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The impact of the implementation of Basel III on the international banking system

أثر تطبيق إتفاقية بازل 3 على النظام البنكي الدولي

L'impact de la mise en œuvre de Bâle III sur le système bancaire international

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ملخص: تهدف الدراسة إلى تسليط الضوء على أهم الإصلاحات المطبقة على النظام البنكي الدولي بعد الأزمة المالية كرفع رأس مال البنوك، وضع معدل سيولة وقواعد جديدة للحوكمة، و محاولة دراسة تأثير هذه الإصلاحات.

تم إستخدام المنهج التاريخي لسرد مختلف الإصلاحات المطبقة، وكذا المنهج الوصفي التحليلي لتحليل مختلف المعلومات المرتبطة بالموضوع.

ساهم تطبيق الإصلاحات السابقة في تقوية البنوك حيث أصبحت لها قدرة أكبر على مواجهة أزمات مستقبلية، وفي جعل النظام البنكي أكثر استقرارا أثناء فترة الإضطرابات. لكن هناك إحتمال لظهور تأثيرات سلبية ستمس أساسا نشاط منح القروض، والسيولة، والحساسية للخطر.

الكلمات المفتاحية: الأزمة المالية ؛ إتفاقية بازل 3؛ إصلاحات النظام البنكي؛ أثر الإصلاحات.

Abstract:
The study aims to shed light on the most important reforms applied to the international banking system after the financial crisis such as raising banks' capital, establishing liquidity rate, new rules of governance and the results of their application.
The historical approach was used to describe the various reforms applied as well as the analytical descriptive approach to analyze the relevant information.
The implementation of previous reforms has strengthened banks as they have become more resilient to future crises, it made the banking system more stable during the turmoil. However, there is a possibility for negative effects that will mainly affect loan activity, liquidity, and risk sensitivity
Keywords: The financial crisis; the Basel III regulation; the banking system reforms; the impact of reforms.
Résumé :
L'étude vise à souligner les réformes les plus importantes appliquées au système bancaire international après la crise financière telles que l'augmentation des fonds propres des banques, l'établissement du taux de liquidité, les nouvelles règles de gouvernance et les résultats de leur application.
L'approche historique a été utilisée pour décrire les différentes réformes appliquées ainsi que l'approche descriptive analytique pour analyser les informations pertinentes.
La mise en œuvre des réformes précédentes a renforcé les banques car elles sont devenues plus résilientes aux futures crises, elles ont rendu le système bancaire plus stable pendant la tourmente. Cependant, il existe une possibilité d'effets négatifs qui affecteront principalement l'activité de prêt, la liquidité et la sensibilité au risque.
Mots clés : Crise financière ; l'accord de Bâle III ; réforme du système bancaire ; impact des réformes

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Introduction:

The financial crisis showed many shortcomings at the level of the financial system in general, and the banking system in particular, represented in:

- Increase in the volume of loans at an uncontrolled way accompanied by a rise in leverage;
- Improper credit risk assessment;
- High systemic risk;
- Insufficient levels of liquidity and capital.

That is why, immediately after the crisis, the G20 established the Financial Stability Board (FSB) in order to fix the defect that affected the financial system. As it turned out that the prevailing regulatory framework before the crisis in many advanced economies did not allow confronting problems resulting from a banking sector that has become more complex than before, and the international authorities found themselves unable to find effective ways to confront the risks created at the national level and transferred to the international one.

The global dimension of the financial crisis necessitated finding international solutions, therefore it is imperative to create and develop new rules on this scale. However, it took a long time to implement the reforms due to the bad situation after the crisis.

The commitment of heads of state and government to work hard within the framework of the Group of Twenty allowed, in the end, to find many reforms aimed primarily to improve the position of international institutions, and to make them more capable of facing crises in the future.

In this context, the following main question can be asked: What are the most important impacts of the reforms resulting from the application of Basel III recommendations on the international banking system?

Trying to answer the previous question, we will address the following points:

- The objectives of the new financial regulation after the financial crisis;
- The most important post-crisis reforms, especially those that affected the banking system, represented in Basel III agreement;
- The positive and negative effects of implementing reforms.

1- Literature review

Since its establishment at the end of 1974, to enhance financial stability, the Basel Committee on Banking Supervision (BCBS) has continued to formulate and recommend new and best practices for banking standards.

The Basel Accord included a set of recommendations that focused on a capital measurement system; the basic principal is that banks should have sufficient capital to cover the risks they are exposed to.

The first Basel Accord called for a minimum ratio of capital to risk-weighted assets of 8%, to include the 1988 agreement, which was mainly concerned with credit risk, as well as the amendments that it went through in 1996 that resulted in the inclusion of market risk.

A new revised framework called Basel II, replaced the Basel I accord. It was designed to better address the financial innovation and improve the way regulatory capital requirements reflect underlying risks. It also covered the operational risk and risk based supervisory frame work.

The second accord Basel II, has been replaced on December 16, 2010 by the new capital and liquidity standards, now referred to as Basel III, in order to fill the weaknesses revealed by the 2008-2009 financial crisis, and to address both bank specific and systemic risks. Whereas, unlike the previous Basel accords founded on the principles of microprudential approach, the new accord has incorporated macroprudential regulation approach.

2- The objectives of financial regulation after the financial crisis

The objectives of the post-crisis financial regulation revolve around four main points, which were the product of the cooperation of many countries within the Group of Twenty, in addition to what was proposed through the Basel III agreement. These goals can be summarized as follows:

2-1. Increasing the ability of financial institutions to cope with crises

Post-crisis reforms aimed to improve and raise the ability of financial institutions of facing the future crises, by increasing capital adequacy and liquidity, and making supervision more effective (Carnez 2017, 15). This goal was demonstrated through the work of the Basel committee, where a program of reforms was approved through the Basel III agreement to address the shortcomings associated with the minimum capital requirements, to ensure a minimum level of capital for high quality to absorb losses and to ensure the stability of bank activity, especially those related to financing in periods of crisis.

