% of retail cover but the other funding was just from securitization and covered bonds and wholesale borrowing that disappeared owing to the contraction in wholesale lending. (Walker G., n.d.). the financial crisis brought the UK government to further major reforms under banking act 2009, mostly after the problem rock situation. The main purpose of banking act it was to create a new special resolution regime(SRR) regard the failing banks (gov.uk, 2009). In other words, the banking act implements the nationalisation of banks and make provision about the financial service compensation scheme(FSCS) to which protect the customers' deposits of financial service.

In the U.S it was implemented the Dodd-Frank Act in response to the financial crisis to which foresaw various aspects of the financial system. Firstly, it was implemented the financial stability oversight council(FSOC) and orderly liquidation authority to which monitor the stability of financial system and identify the excessive risk of failure from banks so that to eliminate "too big to fail"(Haddon S., 2010).Furthermore, to prevent the predatory mortgage lending, it was established the consumer financial protection bureau(CFPB) so that to make easier for consumers to understand the mortgages' terms before to make agree with it. In addition, it was established the Volcker rule that its purpose is to protect bank customers by preventing banks to make speculative investments to which have brought to the financial crisis 2008.

In 2008, the European Union has had an unprecedented financial crisis in account of the global economic downturn. The EU dealt with declining gross domestic product(GDP),increasing public debt by driving the EU in an harm situation. indeed, there was a huge increase of unemployment rate and plummeting houses prices. In other words, the crisis triggered consequences that curb the growth, investment employment as well as the fiscal position of the member states. To improve the resilience of the euro area, it was improved the financial sector and strengthen economic

governance, particularly in the countries most affected. Hence, the European union created a resilience reform so-called the banking union to allow the banks to deal with the financial downturn scenario.

## **European Banking Union**

Following the financial Crisis In October 2008, the director of the international monetary fund, Jacques de Larosiere drawn an report so called de Larosiere report that concluded the supervisory framework of the EU needed to be replaced so that to reduce the risk and other future financial crises. (Larosiere J., 2009)

The De Larosiere's report recommended three European Supervisory Authorities(ESA):

- ✓ -European banking authority to regulate the banking sector (EBA):
- ✓ -European Securities and markets authority(ESMA) for securities sector :
- ✓ -European Insurance and occupational pension authority(EIOPA) to which regulate insurance and occupational pensions sector.

Such report, drawn to establish an European Risk Board(ESRB) so that to monitor and to assess potential threats to the financial stability. According to Rompuy, the European banking union have to integrate a financial framework so that to have a financial stability to avoid the risk of banks failure to guarantee the customer deposits through a common mechanism (Rompuy V., 2012).

Since the beginning of crisis 2008, the European union to make more efficient, safe and stable the financial system has created the European banking Union. The motivation of banking union it was the weakness of more banks in the eurozone as well as the assess of vicious circle between credit conditions for these banks and sovereignty credit of their countries. In more countries the debts from a private bubble were transferred to debt sovereign owing to both banking system bailout and the implementation of rules from the governments of the member states. (Elliot D., 2012 )

Therefore, in 2012 the banking union to respond to the eurozone crisis, transferred the responsibility from the national to the EU level in some member states regard the banking policy. In other words, the European banking union put together resolution, supervision and responsibility and constrain the euro area banks to respect the rules. Thus, the main purpose of the banking union is to ensure that the banking sector in the euro area is stable and safe. The treaty is composed by: (Union, n.d.)

- -single rulebook
- -single supervisory mechanism(SSM)
- -single resolution mechanism(SRM)

Furthermore, the euro area member states to which have different currency i.e. the currency is not euro such as U.K, can join at European banking union through the establishment of close cooperation to resolve the potential conflict between eurozone member states and non-euro states (House of Lords., 2012)

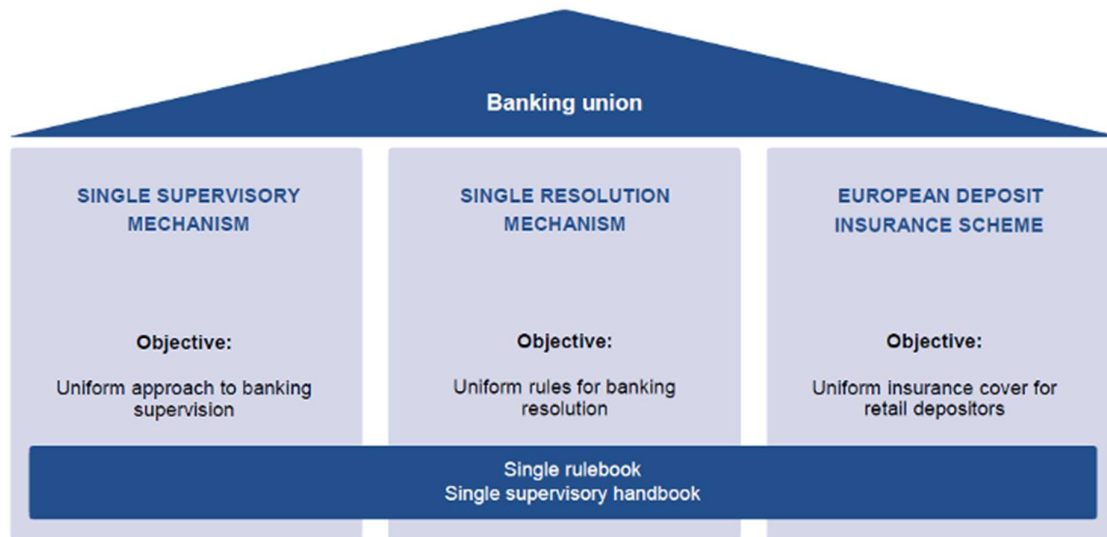
### **Single rulebook**

The framework post Crisis E.U so-called single rulebook set a new regulatory to which presents both the capital requirement regulation(CRR) and the capital requirement directive(CRD IV) that implement the Basel accord on prudential regulation of banks (Babis V., 2014).

