



**LISBOA
SCHOOL OF
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**MESTRADO
MSC IN FINANCE**

**TRABALHO FINAL DE MESTRADO
DISSERTAÇÃO**

LIQUIDITY RULES IN BASEL III: A TEST ON THE
LARGEST PORTUGUESE BANKS

PEDRO LOBATO PEREIRA CASTANHEIRO LOURO

OUTUBRO - 2014



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ORIENTAÇÃO:

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Abstract

The main objective of the present dissertation was a preliminary analysis of the new regulatory package of Basel III, namely, a first analysis of the Liquidity Coverage Ratio computation, its practical application and its benefits for liquidity risk management in financial institutions.

For this purposes, it was selected a sample of 5 Portuguese financial institutions which, as at 31 December 2012, represented the most relevant financial institutions with retail banking activities (Portuguese “banking market”).

Considering the average Liquidity Coverage Ratio obtained it was possible to observe that the Portuguese “banking market” started to present a Liquidity Coverage Ratio clearly above the Basel III minimum requirement (60%). The Liquidity Coverage Ratio obtained by the Portuguese “banking market” insofar was 102% for 2013.

In a simulated stress scenario, we were able to verify that the minimum which Portuguese “banking market” high quality liquidity assets stock could drop was approximately 59% of its value, at 31st of December 2013, and still maintain the conditions to fulfil the Basel III minimum requirement (60%).

According to all the analysis performed, it was possible to conclude that the Portuguese “banking market” has the ability to efficiently sustain, any financial stress scenario. Therefore, holds sufficient stock of high quality liquidity assets that could be easily and immediately converted into cash (in private markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

Moreover, given the analysis and conclusions inferred, we were able to verify that the Portuguese “banking market” has a low liquidity risk profile and, consequently, in light with the Base III new liquidity requirements, it is well prepared for financial stress scenarios.

Keywords: *Basel III agreement; Liquidity risk profile; Liquidity Coverage Ratio; High quality liquidity assets; Total net cash outflows; Portuguese financial market.*

Acknowledgments

I would like to express my gratitude to my supervisor Professor José Manuel Dias Lopes, which propose me a very interesting subject of study with great applicability in the banking area, for the useful comments, remarks and engagement through the learning process of this master thesis. Furthermore I would like to thank Professor Clara Raposo for all the support during the masters of science program which provided essential basis in the construction of the thesis and my professional career. I would like to thank my loved ones, who have supported me throughout the entire process, both by keeping me harmonious and helping me putting pieces together. I will be eternally grateful for your love.

I will dedicate this thesis to my parents, my sister and my girlfriend.

INDEX

INTRODUCTION	9
1. LITERATURE REVIEW	10
1.1 LIQUIDITY RISK DEFINITION	10
1.2 THE CRISIS OF 2007 AND THE BACKGROUND TO THE BASEL III: PRE-2007 LIQUIDITY MANAGEMENT	10
1.3 THEORY THAT SUPPORTS THE LIQUIDITY MANAGEMENT	13
1.4 ORIGINAL BASEL III AGREEMENT	14
1.5 BASEL III REVISION.....	15
1.6 COMPARISON OF THE MAIN CHANGES IN THE 2013 REVIEW: EFFECTIVENESS AND IMPROVEMENTS	15
1.7 BASEL III – LCR METHODOLOGY	17
1.7.1. OBJECTIVE AND RELEVANCE FOR FINANCIAL MARKETS	19
1.7.2. STOCK OF HQLA	21
1.7.3. TOTAL NET CASH OUTFLOWS	22
1.7.3.1. CASH OUTFLOWS.....	23
1.7.3.2. CASH INFLOWS.....	24
1.8. KEY CHALLENGES FOR FINANCIAL INSTITUTIONS	25
2. METHODOLOGY	26
2.1. TYPE AND SAMPLE DATABASE.....	26
2.2. LIQUIDITY COVERAGE RATIO – HARMONIZATION.....	29
2.3. LIMITATIONS AND SAMPLING ERRORS.....	32
2.4. HYPOTHESIS UNDER INVESTIGATION	33
2.5. COMPUTATION OF DATA – LCR COMPUTATION.....	34
3. RESULTS	35
3.1 LCR ANALYSIS OF THE FINANCIAL INSTITUTION, INDIVIDUALLY CONSIDERED, FOR EACH FINANCIAL PERIOD AS AT 31ST DECEMBER 2013.....	35
3.2 ANALYSIS OF LCR AVERAGE RATIO PRESENTED BY THE FINANCIAL INSTITUTIONS DURING THE FULL PERIOD OF ANALYSIS.....	37
3.3 ANALYSIS OF LCR OF ALL FINANCIAL INSTITUTIONS IN SCOPE IN EACH PERIOD UNDER ANALYSIS 38	
3.4 LCR ANALYSIS OF ALL FINANCIAL INSTITUTIONS IN EACH PERIOD UNDER ANALYSIS – HQLA STRESS SCENARIO	39
4. CONCLUSION	41
5. REFERENCES	46
6. ANNEX - TABLES	50