The bank's level of core capital has been raised from 2% to 7% (Comité de Bâle sur le contrôle bancaire Octobre 2010, 5) after the crisis. At the same time, the value of the banks' trading portfolio has decreased significantly (Carnez 2017, 15). In addition, an LCR (Liquidity Coverage Ratio) has been established that obliges banks to maintain a certain value of liquid assets that allow to cover a period of thirty days of crisis (Comité de Bâle sur le côntrole bancaire Décembre 2010, 10), and a long-term liquidity ratio (NSFR (Net Stable Funding Ratio) that guarantees bank financing using Suitable stable sources (Comité de Bâle sur le côntrole bancaire Décembre 2010, 10).

After adopting the reinforced international standards, the Basel committee on banking supervision developed a screening program to assess the compatibility of international regulation with the Basel III agreement, through which it was found that the reforms stipulated within Basel III were implemented in a good period, and that the majority of the large international banks are active in the correct way to apply the minimum capital requirements and the short-term liquidity ratio.

2-2. Putting an end to "too big to fail"

The crisis demonstrated the inability of the international authorities to settle the position of financial institutions with international activities without resorting to public capital, and this was confirmed by the financial instability that followed the bankruptcy of Lehman Brothers, as the authorities sought to rescue the other large financial institutions threatened with bankruptcy in order to avoid aggravating the situation.

Increasing the ability of financial institutions to face crises in the future is not sufficient alone to guarantee financial stability. Rather, these institutions must be able to control their position in the event of deficits without affecting financial stability. That is why it was necessary to establish new rules governing the activity of this type of institution; especially since the large group of banks currently, G-SIB (Systemically Important Banks) exceeds the size of Lehman Brothers at that time.

In this context, the G20 in 2011 adopted a set of measures that reduce the risk associated with the large financial institutions (Carnez 2017, 16).The most important of these procedures can be summarized as follows: (Paulin 2014, 62)

- The authorities might have a minimum level of legal authority that allows them to resolve the position of large financial institutions in the event of a deficit, effectively and successfully;

- Appointment of international risk management groups for each financial institution separately, within the framework of cooperation agreements;
- Supporting the financial institutions' ability to absorb losses TLAC (Total Loss Absorbing Capacity), which will ensure, in the event of settling the bank's position, an adequate level of private capital to absorb losses, and allowing the bank to recapitalize without affecting sensitive activities, such as deposits, financial derivatives, and payments.

Although attention has focused on the systemic risk associated with financial institutions, currently many actions seek to develop policies for non-financial institutions of systemic importance.

2-3. Reducing the systemic risk at the level of the financial derivatives market

The effective regulation of derivative markets is a very important step in reducing systemic risk.The recent financial crisis demonstrated the weak ability of banks to absorb the losses resulting from the use of financial derivatives. In addition, the exposure to risk resulting from financial derivatives is complex and multicultural, and it has not allowed financial institutions to determine the exact amount of exposure to credit risk associated with financial institutions in a deficit. This situation caused many banks to refrain from lending to each other, which caused a lack of liquidity, and thus increased the severity of the crisis.

The reform of financial derivative markets was considered an important axis at the G20 meeting in Pittsburgh in 2009, in the light of the fact that the actual regulation of these markets represents an important step to reduce the systemic risk. As it was agreed during the meeting on the following points: (G20 Research Group 24/25 Septembre 2009)

- The necessity of declaring all financial derivative contracts;
- The necessity of adopting the central clearing of typical financial derivatives;
- Imposing additional private capital requirements for non-centralized derivative contracts;
- The necessity to exchange financial derivatives contracts electronically.

Taken together, these measures aim to reduce systemic risk, improve transparency, and increase safety at the level of derivative markets.

2-4. Create a more open financing system and able to cope with crises

The accumulation of risks around the banking sector without effective oversight has negatively affected the real economy. As the sale of assets that took place through the parallel banking system, which ended in disaster, led to a lack of liquidity, which deprived many families and institutions of obtaining Funding required.

In 2011, the Financial Stability Committee proposed an integrated procedure under the title Shadow Banking Road Map, through which it aimed to: (Carnez 2017, 19)

- Reduce the risk of resorting to financing from the shadow banking system and improve its evaluation process;
- Ensure transparency;
- Dampen risks and pro-cyclical incentives associated with repurchase agreements (repos) and securities lending (Yuksel 2019, 49);
- Mitigate the spillover effect between the banking system and the shadow banking system (Yuksel 2019, 50).

3- Regulating the banking sector through Basel III

The Basel III agreement is a logical step and an important reform affecting the banking sector after the shortcomings that were demonstrated by the financial crisis in the second Basel agreement and in the banking system as a whole. Therefore, before addressing on the most important changes in the banking organization that the recent Basel agreement brought, we will present the most important deficiencies in the second Basel agreement and in the prevailing financial system before the financial crisis, which prompted the Basel committee to propose many reforms.

3-1. Basel II shortcomings

It was necessary to reform the Basel II agreement after the financial crisis to make the banking sector more stable and more resilient facing crises.

The main shortcomings of the Basel II agreement can be summarized as follows:

a- The implementation of the second Basel agreement came too late to avoid the crisis and insufficient to prevent its spread:

- The second Basel agreement was not implemented permanently before and during the crisis, nor did it affect all actors: the agreement was applied only by large banks in the United States of America within the limits of the year 2007 (Euro group consulting 2011, 4), and many financial institutions granting loans were not concerned with this agreement, we mention, for example, the Freddie MAC Foundation,
- Basel II did not set a clear framework for securitization mechanics, which led to the spread of the risk by transferring toxic assets from weakly regulated areas to the rest of the system.

b- Basel II does not cover some of the risks resulting from banking activities:

- Basel II did not specify capital requirements to cover liquidity risk,
- The second Basel Agreement did not take into account the impact of the risk of the counterparty on the devaluation of assets in the financial market.

c- The capital adequacy ratio was not sufficient during the crisis (G20 research group june, 2012, 98):

- The wide identification of the capital components allowed banks to include hybrid instruments, which were not able to absorb losses.