the single rulebook represents the basis of the banking union as well as the financial sector. Such rules cover more than 8300 banks in the EU. The single rulebook is set out in three acts (European banking Union., n.d.):

- -capital requirement regulation and directive 4(CRD IV) which consider the Basel III Capital requirement for banks
- -Deposit Guarantee scheme Directive(DGSD) that ensure safe and protection for depositors insurance
- -bank recovery and Resolution Directive(BRRD) which prevent the bank failures through a framework for the recovery and resolution of credit institutions.

Prior to, the European banking legislation was based on rules which created more divergence in national rules. Thus, the financial crisis showed that the divergences could have triggered disruptive effects across the EU single market. therefore, the single rulebook is a regulatory aggregate that put together the same methodologies such as the calculation of the capital ratios and liquidity standards. Therefore, after the financial crisis it was evident that the regulatory in the E.U was necessary. (Babis V., 2014)



### Single Supervisory Mechanism

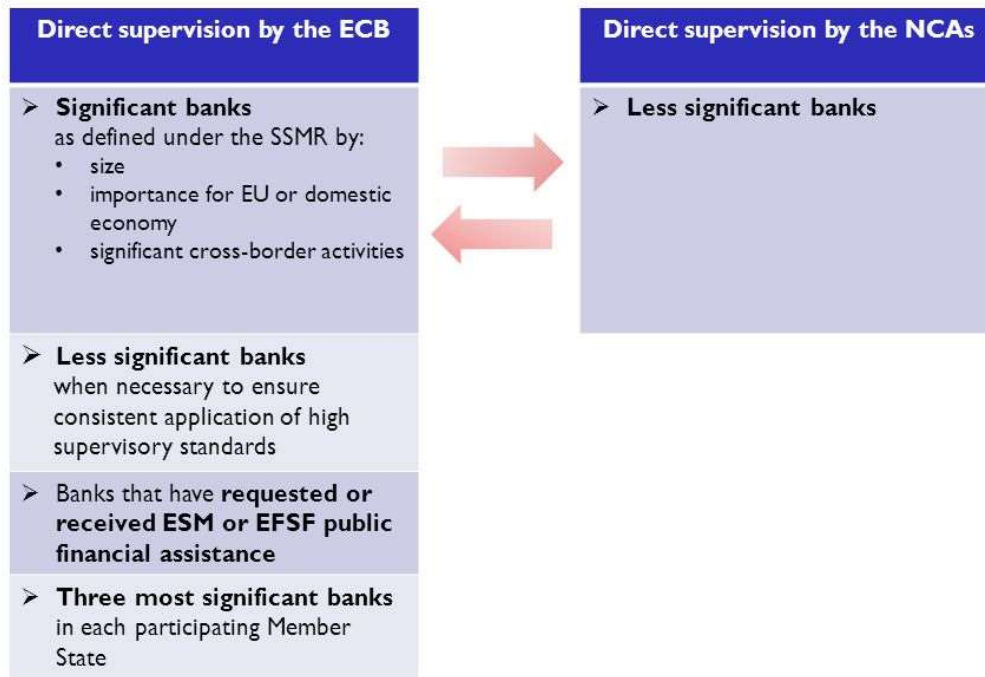
The first pillar of the banking union is the single supervisory mechanism (SSM). The SSM give the European Central Bank (ECB) the power of supervisor of the financial institutions both in the euro area and in non-euro area member states through the close operation process established in 2013 (Turliuc D., 2013). According to Rompuy, the SSM is the first step to create a durable European Banking Union as well as an integrated financial system (Rompuy V., 2012). According to Mario Draghi, the SSM give more confidence to the banking sector through an independent supervision for all member states to which involves both ECB and the national supervisors. (Draghi M., 2014)

Through the SSM, the ECB carry out a sharp supervision on the "significant institutions" which stand for the major banks with:

- 20% of the GDP of the member state and assets more than 30 billion euro
- the value of its assets exceed both 5 billion and 20% of the gross domestic product of the member states
- the bank had large cross-border activities
- the bank received assistance from a eurozone bailout fund
- the bank is part of three significant banks of the member states in which it was located

Instead, the banks known as less significant, are supervised directly by the national supervisory authority of the member states in which the banks were located.

# Banking supervision by the SSM



EUROPEAN CENTRAL BANK

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Whereas the European Central Bank (ECB) affects just a limited number of banks, the SSM tends to supervise the whole banking system. This leads the banking system to be more stable by recognising earlier any threat that could blow it. (Gros D., 2013). The SSM is an important regulatory as it allows the interconnectedness among the financial institutions in the European Union and market so that to keep the banking and the financial sector healthier in the case of a crisis scenario. Furthermore, the transmission of the banking union's regulation to all member states requires a proper level of financial integration to which ensures well performing cross border money markets (Constancio V., 2013). In other words, the SSM helps to achieve a comprehensive prudential supervision in the European Union as well as to ensure the correct application of the prudential norms from the banks of the euro area.