Lis of Tables

TABLE 1. PORTUGUESE FINANCIAL INSTITUTIONS – AMOUNT OF STOCK HQLA (COMPONENTS) AS AT 31.12.2012	50
TABLE 2. PORTUGUESE FINANCIAL INSTITUTIONS - AMOUNT OF TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS (COMPONENTS) AS AT 31.12.2012	51
TABLE 3. PORTUGUESE FINANCIAL INSTITUTIONS – PERCENTAGE IN THE TOTAL STOCK HQLA (COMPONENTS) AS AT 31.12.2012.....	52
TABLE 4. PORTUGUESE FINANCIAL INSTITUTIONS - PERCENTAGE IN THE TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS (COMPONENTS) AS AT 31.12.2012.....	53
TABLE 5. FINANCIAL INSTITUTIONS IN SCOPE – PERCENTAGE IN THE TOTAL STOCK HQLA (COMPONENTS) AS AT 31.12.2012.....	54
TABLE 6. FINANCIAL INSTITUTIONS IN SCOPE - PERCENTAGE IN THE TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS (COMPONENTS) AS AT 31.12.2012	54
TABLE 7. FINANCIAL INSTITUTIONS IN SCOPE – STOCK HQLA AMOUNT BETWEEN 2005 AND 2013.....	54
TABLE 8. FINANCIAL INSTITUTIONS IN SCOPE - TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS AMOUNT BETWEEN 2005 AND 2013.....	55
TABLE 9. FINANCIAL INSTITUTIONS IN SCOPE - LCR BETWEEN 2005 AND 2013.....	55
TABLE 10. FINANCIAL INSTITUTIONS IN SCOPE – STOCK OF HQLA MINIMUM IN 31.12.2013	56

Introduction

The subprime crisis in 2007 changed the financial market way of functioning, as a consequence, it provoked a systemic crisis which affected all the major financial markets of the world, mainly in the American and European markets, causing also a dry up in the interbank lending market. As a result, the international community, in particular the institutions that regulated the markets, felt the urge to produce new and more efficient legislation and rules in order to prevent a new world crisis.

The solution presented by the Basel Committee on Banking Supervision (hereinafter “BCBS”) in 2010 was, amongst others, the Basel III agreement which regulated the liquidity requirements for the banks and financial institutions. We can safely say that this original agreement was very rigorous in the limits and requirements that the institutions had to follow (Hartlage, 2012). The first chapter of the dissertation will present a literature review on this theme and try to explain the economic, social and political context of the agreement, with emphasis upon the 2007 international crisis. The second chapter will contextualize the advent of the agreement and in the third chapter we will present the data available from the 5 major banks in Portugal, concerning the liquidity values and rates in order to analyze the impact of the new regulations imposed by the Basel III.

Finally we will make a data compilation of the official documents and statistics, as well as (inter) national documents and projections, in order to achieve a comprehensive view when testing the new liquidity regulations upon the major banks in Portugal.

1. Literature Review

“The word liquidity has so many facets that is often counter-productive to use it without further and closer definition” (Goodhart, 2008).