In addition to the above, we find that the capital adequacy ratio is linked to the economic cycle (Vanel 2014, 47), so relying on the market to estimate the lending risks led to linking credit to the economic cycle, and the problem in this case is that the change in credit rating will in turn affect the value of the capital necessary to cover the credit risk. In the event of a depression that causes deterioration in the rating, banks tend to narrow their activities due to the increase in the expected risks. While credit rating improvement in the recovery phase, it will lead to a rapid development in the borrowing process and reduce the capital adequacy ratio. (Pierre Yves Thoral 2003, 57)

And this is what happened during the financial crisis, as the banks' respect for the rate instead of a specific value of the capital pushed many of them to reduce the risk-weighted assets to maintain the capital adequacy ratio at 8%, which led to a budget cut that would have a negative impact on the lending process and It leads to catastrophic social consequences if the state does not interfere. (Euro group consulting 2011, 4)

- Not taking into account the systemic risk of some banks, due to the adoption of the Basel II agreement for Micro-prudential approach, through which it aims to avoid individual bankruptcy cases without seeking to preserve the balance of the financial system as a whole. (Elmalem Juillet 2011, 6)

In addition to the previous shortcomings of the second Basel agreement, other problems have emerged that confirm the necessity of considering the prevailing financial regulation, among them (Elmalem Juillet 2011, 6-7):

- Excessive risk-taking, especially by large banks, by using financial innovations that benefit from many tax and regulatory privileges;
- Errors in the judgment of rating agencies due to a bad risk assessment;
- Lack of transparency, which made it difficult to analyze and evaluate the risk exposure of market players.

3-2. Basis of the Basel III agreement

The reforms undertaken by the Basel Convention targeted two levels (G20 research group june, 2012, 98):

- Bank level: to increase its resilience in times of crisis,
- The level of global prudence: in order to mitigate the effects of the link with the cycle that characterized the financial system during the financial crisis.

The development that touched financial regulation contributed to several changes, the most important of them:

- Improving the quality of private capital;
- An increase in the amount of capital requirements by adding complementary reserves;
- Increase the risk weights of certain assets;
- Imposing an additional cost of capital IRC (Incremental Risk Charge) to take into account the credit risk associated with the commercial activities of banks (Trading Book), which includes all assets that can be exchanged in the short and medium term;
- Imposition of a supplementary capital cost CRA (Credit Valuation Adjustment), to take into account the impact of counterparty risk on the value of the derivative products.

In addition to the above, two new tools have been developed, namely the advantage ratio and the liquidity short and long term ratio.

Below we will look at the most important changes in the banking regulation brought by the Basel III agreement.

3-2-1. The bank’s capital

The financial crisis showed that there is no uniformity in determining the elements of the bank’s capital from one country to another.In addition the lack of transparency which led to the lack of information necessary to determine its quality,where it was found that the banks used the undistributed profits to cover the losses and the devaluation caused by the crisis. Therefore, the Basel Committee re-defined the components of the statutory bank capital as follows:

a-Tierone :core capital (T1)

It aims to ensure the continuity of the exploitation activity. It consists in turn of (Saidane Septembre 2012, 22):

• Common shares and the like, which include:

- Common shares issued by the bank that meet the criteria for classification as common shares for regulatory purposes (or the equivalent for non-joint stock companies);

- Stock surplus (share premium) resulting from the issue of instruments included;
- Retainedearnings ;
- Accumulated other comprehensive income and other disclosed reserves;
- Common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e. minority interest) that meet the criteria for inclusion in Common Equity Tier 1 capital,

•Other elements: composed of secondary financial instruments, which have no maturity date.

Common Equity tier 1 (CET1) must be at least 4,5% of risk-weighted assets at all times. (Comité de Bâle sur le cȏntrole bancaire Décembre 2010, 13)

In the beginning of the crisis, many banks continued to distribute significant profits and efficiencies in spite of the deterioration of their financial position, and this is because considering that any reduction would affect the value of the distributed profits will be a clear indication of their weakness.This behavior led to the weakening of the individual position of banks,and the banking sector as a whole has been weakened. Many banks later became aware of this situation and rushed to retain a portion of their profits, but they were unable to accumulate the necessary value to cover the losses.

In order to avoid a repetition of this situation, the Basel committee asked the banks, in addition to the previous requirements, to allocate a portion of the capital outside the periods of tension and keep it for use in covering the losses in the event of their occurrence, as it should not be less than 2,5% of the risk weighted assets.

The following table shows the minimum rates of capital to be held according to the ratio of earnings.

Table -1-: Minimum capital conservation standards

CommonEquityTier1 Ratio (CET1)	Minimum Capital Conservation Ratios (expressed as a percentage of earnings)
4,5% - 5,125%	100%
>5,125% - 5.75%	80%
>5,75% - 6,375%	60%
>6,375% - 7,0%	40%
> 7,0%	0%

Source: Comité de Bâle sur le contrôle bancaire, « Bâle III: dispositif réglementaire mondial visant à renforcer la résilience des établissement et systèmes bancaires», Banques des réglements internationaux, Décembre 2010, P62.

The table shows the minimum capital conservation ratios a bank must meet at various levels of the Common Equity Tier 1 capital ratios. For example, a bank with a tier 1 capital ratio in the range of 5,125% to 5,75% is required to conserve 80% of its earnings in the subsequent financial year (i.e. payout no more than 20% in terms of dividends).

If the bank wants to make payments in excess of the constraints imposed by this regime, it would have the option of raising capital in the private sector equal to the amount above the constraint, which it wishes to distribute. (Comité de Bâle sur le cȏntrole bancaire Décembre 2010, 61)