## Single resolution mechanism

The European banking union is composed by the single resolution mechanism to which create a uniform resolution process to the member states of the EU

The Single resolution mechanism allows a resolution regime at the same institutional level around the euro area. (European banking Union., 2012). It was adopted in 2013 so that to harmonize the rules across the euro area to how to resolve the banks failure. Whereas the SSM aligned the supervision of the eurozone banks, the resolution banks were decentralized at the national level. Therefore, the European union parliament adopted such regulation to make the resolution for the banks belonging to the SSM. If the bank is failing the board applies a single resolution fund so that to restructuring the failing credit of the bank.

#### **THE CAPITAL REQUIREMENT DIRECTIVE IV AND THE BASEL ACCORDS**

The capital requirement directive is a framework which observe the Basel indicator Approach on capital measurement and capital standards so-called the Basel III accord which draw the international banking supervision that allow the banks to have more conservative approach. The purpose of such reform is to enhance the banking sector to mitigate the shock economy i.e. the financial stress so that to reduce the risk of failing. The European union through the directive 2013/36/EU (i.e. CRD IV) has implemented the Basel III requirements by 1 January 2014. (European parliament., 2013)

#### **Basel 1 approach**

the Basel 1 is the first regulation introduced in 1988 from the Basel committee on banking supervision. The rule imposes the minimum capital requirement that has the target to minimize the credit risk. As a result of the Basel 1 accords, the banks must hold capital a minimum amount of 8% of capital based on risk-weighted assets. The level of risk is classified into 5 kind of risk by considering the percentage of risk that could be 0%, 20%, 50%, and 100%. (# Banking committee on banking supervision., 1995)

**Risk weight level**

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

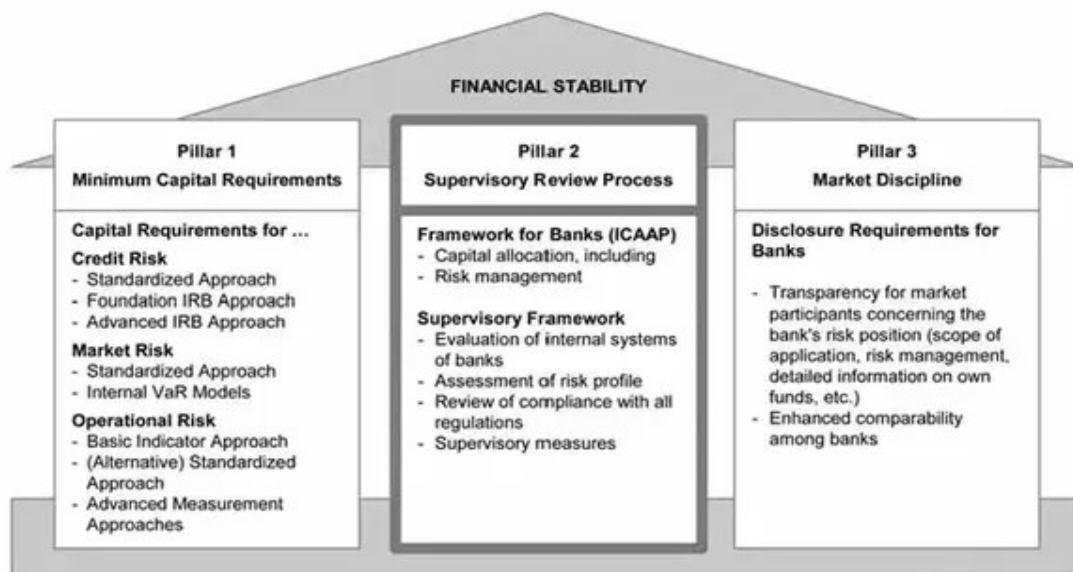
Source: BIS [1988]

However, the Basel 1 accord it was considered restricted owing to limited differentiation of credit risk, static measure of default risk as well as of the simplified calculation of potential future counterparty risk.

## Basel II approach

As a result of the limited of Basel 1 the committee has revised it by implementing the Basel II. The Basel II accord is the second approach of international banking regulations that was published in 2004 as an extension of the first approach of the Basel 1. Such approach evaluates that a bank has adequate capital of risk to through its investment, lending and trading activities. It was implemented thoroughly 2008 during the financial crisis (Basel Committee on banking supervision., 2004 ). The Basel II is based by three fundamental pillars:

- Minimum capital requirements
- supervisory process review to which evaluating the risk of bank and if it respects the requirement of the minimum capital requirements of pillar 1
- Market discipline that offers right information to all market participants concerning the bank's risk position, objectives and policies.



## The minimum capital requirement

Basel II draws the main rules for calculation of the minimum regulatory capital ratios by confirming the 8% minimum for regulatory capital calculated for credit risk, operational risk and market risk to align them at the bank's actual risk of economic loss.

- Credit risk: the borrower is not able to repay his loan that result in an interruption of cash flows.
- Market risk: losses due to from the performance of investments in the financial markets.
- operational risk: aree a losses which come from external events, people and system as well as inadequate internal process.

By considering this risk , the regulatory capital requirement so-called capital adequacy Ratio is the follow:

$$\text{Capital adequacy ratio} = \frac{\text{Capital}( \text{tier 1} + \text{tier2} + \text{Tier 3})}{\text{Risk weighted assets}}$$

The numerator considers 3 kind of Tier:

- Tier 1 consist in equity capital, intangible assets, ordinary share capital which is used to cushion losses that a bank has without require to a bank to cease the operations. The bank must have 4% of tier 1
- Tier 2 is composed by unaudited reserves and general loss reserves so that to absorb losses in of a winding up or liquating of a company. if a bank winding up, such tier provides a protection to depositors and creditors as a cushion losses.
- Tier 3 is a capital banks to support the market risk on a trading services.

To summarize, the main reason of The Capital adequacy ratios is to guarantee that the banks have the cushions to absorb amount of losses to protect depositors in the events that the bank become insolvent. Thus, this tool makes sure the banks to have a stability in the financial system by lowering the risk.

### **Credit risk's analysis model**

the credit risk is an expected loss of a financial transaction. The credit risk is a risk of loss that could occur if the borrower is in position to which isn't not able to pay its loan off. The assessment of credit risk has received more attention by bank supervisor and regulators. Therefore, the Basel framework introduced some risk models to make an in-depth evaluation of the credit risk. (Basel Committe on banking Supervision., 2013) the credit risk could be asses as follow:

**Credit risk**= Probability Default X exposure X loss rate

Thus:

**Probability default(PD)** Is the probability that the debtor don't pays his debt

**Exposure** is the total borrowed by the debtor bi including the interest payments

**Loss rate**= 1- recovery rate where the recovery rate is the amount that can be recover if the debtor result in default

The credit risk can be evaluated through the credit rating so- called standardize approach to which determine if the borrower is able to pay back his loan that the bank borrowed to. If the credit score results higher it means that there is a better chance that the credit being accepted. On the contrary, if the borrower has had a problem in the past to pay back the loans, the credit rating can determine it by affecting the chance that the loan being approved.

| Moody's rating scale |                             |
|----------------------|-----------------------------|
| Aaa                  | Lowest level of credit risk |
| Aa1                  |                             |
| Aa2                  |                             |
| Aa3                  |                             |
| A1                   | Very low credit risk        |
| A2                   |                             |
| A3                   |                             |
| Baa1                 | Low credit risk             |
| Baa2                 |                             |
| Baa3                 |                             |
| Ba1                  | Moderate credit risk        |
| Ba2                  |                             |
| Ba3                  |                             |
| B1                   | Substantial credit risk     |
| B2                   |                             |
| B3                   |                             |
| Caa1                 | High credit risk            |
| Caa2                 |                             |
| Caa3                 |                             |
|                      | Very high credit risk       |
|                      |                             |
|                      |                             |

Source: Moody's © DW

The figure above shows the credit rating by Moody's agency which assign the letter grades that indicates the rating. As a result, if the borrowers- both businesses and governments- has a credit rating AAA it means that there is a lower level of credit risk, thus, the borrower is able to pay back the loan straightforward. However, if the rating's agency set a credit rating C it implies that the borrowers has a high level of credit risk.

To standardize approach of Basel II, the banks can use the ratings from any agency rating to assess the credit risk. In other words, to quantify required capital for credit risk, the banks can use the ratings scale from the agency such as Moody's rating scale

### Risk-weights in standardize approach

| Claim                      | Assessment |          |              |                   |                       |         |
|----------------------------|------------|----------|--------------|-------------------|-----------------------|---------|
|                            | AAA to AA- | A+ to A- | BBB+ to BBB- | BB+ to B-         | Below B-              | Unrated |
| Sovereign                  | 0%         | 20%      | 50%          | 100%              | 150%                  | 100%    |
| Bank option 1              | 20%        | 50%      | 100%         | 100%              | 150%                  | 100%    |
| Bank option 2              | 20%        | 50%      | 50%          | 100%              | 150%                  | 50%     |
| Bank option 2 (short term) | 20%        | 20%      | 20%          | 50%               | 150%                  | 20%     |
|                            | AAA to AA- | A+ to A- | BBB+ to BB-  |                   | Below BB-             | Unrated |
| Corporate                  | 20%        | 50%      | 100%         |                   | 150%                  | 100%    |
|                            | AAA to AA- | A+ to A- | BBB+ to BBB- | BB+ to BB-        | B+ and below, Unrated |         |
| Securitisation             | 20%        | 50%      | 100%         | 350% <sup>a</sup> | Deduct from Capital   |         |

Notes: <sup>a</sup> Investors only. Originating banks must deduct from capital

Source: BCBS (2006)

For instance, 20% of risk weight for corporate is equal to AAA credit rating that implies an excellent rating. Furthermore, the banks can rely on their own empirical model to estimate the probability of default(PD) for individual clients or groups of clients through the foundation internal rating based(IRB)approach to calculate the Risk-weighted Assets(RWA) as well as the advanced internal ratings-bases approach(IRB)

### Basel III

The third accord so-called Basel III it was set after the Basel II regulation to deal with the financial crisis 2007-2008. Such accord has strengthened the bank capital requirement by increasing bank liquidity and decreasing bank leverage. Hence, Basel III has the target to enhance the banks' ability to manage the financial shock i.e. the financial crisis. Basel III was built as a continuous process after the first two accords. Likewise, Basel I and II, Basel III has some new key principles (Basel Committee on banking supervision., 2011).