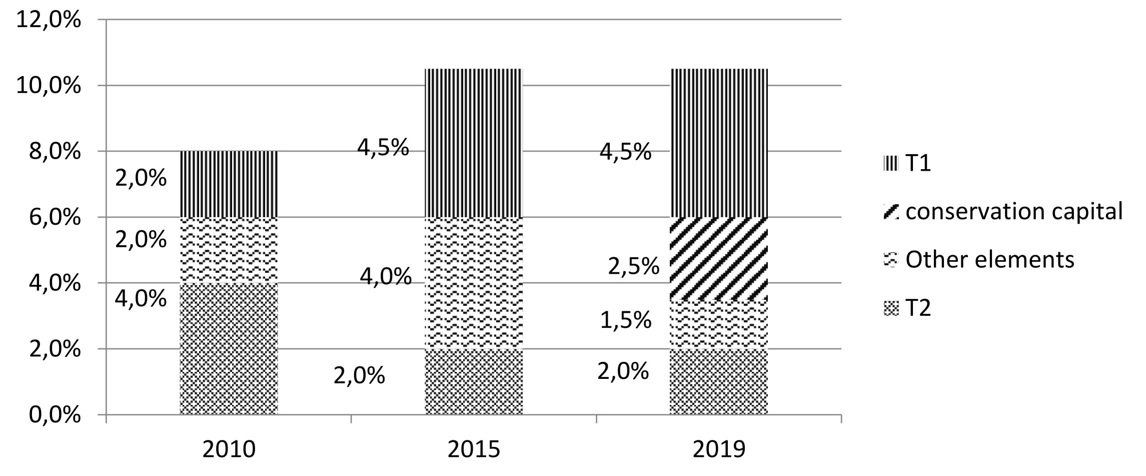
b- Tier 2 capital

The objective of Tier 2 is to provide loss absorption on a gone-concern basis.It is set at 2% of the risk weighted assets.

Therefore, the bank's capital adequacy ratio (T1 + T2) should not be less than 8% of the risk-weighted assets and less than 10,5% if we take into account the held capital.

The changes that affected the capital components and their percentage can be illustrated by the following figure:

Graph -1-: Bank's minimum capital requirement



Source : Prepared by the student, based on:

- Comité de Bâle sur le contrôle bancaire, « Réponse de Bâle à la crise financière, rapport au groupe des vingt », Banques des réglements internationaux, Octobre 2010, P 13.
- Dhafer Saidane, « l'impact de la réglementation de Bâle 3 sur les métiers des salariés des banques », Université de Lille Nord de France et SKEMA , Lille, Septembre 2012, P22.

3-2-2.Expanding the coverage of risks

The basic idea is not only to improve the quality and quantity of the bank's capital, but also to ensure that the important risks have been taken into account.

In order to address the shortcomings of the financial crisis in the area of covering the risks associated with financial derivatives, the Basel committee in July 2009 adopted a set of measures to increase the capital requirements to cover the exposure to risk resulting from the use of securitization.

Whereas, the reforms aimed at covering the counterparty risk, which started in 2003, included the following: (Saidane Septembre 2012, 24)

- Banks must define their own capital needs to cover counterparty risk by estimating the amount of inputs during a crisis period;
- Banks must cover losses estimated in the market value resulting from the credit rating deterioration CVA (Credit Value Adjustment);
- Reducing the resort to rating agencies, as banks were encouraged to use internal evaluation methods to measure exposure to risk resulting from the use of financial derivatives.

3-2-3. Leverage ratio

The accumulation of the effect of leverage to the balance and of balance sheet amounts in the banking sector was one of the characteristics of the financial crisis, and under the impact, the banking sector was obliged to reduce the impact of the leverage in a way that led to a decrease in the value of the assets, which then caused a decrease in the private capital of banks And shrinking of loan operations.

Therefore, the Basel committee has established a leverage ratio that is easy to calculate and transparent. This isto : (Comité de Bâle sur le côntrole bancaire Décembre 2010, 68)

- Putting an end to the accumulation of leverage impact in the banking sector;
- Reinforce the risk-based requirements with a simple, non-risk based "backstop" measure.

The leverage ratio is calculated in the following way: (Comité de Bâle sur le côntrole bancaire Décembre 2010, 67)

$$Leverage\ ratio= \frac{\text{Tier 1}}{\text{on balance sheet items+ off balance sheet items}} \geq 3\%$$

Applying this rate would make banks more transparent regarding off balance sheet items.

3-2-4.Liquidity management

Liquidity was a real problem during the financial crisis and at that time there was no international regulation to control it. Where some banks had a good level of capital requirements, but they suffered from a lack of liquidity, which prompted the authorities to intervene to ensure the proper functioning of markets, and sometimes to save the banks.

The crisis has emphasized the importance of liquidity to ensure the proper functioning of the financial markets and the banking sector. Where the value of assets was high in the markets before the crisis, and the process of obtaining financing was easy, but the sudden change during the crisis confirmed that the evaporation of liquidity can happen very quickly, and that reconfiguration may take more time.

The Basel committee published in 2008 the Principles for Sound Liquidity Risk Management and supervision. To complement these principles, the Committee has further strengthened its liquidity framework by developing two minimum standards for funding liquidity.

a- LiquidityCoverage Ratio (LCR)

The LCR is intended to promote resilience to potential liquidity disruptions over a thirty-day horizon. It will help ensure that global banks have sufficient unencumbered, high quality liquid assets to offset the net cash outflows it could encounter under an acute short-term stress scenario.

The minimum liquidity requirements have been set at 60%, from 2015, to reach 100% on January 1, 2019, as shown in the following table:

Table -2- :Minimum liquidity requirements (on short term)

	1 er janvier 2015	1 er janvier 2016	1 er janvier 2017	1 er janvier 2018	1 er janvier 2019
LCR	60%	70%	80%	90%	100%

Source : Basel Committee on Banking Supervision,« Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools», Bank for international settlements, January 2013, P 3.

The liquidity coverage ratio is calculated according to the following formula: (Basel Committee on Banking Supervision January 2013, 6)

$$LCR = \frac{\text{High quality liquid asset amount (HQLA)}}{\text{total net cash outflows within 30 days}} \geq 100\%$$

High-quality liquid assets held in the stock should be unencumbered, liquid in markets during a time of stress and, ideally, be central bank eligible.