### 1) Minimum capital requirement

As in Basel II the minimum capital requirement was 2%, in Basel III it grew up to 4.5% of common equity, as a percentage of the bank's risk-weighted assets. Furthermore, the accord provide 2.5% additional capital buffer requirement to which the overall minimum requirement is 7% so that to allow the banks to use it in the financial stress scenario. However, by 2015, the Tier 1 capital requirement has growth by 2% in Basel II to 6% in Basel III that is composed by 4.5% of common equity tier 1 and 1.5% extra additional tier 1 capital. the implementation of such tools will be by 1 January 2022.

|                                                            | Basel II | Basel III |
|------------------------------------------------------------|----------|-----------|
| Minimum Requirements                                       |          |           |
| Ratio of total capital to RWAs (incl. conservation buffer) | 8%       | 10.50%    |
| Ratio of common equity to RWAs                             | 2%       | 4.50%     |
| Tier 1 capital to RWAs                                     | 4%       | 6%        |
| Countercyclical buffer to RWAs                             | None     | 2.5%      |
| Leverage ratio                                             | None     | 3%        |
| Liquidity coverage ratio                                   | None     | (2015)    |
| Net stable funding ratio                                   | None     | (2018)    |
| All with phase-in arrangements up to 1 January 2019        |          |           |

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### 2) Leverage Ratio

Basel III introduced a minimum leverage ratio that is given by dividing Tier 1 capital and the bank's average total consolidate asset to evaluate how leveraged the bank is. In other words, the tier 1 capital represent the assets that the bank can liquidated in a situation or event of financial crisis. The tier 1 at numerator refers to the capital of a bank, thus, how it is able to absorbing losses in event od downturn.

The minimum requirement of Tier 1 leverage ratio request by Basel III is 3%. Thus, the banks must maintain a leverage ratio in excess of 3%

$$\text{leverage ratio} = \frac{\text{Tier 1 Capital}}{\text{Total Exposure}} \geq 3\%$$

### 3) Liquidity Ratio

the Basel committee on banking supervision to meet the liquidity problem had in the financial crisis, has proposed liquidity ratios so that to assess that the banks have enough liquidity to cope to their obligations both short-term and long term. Basel III introduced: liquidity coverage ratio (LCR) And Net stable funding Ratio (NSFR) that was approved in October 2014.

**Liquidity coverage Ratio (LCR)** is a tool that request to the banks a sufficiently liquid to deal with credit market stress. In other words, the banks have a high-quality of liquidity assets (HQLA) which can be converted in the financial market so that to guarantee that the bank can meet its liquidity needs for 30 day hypothetical financial stress scenario.

$$LCR = \frac{\text{high - quality liquidity assets}}{\text{total net cash outflows over 30 days}} \geq 100\%$$

There are two categories of high-quality liquidity assets (Basel 3 liquidity framework). The first refers, cash and any other assets which is being converted in a financial stress situation such as high-quality sovereign debt. The level 2 of assets includes assets such as low risk corporate bonds, covered bonds and some securities issued by sovereigns, central banks and similar entities. (supervision, 2013)

### Stress Test Scenario

The pillar 2 of the Basel III provides a supervisory review process to ensure that the banks develop a great risk management to monitor and managing the risk. The Basel committee, to attempt to deal with the further financial crisis and monitoring the risk, has designed an analysis so-called stress test scenario that is considers a core tool to the banking supervision as well as the macroprudential authorities. (Basel Committee on banking supervision., 2014). In other words, such test determined if a bank has enough capital to cope a crash of financial market or a negative shock economy i.e. during a tough time. The stress test makes a simulation by creating a scenario by using the criteria from the international monetary fund and federal reserve. It measures the health of the banks by focusing on credit risk, market risk and liquidity risk. (Basel Committee on banking supervision., 2014)

The stress test scenario produces information for market participant and can mitigating the bank opacity and it is a useful tool to mitigate the systematic risk both in stock and credit markets. (Cenkhan S., 2015).

## THE IMPACT OF EUROPEAN BANKING REFORMS

The concept of a banking union is considered as the monetary union and political union. The banking union refers at system where the member states can be coordinate the banking system through a common regulation and supervision so that to apply the same rules in different countries. (Turliuc D., 2013)

According to Mersch, the European banking union it was established to delink the sovereigns and banks to promote an integration of financial market. (Mersch Y., 2013 ). The SSM give the ECB more powerful to give it more supervision on the main eurozone banking groups. As a result, the banks that are under supervision of the ECB have consolidated 27 trillion euro and they account for about 85% of the total consolidation (Gros D., 2014). Thus, the main reasons that the European union has implemented the European banking union is to achieve a higher level of supervisory convergence and reduce the fiscal cost of bank bailouts. The banking union allows the authorities to recognize the loan losses and take the recapitalization. (Baglioni A., 2014 ). According to Santos the European banking union is necessary against the financial crisis as provides both a systemic risk and the better protection to the depositors' interests. (Santos J. A. C., 2000). Furthermore, the Banking collapse is due to weaknesses in corporate governance arrangements such as insufficient regulatory requirement and accounting standard and a weaknesses on the remuneration system (Kirkpatrick, 2010). Thus, one of the major targets of the single supervisory mechanism is to enhance the European banking's governance by including the correctness of the management and key function holders.