The term total net cash outflows is defined as the total expected cash outflows minus total expected cash inflows in the specified stress scenario for the subsequent 30 calendar days. Total expected cash outflows are calculated by multiplying the outstanding balances of various categories or types of liabilities and off-balance sheet commitments by the rates at which they are expected to run off or be drawn down. Total expected cash inflows are calculated by multiplying the outstanding balances of various categories of contractual receivables by the rates at which they are expected to flow in under the scenario up to an aggregate cap of 75% of total expected cash outflows.

b- Net Stable Funding Ratio (NSFR)

The long-term liquidity ratio, or what is known as the structural liquidity ratio, was established with the aim of reducing the risk of financing over a longer period by forcing banks to finance their activities through stable resources. The NSFR is defined as the amount of available stable funding relative to the amount of required stable funding. This ratio should be equal to at least 100% according to the following formula: (Comité de Bâle sur le côntrole bancaire Octobre 2014, 2)

$$NFSR = \frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RAF)}} \geq 100\%$$

A bank's total ASF is the portion of its capital and liabilities that will remain with the institution for more than one year. The broad characteristics of an institution's funding sources and their assumed degree of stability are the basis for determining ASF. An ASF factor is assigned to the carrying value of each element of funding. ASF factors range from 100% – meaning that the funding is expected to be still fully available in more than a year – to 0% – reflecting that funding from this source is unreliable. The three other ASF factors are 95%, which applies, for instance, to well divided retail deposits, 90% and 50%. The total amount of ASF is the sum of the ASF amounts for each category of liability.

A bank's total RSF is the amount of stable funding that it is required to hold given the liquidity characteristics and residual maturities of its assets and the contingent liquidity risk arising from its off balance sheet exposures. For each item, the RSF amount is determined by assigning an RSF factor to the carrying value of the exposure. These range from 100% to 0%. An RSF factor of 100% means that the asset or exposure needs to be entirely financed by stable funding because it is illiquid. This is, for instance, the case for all loans to financial institutions with a residual maturity of 12 months or more. An RSF factor of 0% applies to fully liquid and unencumbered assets. The other RSF factors are 85%, 65%, 50%, 15%, 10% and 5%. The total RSF amount is the sum of the RSF for each category.

According to the calendar established by the Basel committee, the NSFR became a minimum standard applicable to all internationally active banks on a consolidated basis on 1 January 2018, although national supervisors may also apply it to any subset of entities of large internationally active banks or to all other banks.

3-3. Basel reform of 2017

The Group of Central Bank Governors and Heads of Supervision (GHOS), has endorsed the outstanding Basel III post-crisis regulatory reforms which were designed to complement the Basel Convention in 2010. The 2017 reforms, touched on the following points:

- Credibility: Several studies have shown a great variation in the weights of the risks applied in many banks. This undesirable difference makes it difficult to compare the minimum capital requirements, which affects the degree of confidence in these ratios. For this reason, adjustments have been made to improve this position.

- Internal models for measuring risks: It is assumed that these models allow for a more accurate measure of risk than standardised approaches, but there are many incentives that reduce the risk weight when using internal approaches to determine capital requirements. In addition, some types of assets, such as low-risk counterparty risk, cannot be modeled in an accurate manner. Therefore, the 2017 reforms placed some restrictions on risk assessments within the framework of the internal approaches that Basel III came up with, which aim to:

a- Improving the process of measuring credit risk

Most banks use the standardised approach to measure credit risk. According to this approach, the supervisory authorities determine weights applied by the bank. The most important modifications that affect this approach are:

- Improving risk sensitivity by maintaining the simplicity of the standardised approach to measuring credit risk. In this context, a more detailed approach will be proposed to replace standardised approach.
- Reducing the resort to external rating agencies: The bank should carry out adequate investigations while relying on external rating. An approach not dependent on external ratings should be proposed soon.

The reforms also affected the type of approaches used to assess certain types of risk, as shown in the table below:

Table -3-: Reforms that have affected risk measurement approaches

Exposure to risk	Method available under new standards relating to credit risk	The changes compared to the current regulation
Banks and other financial institutions	Standardised approach or foundation Internal ratings-based approach	Abolishing the advanced Internal ratings-based approach
Institutions belonging to holding companies with a combined turnover of more than 500 million euro	Standardised approach or foundation Internal ratings-based approach	Abolishing the advanced Internal ratings-based approach
Other institutions	Standardised approach or Internal ratings-based approach	without change
Specialized financing	Standardised approach or prudential classification criteria approach or Internal ratings-based approach	without change
Retail banks	Standardised approach or Internal ratings-based approach	without change
stocks	Standardisedapproch	Abolishing the Internal ratings-based approach

Source : Comité de Bâle sur le contrôle bancaire, « Finalisation de Bâle III en bref», Banque des règlements internationaux, Décembre 2017, P5.

b- Rationalisation of opérationnel risk management

In this context, the following reforms were proposed:

- Replacing the current four operational risk measurement approaches with one standardised approach;

- Improve the sensitivity to operational risk by combining the average of the overall result and the results of the last 10 years in terms of internal losses;
- Facilitating the process of comparing risk weighting used in banks by eliminating the possibility of resorting to different approaches and internal models.

Capital requirements to cover operational risk are calculated according to the following formula: (Comité de Bâle sur le côntrole bancaire Janvier 2018, 5)

Coverage of the risk of loss linked to deficiencies or defects attributable to internal procedures

$$Capital\ requirements\ to\ cover\ operational\ risk = \text{Activity indicator component} \times Internal\ loss\ multiplier$$

Gradual measure of profit increasing the size of the bank

Risk-sensitive component covering internal losses of a bank

c- Establish additional requirements for the leverage ratio for large banks:

The 2017 reforms came with an additional capital margin related to the leverage ratio of major international banks; the buffer will be set, for each bank, at 50% of the risk-based capital buffer. Thus, a bank with a risk-based buffer of 2% will have a capital buffer linked to the leverage ratio of 1%, and will therefore be required to maintain a leverage ratio of minus 4%. (Comité de Bâle sur le contrôle bancaire Décembre 2017, 14)

As an example, the table below shows the minimum capital conservation standards for the CET1 risk-weighted requirements and Tier 1 leverage ratio requirements of a G-SIB in the first bucket of the higher loss-absorbency requirements (ie where a 1% risk-weighted G-SIB capital buffer applies).