The positive effect of the capital requirement directive IV-that implement the legislation of Basel III in the EU- is to reduce the probability of the banking crisis through an efficient financial system to which has a positive effect on the economic growth (Reifner U., 2011). Finally, From Basel III the close cooperation between European commission, European central bank and international monetary fund assure a successfully and robust market system to protect the European economy further.

## **THE IMPACT OF REFORMS ON UBI BANCA GROUP**

The UBI banca group is an Italian banking group that was formed on 2007 and represents the fifth largest in Italy by number of branches.

According to the regulation for the prudential supervision of banks to which in EU has been implemented through Directive 2013/36/EU so-called CRD IV which came into force of 1 January 2014. The capital requirement regulation were implemented from the bank of Italy on 17 December 2013 through the circular No. 285 so-called “regulations for the prudential supervisions of banks.” as well as the circular No. 286 which draws the requirements for compiling supervisory reports for banks and stock brokerage firms. Hence, such regulation remarks the rules for own funds, minimum capital requirements, liquidity risks, leverage, counterparty risk and public disclosures (Bank of Italy, 2015).

The own funds of a bank are calculated through the sum of the Tier 1 that is composed of:

- Common Equity tier 1 (CET 1) that consists in share capital, share premiums, retained earnings, valuation reserves, non-controlling interests and prudential filter.
- additional Tier 1 capital (AT1) consists in an hybrid security that can be used in a trigger event which may cause that the CET1 could falls below a certain threshold

Tier 2 consists in subordinated loans: subordinated loans: hybrid capital instruments: general provisions and revaluation reserves.

According to the UBI banca report, at 31/12/2015 the Common equity tier 1 capital (CET1) is €7.408.894, the additional Tier 1 is €38.891. Tier 2 capital is €1.136.123.

By doing the sum among T1 and T2, the total capital is €8.545.017. The total risk weighted (RWA) assets that the report shows is €61.344.868. (UBI Banca, December 2015). Furthermore, the additional tier 1 capital showed by report is 0, this implies that when a trigger event occurs the bank doesn't have such hybrid security when CET1 falls below a certain threshold. Thus:

$$\text{CET1/RWA} = 7.408.864 / 61.344.868 = 12.08\%$$

$$\text{TOTAL CAPITAL/RWA} = 8.545.017 / 61.344.868 = 13.93\%$$

As a result, the ubi banca group has a Minimal total capital Ratio to 13,93% that imply the bank widely respects the minimum of 7% request. Thus, the bank has a high capital adequacy ratio and is likely to deal with a financial downturn or other losses (UBI Banca., December 2015).

### **Ubi Banca's Leverage ratio**

At 31 December 2015, the total leverage ratio exposure is €123.412.192. the tier 1 is 7.408.894.

$$\text{Leverage ratio} = \frac{7.408.894}{123.412.192} \times 100 = 6\%$$

It implies that the UBI group respect the minimum requirement of 3% i.e. a high likelihood that the bank could cope a negative shock. However, the higher the leverage ratio, the higher the probability that the bank could deal with a negative shock.

### **UBI banca's credit risk model**

Credit risk is the possibility that a borrower isn't able to pay back his loan totally or partially. Yet, the credit risk refers to default risk, performance risk or counterparty risk (Brown, 2012 ).

In the last years, the tools to measures the credit risk are increased. Indeed, there are more mathematical ad statistical tools and multivariate statistics analysis to quantify it. (Morellec, 2003)

Most credit risk approaches request three parameters on the calculation: the probability of default (PD), the loss given default(LGD) and the correlation across defaults and losses (Crouhy M., 2000)

The Ubi Banca group uses the internal rating Based(IRB) and the advanced internal rating based(AIRB) to assess the credit risk. The internal rating Based(IRR) approach for credit risk is a model that allow the banks to calculate the risk-weighted assets from the credit exposures by considering the retail, corporate financial institution and sovereign borrowers (Danilo V., 2019). In other words, the IRR approach allow the bank to be more sensitive of the credit risk in their portfolio

of assets and to minimize the regulatory capital. Yet, this approach requests to calculate some risk parameters:

- Probability of default(PD); is the likelihood that the borrower is not able to pay back its debt, for individuals is being used the FICO score to assess the credit risk and for Businesses or corporate it refers to credit ratings system.
- Loss given default(LGD): the loss given default is the amount of money that the bank loses if a borrower default on a debt as a percentage of exposure at the time of default
- Exposure at default(EAD); represents the amount of loss that a bank may have when the borrower defaults on a debt and so to determine the overall risk of default.
- Maturity(M); regards the date of the final payments to which the borrower due

In particular, the UBI banca group use such method with Residential Real Estate(individuals and retail businesses) and the corporate portfolios. Furthermore, the bank of Italy allow to use of internal estimates the probability of default(PD) and loss given Default(LGD) for such segment group. In particular, the probability of default(PD)for exposures to corporates, the UBI bank make an assessment of counterparty risk by using both quantitative and qualitative method. Moreover, the quantitative components are being used for monitoring and granting loans assess the credit rating for small companies. Yet, the private individuals are being assessed through the credit rating by integrating information, personal details, external and internal performance.