Table -4-: Capital conservation ratios for a G-SIB s

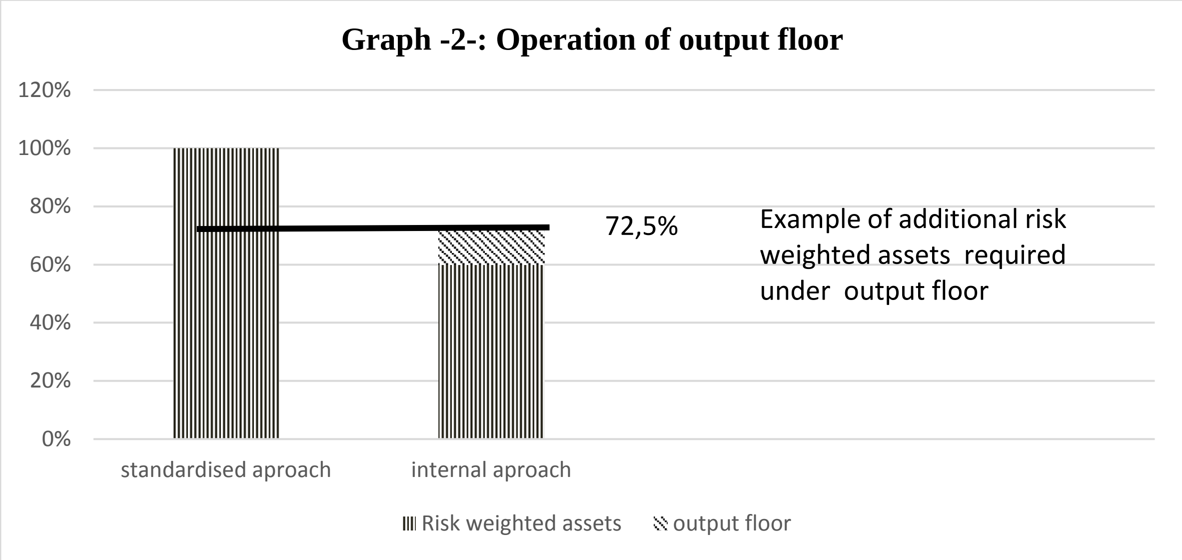
CET1 risk-weighted ratio	Tier 1 leverage ratio	Minimum capital conservation ratios (expressed as a percentage of earnings)
4.5–5.375%	3–3.125%	100%
> 5.375–6.25%	> 3.125–3.25%	80%
> 6.25–7.125%	> 3.25–3.375%	60%
> 7.125–8%	> 3.375–3.50%	40%
> 8.0%	>3.50%	0%

Source: Basel committee on banking supervision, "High-level summary of Basel III reforms", bank for international settlements, December 2017, p 9.

d- Creation of an output floor more solid and more sensitive to risk

This will be achieved by specifying the capital-related benefits that the bank can achieve by using internal approaches compared to using a standardised approach.

Whereas, the risk weighted assets calculated using internal approaches cannot be less than 72,5% of the assets weighted by the risks calculated using the standardised approach. Therefore, the value of the interest that the bank can achieve from using its own models is set at 27,5%, according to the following figure:



Source : Comité de Bâle sur le contrôle bancaire, « Finalisation de Bâle III en bref», Banque des réglements internationaux, Janvier 2018, P7.

All previous reforms are implemented according to the following calendar:

Table -5-:Calendar of the implementation of reforms

		2017	2018	2019	2020	2021	2022	2023
	Leverage ratio		2014 exposure definition					Revised exposure definition G-SIB buffer
Capital	Capital conservation buffer	1,25%	1,875%	2,5%				
	Minimum common equity plus capital conservation buffer	5,75%	6,375%	7%				
	Minimum total capital plus capital conservation buffer	9,25%	9,875%	10,5%				
	Phase- in of deduction from CET1	80%	100%					
	Capital instruments that no longer qualify as non-core Tier1 or Tier 2 capital	Phased out from 2013						
Risk coverage	Capital requirements for equity investments in funds and exposures	Implementation						
	Standardised approach to counterparty credit risk	Implementation						
	Revised securitization framework		Implementation					
	Interest rate risk in the banking book		Implementation					
	Large exposures framework			Implementation				
	Revised standardised approach for credit risk							Implementation
	Revised IRB framework							Implementation
	Revised CVA framework							Implementation
	Revised operational risk framework							Implementation
	Revised market risk framework							Implementation
Liquidity	Liquidity Coverage Ratio	80%	90%	100%				
	Net Stable Funding Ratio		100%					
		2023	2024	2025	2026	2027	2028	
	Output floor	50%	55%	60%	65%	70%	72,5 %	

Source: Basel committee on banking supervision, "Basel III transitional arrangements, 2017-2028", bank for international settlements, December 2017.

3-4. Revised market risk framework, January 2019

In January 2019, the Basel committee revised the framework to address design and calibration issues from the previous version and make clarifications that simplify its implementation. The main changes are: (Basel comittee on banking supervision February 2019, 3-7)

- Boundary between the banking book and the trading book: the revisions clarify the perimeter of the positions subject to the market risk framework, including the treatment of equity investments in funds and that of currency positions;
- Modification of the internal models approach: the revisions include a redesign of the methods of the profit and loss attribution test in order to better distinguish the efficient models from the underperforming one. Targeted changes aim to address the impact of non-modelable risk factors (NMRF);
- Modification of the standardised approach: the revisions allow a better alignment of the treatment of currency positions, options and index instruments with the associated risks;
- The risk weights have been lowered by 30% for general interest rate risk and by 50% for currency risk. Banks with simple or modest trading portfolios can continue to use a recalibrated Basel 2,5standard approach, subject to the approval of their supervisors.

Compared to Basel 2,5, the modified framework should result in an increase of 22% on average in capital requirements in relation to market risk. Market risk-weighted assets would represent 5% of total risk-weighted assets (RWA), compared to 4% under Basel 2,5. (Comité de Bâle sur le côtrole bancaire Jnavier 2019, 3)

4- The impact of post-crisis reforms on the banking system

The reforms implemented so far have had a positive impact, according to many specialists, on the banking sector and the financial system as a whole. While it is expected to have many negative effects, according to many studies. The following will address the impact of post-crisis reforms on the financial system, positive or negative.

4-1. Positive effects

The reforms contributed to improving the financial sector's solidity as large international banks became stronger in terms of capital and liquidity, according to Mark Carney, Chairman of the Financial Stability Committee.

In February 2016, he stressed the need for banks to increase their capital by 7 to 10 times more than before the crisis. Thus, the minimum capital requirements that Basel III came up with and which were applied by the largest banks even before 2019 were the reason for improving the financial sector's ability to cope with crises, and this by increasing the size and quality of capital, as well as improving its liquidity thanks to the minimum requirements to cover losses. (Weber 2017, 52)

The previous positive influences were referred to in the report published by the Financial Stability Committee in August 2016, which stated: "The reforms aimed at strengthening the financial sector's solidity had positive effects, which continued to perform his functions during a series of recent turmoil that affected markets and this by reducing difficulties rather than contributing to their exacerbation". (Weber 2017, 52)

In addition to the above, the derivatives market has become safer thanks to the procedures for reporting central clearing operations, which account for more than 90% of transactions.

4-2. Negative effects

There is a possibility that the reforms will have some future negative impacts represented in the following points:

- **Loan granting activity**

Increasing the bank's capital and its ability to absorb losses will increase the cost of financing. To face this problem, either the bank will abandon some lines of activity, or offset part or all of the costs by increasing the margin or expenses of banking products, and this would affect the economy as a whole.

Raising the minimum capital requirements from 8% to 10,5% will in turn raise the capital of banks, which will push the latter to become more stringent in granting loans and reducing their size.

According to some studies, increasing the minimum capital requirements by 1% will result in a reduction in loans granted by between 0,3% and 8% in organization for economic cooperation and development countries (OECD), and Basel III reforms will lead to a total reduction in the loan size by 13%. (Balta 2017, 43)

Thus, the lack of financing for institutions, whether due to an increase in the cost of the loan or because of a decrease in the offer, will have an impact on the cost of capital for the last user, which leads to a decrease in production.

- **Liquidity**

Banks are considered as a mediator in the financial markets, as they contribute to providing liquidity through their various activities. However, the increase in capital and liquidity requirements has caused some disturbances at the market level by raising the cost of mediation and reducing profitability.

According to some estimates, the cumulative costs resulting from the leverage ratio and long-term liquidity will have an impact of between 60 and 110 points on the banking costs associated with financial market activities, which in turn will reduce the size of the banks' budget which practice in this type of activity of 50% of weighted assets identified by Basel III, which in turn represent 25% to 30% of the total size of the budget. (Balta 2017, 44)

The speed and degree of price change in capital markets is related to the availability of liquidity, as transactions in a liquid market will have a weak and limited impact on prices. For example, what happened during the year 2015 when the Swiss National Bank announced its abandonment of the policy of roofing the Swiss franc exchange rate against the euro, which led to a sudden rise in the value of the Swiss franc by 30% during the first 13 minutes, to reflect the situation after that, and it happened due to lack of liquidity in the financial market. (Balta 2017, 44)

- **Sensitivity to risk**

There are two regulatory procedures that reduce sensitivity to risk are the adoption of the ratio of leverage and the adoption of a standardised approach to measure risk, where the procedures are simple and rely on the assumptions previously made, which makes them insensitive to the changes that may occur due to a risk.

More impacts of Basel III regulation will be illustrated by figures in the next point.

5- Basel III last monitoring report

This report presents the results of the last Basel III monitoring exercise of the Basel committee, based on data as of June 30, 2019. The report describes the impact of the Basel III framework initially agreed in 2010 as well as the effects of the December meeting of the Committee Finalization in 2017 of the Basel III reforms and finalization of the market risk framework published in January 2019.

Data are provided for 174 banks, including 105 large banks active internationally. These “group 1” banks are defined as internationally active banks with category 1 capital exceeding 3 billion euros and include the 30 institutions designated as banks of global systemic importance (G-SIB). The Basel committee sample also includes 69 “group 2” banks (i.e. banks whose Tier 1 capital is less than 3 billion euros or which are not active internationally).

As recently agreed by the group of governors and supervisors, the implementation of the final Basel III minimum requirements has been postponed until January 1, 2023, and they will be fully introduced by January 1, 2028.

We will present and analyze the most important results, which are: (Basel commitee on banking supervision April 2020, 23-44)

- Compared to the previous reference period (end of December 2018), the average Common Equity Tier 1 (CET1) capital ratio under the initial Basel III framework decreased from 12,7% to 12,8% for group 1 banks and it decreased from 15,4% to 14,8% for group 2 banks. The average impact of the final Basel III framework on group 1 banks is lower (2,5%) compared to the 3,0% increase at the end of December 2018;
- Applying the 2022 minimum TLAC requirements and the initial Basel III framework, three of the 25 G-SIBs reporting data on total loss absorption capacity (TLAC) have a combined deficit of 35,2 billioneuros, compared to 32,6 billion Euros at the end of December 2018;
- The average liquidity ratio (LCR) of group 1 banks remained stable at 136,2%, while the stable net funding ratio (NSFR) increased only slightly, from 116,3% to 116,4 %. For group2 banks, there was a slight decrease for the LCR and a small increase for the NSFR;
- The overall CET1 capital ratios for group1 banks in the consistent sample have increased to 12,8% in June 2019 from 12,7% in December 2018. Overall Tier 1 and total capital ratios displayed slightly larger increases (+0,3 and +0,6 respectively) over this same period;
- For group 1 banks, the Tier 1 minimum required capital (MRC) would increase by 2,5% with reduced estimation bias and by 2,8% with a conservative estimate, after the full implementation of the final standards of Basel III. This increase is composed of 3,4% (3,7%) increase for the combined risk-based components, driven by the positive contributions of output floor (2,4%), of market risk (1,6% or 1,9%) and CVA (credit value adjustment) (1,5%), as well as reductions in credit risk (-1,5%) and operational risk requirements (-0,7%). This increase is offset by a reduction of -0,9% in the Tier 1 MRC leverage ratio: that’s reflects the fact that the Basel III leverage ratio is becoming relatively less restrictive for many banks in the sample in the presence of output floor.