UBI BANCA GROUP RATING MODELS

| Master Scale | PD THRESHOLDS |         | UBI INTERNAL RATING MODELS    |                |                   |                     | Master Scale | EXTERNAL RATINGS |
|--------------|---------------|---------|-------------------------------|----------------|-------------------|---------------------|--------------|------------------|
|              | Min PD        | Max PD  | Corporate and Large Corporate | Small Business | Retail Businesses | Private individuals |              | Moody's 2014     |
|              |               |         | class                         | class          | class             | class               |              | class            |
| SM1          | 0.030%        | 0.049%  | 1                             |                |                   | 1                   | SM1          | Aaa Aa1 Aa2 Aa3  |
| SM2          | 0.049%        | 0.084%  |                               | 1              | 1                 | 2                   | SM2          | A1 A2 A3         |
| SM3          | 0.084%        | 0.174%  | 2                             |                | 2                 |                     | SM3          | Baa1 Baa2        |
| SM4          | 0.174%        | 0.298%  |                               | 2              |                   |                     | SM4          | Baa3             |
| SM5          | 0.298%        | 0.469%  | 3                             | 3              | 3                 | 3                   | SM5          | Baa3/Ba1         |
| SM6          | 0.469%        | 0.732%  | 4                             |                |                   |                     | SM6          | Ba1 Ba2          |
| SM7          | 0.732%        | 1.102%  |                               | 4              | 4                 | 4                   | SM7          | Ba2/Ba3          |
| SM8          | 1.102%        | 1.867%  | 5                             |                |                   |                     | SM8          | Ba3              |
| SM9          | 1.867%        | 2.968%  | 6                             | 5              | 5                 | 5                   | SM9          | B1               |
| SM10         | 2.968%        | 5.370%  |                               | 6              | 6                 | 6                   | SM10         | B2 B3            |
| SM11         | 5.370%        | 9.103%  | 7                             |                |                   |                     | SM11         | Caa1             |
| SM12         | 9.103%        | 13.536% |                               | 7              | 7                 | 7                   | SM12         | Caa1/Caa2        |
| SM13         | 13.536%       | 19.142% | 8                             | 8              |                   |                     | SM13         | Caa2             |
| SM14         | 19.142%       | 99.999% | 9                             | 9              | 8-9               | 8-9                 | SM14         | Caa3 Ca-C        |

The ubi banca group to quantify the Probability of default(PD) threshold refers of nine rating classes that are associated to the relative PD that include default up to December 2014 for exposure to businesses and for retail exposures. Consequently the Probability of Default(PD) is being compared with the external rating of Moody's agency just for reporting purpose. Instead, the Loss Given Default(LGD) is calculated by referring through some factors:

- **Non Performing Loans**-that refers to the loans where the borrower is in default and he haven't paid it within 90 days.
- **Downturn LGD**- in Basel III the downturn is being estimated through the loss on bad loans during adverse conditions. The LGD downturn is quantified by considering the loss data available of the period of downturn are available or, if the loss data are not available it could be calculate it through quantitative methodologies. (Calabrese R., 2014)
- **Danger rate**- is a factor that is being applied to the downturn LGD through three components: the composition of default; the migration between different categories of default and the change in the exposure between different default categories.

#### **UBI group's Stress test scenario**

The stress test scenario evaluate if the banks(large banks) can deal with the economic downturns scenario i.e. whether the banks are resilience in case of financial crisis by evaluating their losses, capital levels and revenue and provide a cushion against losses. In 2016, the UBI group participated at "2016 EU-wide stress test to which assess the resilience of large European banks to cope to economic downturns scenarios. Such scenario covers a time horizon of three years (2016-2018). As a result of the stress test, Assuming the CET1 ratio phased at 31 December 2015 is 12.08% and adding the fully loaded regime that is -46 point basis, the UBI group present a financial solidity overall determining – in the base scenario- an impact of +139 basis points with fully loaded CET1 of 13.01% at 31 December 2018. In the adverse scenario the stress test gave the result of -277 point basis with fully loaded CET1 of 8.85% in December 2018. As a result, at the end of the stressful exercise, the UBI's capital ratios result high resilience in the events of economic downturns. In other words, in hypothesis of adverse scenario the UBI group has recorded on the phased-in CET 1 an impact of -277 point basis-lower than the 410 point basis by the European Average- by getting a CET1 fully loaded to 8.85% at 31 December 2018 from 11.62% on 31 December 2015 (Ubi Banca, 2016)

### UBI group's Stress test result (2016-2018)

| SCENARIO<br>AVVERSO  | CET1 ratio al<br>31/12/2015 | Passaggio al<br>fully loaded al<br>31/12/2015 | Impatto stress<br>test | Totale impatto<br>al 31/12/2018 | CET1 ratio<br>fully loaded al<br>31/12/2018 |
|----------------------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------|---------------------------------------------|
| CET1 phased in       | 12,08%                      | -0,46%                                        | -2,77%                 | -3,23%                          | 8,85%                                       |
| CET1 fully<br>loaded | 11,62%                      |                                               | -2,77%                 | -2,77%                          | 8,85%                                       |