  For group2 banks, the overall 7,5% increase in Tier 1 MRC is driven by an increase in the risk based measure of 14.8%, mainly driven by credit risk (6,7%) and the output floor (4,2%). The change in Tier 1 MRC for the leverage ratio is partially offsetting this increase at -7.3%;
- For the full sample at the end-June 2019 reporting date, the average fully phased-in Basel III Tier 1 leverage ratios are 6,0% for group1 banks and for G-SIBs- until the end of 2016, the average leverage ratio had continuously increased from 3,5% in June 2011, driven by tier 1

capital increases, which had more than offset an overall increase in the exposure measure- and 4,9% for Group2 banks;

- From end-June 2011 to end-June 2019, the level of group1 banks' CET1 capital has increased by 97,9% from 1,954 billion euros to 3,866 billioneuros. Since end-December 2018, group1 CET1 capital has increased by 122 billion euros (or 3,3%); the rise in overall CET1 capital among Group1 banks is largely due to profits, primarily generated by the G-SIBs.
- At the end of June 2019, overall credit risk continued to constitute the dominant part of the global minimum capital requirement (MRC), this category representing on average 65,4% of the total MRC of Group 1 banks. However, the share of the risk of credit fell sharply from 74,4% at the end of June 2011;
- Conversely, the share of MRC operational risk increased sharply, from 7,9% at the end of June 2011 to 16,3% at the end of 2015 and has been generally stable since. This increase is largely attributed to the increase in the number and severity of operational risk events during and after the financial crisis, which are factored into the MRC calculation for operational risk as part of the advanced measurement approach.

Conclusion:

The banking sector continues to support efforts aimed to improve the international regulatory framework, as regulators have contributed to improving the stability and security of this sector.

The new regulations put in place after the crisis were an essential step in providing a reliable reference to restore confidence in the banking sector, which was exposed to many difficulties after the crisis. In this context, the Basel III agreement is consideredas an important reform, by raising the minimum requirements for banks 'capital, setting a scheme to liquidate banks in case of bankruptcy, setting liquidity ratios, and measures to improve the institutional culture.The banks will be more able to face crises in future, and the banking sector will be more stable during the period of unrest. It is necessary to work to avoid the negative effects that could result from the implementation of reforms through conducting more in-depth and comprehensive studies. Within this framework, we can suggest the following:

- Increase efforts to measure the costs and profits resulting from implementing reforms for each of the bank's activities separately, so the right decision can be made regarding whether or not to implement an action. And it is necessary for every country to do a cost benefit analysis of the government expenditure and of the banking sector activities, particularly on the chances of insolvency, liquidity, spreads and others;
- Conducting more research on the impact of other reforms, as many researchers focused on the impact of raising capital requirements and liquidity ratios;
- It is important to identify overlaps between reforms to avoid multiplier effects, especially negative ones;

Finally, we emphasize the importance of studying the impact of the implementation of reforms on the banking sector of other countries, since the studies were based on developed markets in the United States of America and in European countries only.

Bibliography in French

1. Balta, D. J. (2017, Avril). Mesurer l'impact de Bâle III. *Revue de la stabilité financière*, pp. 37-48.
2. Basel comittee on banking supervision. (February 2019). *Minimum capital requirement for market risk.* Basel: Bank for international settlements.
3. Basel commitee on banking supervision. (April 2020). *Basel 3 monitoring report.* Basel: Bank of international settlements.
4. Basel Committee on Banking Supervision. (January 2013). *Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools.* Basel: Bank of international settlements.
5. Carnez, M. (2017, Avril). Dix ans aprés: remédier aux failles à l'origine de la crise financière mondiale. *Revue de la stabilité financière, N° 21*, pp. 13-22.
6. Comité de Bâle sur le contrôle bancaire. (Octobre 2010). *Réponse de Bâle à la crise financière, rapport au groupe de vingt.* Bâle: Banque des réglements internationaux.
7. Comité de Bâle sur le côntrole bancaire. (Décembre 2010). *Bâle 3: dispositif réglementaire mondiale visant à renforcer la résilience des établissements et système bancaires.* Bâle: Banques des réglements internationaux.
8. Comité de Bâle sur le côntrole bancaire. (Janvier 2018). *Finalisation de Bâle 3 en bref.* Bâle: Banque des réglements internationaux.
9. Comité de Bâle sur le côntrole bancaire. (Octobre 2014). *Bâle 3: ratio structurel de liquidité à long terme.* Bâle: Banque des réglements internationaux.
10. Comité de Bâle sur le côtrole bancaire. (Décembre 2017). *Notre récapitulative sur les réformes de Bâle 3.* Bâle: Bnaque des réglements internationaux.
11. Comité de Bâle sur le côtrole bancaire. (Jnavier 2019). *Cadre du risque de marché en bref.* Bâle: Banque des réglements internationaux.
12. Elmalem, Y. (Juillet 2011). *Bâle 3: Décryptage, impacts et limites des nouvelles exigences réglementaire.* Auxia conseil.
13. Euro group consulting. (2011, Avril). Bâle 3: quels impacts sur les métiers de la banque. *The art of mobilization*, p. 4.
14. G20 Research Group. (24/25 Septembre 2009). Leaders' statments. *The Pittsburg summit*, (pp. 2-13). United States .
15. G20 research group. (june, 2012). *G20 compliance report.* Cannes.
16. Paulin, E. c. (2014, Juin). La mise en oeuvre de Bâle 3: vers un secteur bancaie plus sûr. *Revue du système financier*, pp. 61-68.
17. Pierre Yves Thoral, A. D. (2003, Novembre). Stabilité financière et nouvel accord de Bâle. *Revue de la stabilité financière, N° 03*, pp. 53-67.
18. Saidane, D. (Septembre 2012). *l'impact de la réglementation de Bâle 3 sur les métiers des salariés des banques.* Lile: Université de Lile Nord de France et SKEMA.
19. Vanel, G. (2014). Quand la prudence n'est pas une vertu. *Revue Economie et société N°4*, pp. 39-54.
20. Weber, A. (2017, Avril). L'impact de la réglementation financière: le point de vue des établissements bancaires d'importance systémique. *Revue de la stabilité financière N°21*, pp. 51-61.
21. Yuksel, M. (2019, June). A decade of post-crisis: G20 financial sector reform. *Finacial stability*, pp. 45-65.