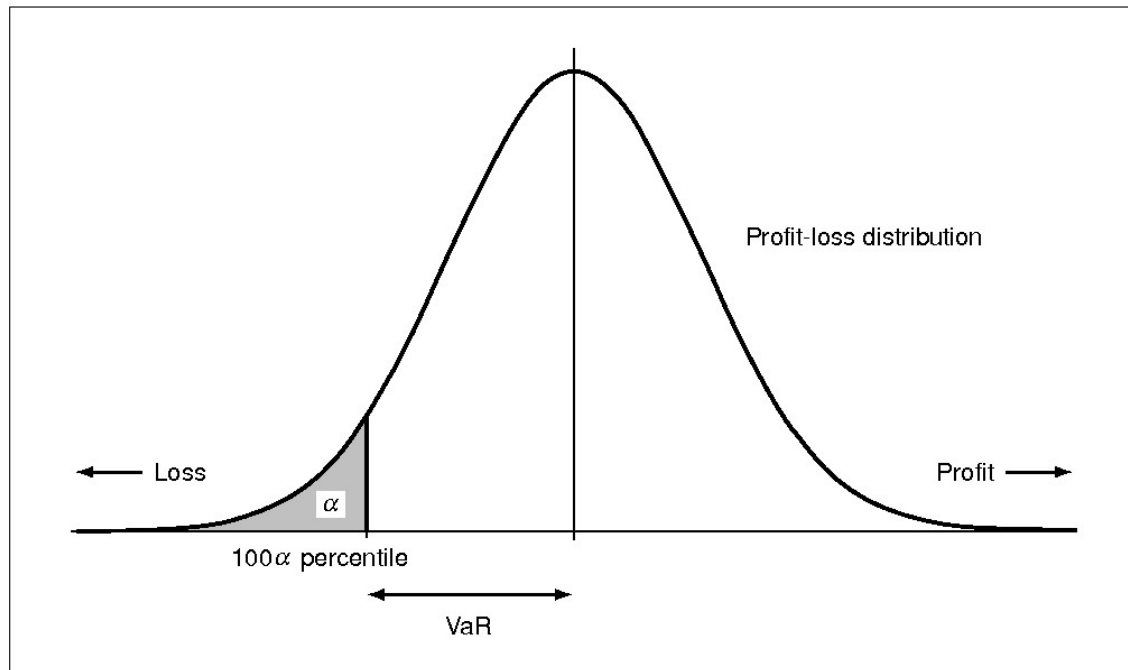
| SCENARIO<br>BASE     | CET1 ratio al<br>31/12/2015 | Passaggio al<br>fully loaded al<br>31/12/2015 | Impatto stress<br>test | Totale impatto<br>al 31/12/2018 | CET1 ratio<br>fully loaded al<br>31/12/2018 |
|----------------------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------|---------------------------------------------|
| CET1 phased in       | 12,08%                      | -0,46%                                        | 1,39%                  | 0,93%                           | 13,01%                                      |
| CET1 fully<br>loaded | 11,62%                      |                                               | 1,39%                  | 1,39%                           | 13,01%                                      |

### Ubi banca's Market risk model

The market risk is the risk of losses provoked by movements in market prices. the financial crisis of 2008 has led the banks to draw more attention on market risk management. The Basel III approach provides new methods to cope a stress scenario and to better estimate interest rate risk, exchange risk and other kind of risk (Ioan, 2015). The most common statistical method to measure the market risk associated with the banks Portfolios is Value At Risk(VaR). This model measures the potential maximum loss-in a period of time- of the market value of the bank portfolio by taking into account a standard confidence level. By considering a time horizon t and confidence level p, the value at risk is the loss in market value over the time horizon t that exceeded with probability 1-p. (Beder, 1995)

For example, if the 95% one-month Var is £3 million, it implies that there is 95% confidence that over next month there isn't a lose more than £3 million

**Figure 1 Profit-Loss Distribution and VaR**



If a financial organization determine that has a 6% one-month Var 3%, it implies that a 6% that the asset decline in value by 3% during the one-month time frame. Thus, the 6% of likelihood of chance of occurrence to a daily ratio lay the probability of loss of 3% at one day per month.

The Value At risk can be calculate through more methods: variance-covariance method, historical method and Monte Carlo Method. The simplest method to calculate the VaR results be the historical method that calculate the impact of market on portfolio through the historical data. Unlike the other methods, the historical simulation is consider more efficiency as doesn't consider a particular distribution of the asset returns. (Mapa D., 2009)

The VaR of the UBI banca group is calculated with historical Method by using an interval of confidence of 99% and holding a period of one day. The portfolio is calculated by considering in the two previous years all changes in the risk factors by obtaining the value and comparing it with the present value of portfolio so that it results a hypothetical series both gains and results. Furthermore, The UBI group to integrate the risk results by the VaR utilise a stress test programme to assess further events to which could occur and could have a significant impact on the balance sheet of the bank.

## CONCLUSION

The banking union has changed the European union landscape both legal and political. As a result, the banking union is effective and functionally to deal with the threat of further financial crisis. The key element of the banking union is the SSM as itself guarantee more integration between the European member states. Also, The CRD IV regulation to which has implemented the Basel III framework to bank capital, liquidity, and leverage requirements ensure and facilitate the harmonisation across the European Union and changes the rules both on corporate governance and by introducing standardised regulatory. The CRD IV regime assure the solvency of financial institution and the support of the financial stability so that to reduce the risk that the failure of financial institution. Finally, the CRD IV increases the capacity of financial intermediary to improve the loss absorbing capacity and enhance their resilience in the future events of economic downturn.

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