1.1 Liquidity risk definition

The liquidity risk arises because revenues and outlays are not synchronized (Holmström & Tirole, 1998). This would not matter if the agents could issue financial contracts to third parties, pledging their future income as collateral. However, in reality this is not always possible and agents may become illiquid since the risk of liquidity means the ability to settle obligations immediately (Drehmann & Nikolaou, 2010). Consequently, a bank is illiquid if it is unable to fulfill his obligations. In legal terms, a bank is then in default. In this sense, we define funding liquidity risk as the possibility that over a specific horizon the bank will become unable to settle obligations immediately.

Liquidity risk management is a part of the larger risk management framework of the financial services industry, which concerns all financial institutions (Zhang, 2011). Studying liquidity risk management issues is critical and complex. Failure to address the matter may lead to dire consequences, including banking collapse, and by extension, the instability of the financial system. In fact, most of the bank failures are due to issues around liquidity risk management. The author added that this is also the reason why regulators are very concerned with the liquidity of financial institutions and additionally why many financial industry professionals believe that the current thinking of regulators appears to be focused on the strengthening of the liquidity framework.

1.2 The crisis of 2007 and the background to the Basel III: pre-2007 liquidity management

The liquidity management is an aspect which belongs to the everyday life of the banking system and it results from the fact that banks finance long-term loans and other assets with short-term liabilities, such as deposits, and also because banks need to ensure that they have enough liquidity to sustain the day-to-day deposits and withdrawals. Since there is the possibility of the deposits being withdrawn at any time, the banks need to manage their liquidity to ensure that they can satisfy deposit withdrawals without being forced to liquidate long-term capital, in this case gross loans.

The liquidity management method more traditionally applied by commercial banks is the use of interbank lending and high liquidity securities (i.e.: US treasuries bonds) to guard against liquidity shocks (Campello, Giambona, & Graham, 2011; Riddiough & Wu, 2009; Cornetta, McNutt, Strahan, & Tehranian, 2011; Slovik & Cournèd, 2011).

Starting in late 1990's and increasing as we get closer to the mid-2000's, the management of liquidity in commercial banks changed dramatically in order to keep up with the quick changes and new demands of the market (Gerardi, Lehnert, Sherlund, & Willen, 2008). These changes occurred mainly in the largest US banks, European banks and emerging financial institutions, which perform activities as a bank, but outside the scope of traditional banking regulation and supervision. The changes involve new types of assets and a more pronounced use of liabilities in very short term as sources of liquidity, which ultimately contributed to the crisis that affected all financial and economic market. Financial institutions have invested in bonds anchored in safe assets (asset-backed securities – ABS). Although ABS assets are liquid during economy expansionary phases, and even in mild recessions, they have become illiquid during the financial crisis, contributing to the lack of liquidity of the financial institutions (Gerardi, Lehnert, Sherlund, & Willen, 2008).

Cash flows of such securities assets are supported by a set of loans administered by the banks and the transformation of individual loans (illiquid) in ABS assets was driven by technological and scientific advances occurred in the financial area. Although the ultimate goal was to distribute these titles to other participants and elements of the financial markets, many financial institutions have kept the real estate assets at their charge, for investment purposes and liquidity, especially in cases where they had high credit rates, since the high rates of the assets assured with some security that the holders would sell them or use them as collateral in repurchase agreements (operations in which an ABS is sold for money and the seller agrees to buy it back in the future). However, since the default rates of underlying assets (in particular mortgages) began to increase these titles have become illiquid and as a consequence banks could no longer use them as a significant source of liquidity, which led to the fragility of the financial system (Gerardi, Lehnert, Sherlund, & Willen, 2008).

Simultaneously, the largest financial institutions have increased their dependence on short-term financing and the most important sources of such funding were repurchase agreements and the asset-backed commercial paper (ABCP). The latter

consisted of short-term obligations, backed up by cash flow from assets such as ABS. Knowing this facts we can understand how the system became dependent of this kind of assets and consequently more fragile. In reality, the increasing dependence on these types of funding sources is directly connected with the growth of ABS. Therefore the marketing of ABS has created a growing reserve of liquid assets that could be used as collateral for short-term loans, making them important financing instruments. Financial institutions demand on this type of funding arose because traditional deposits practice was insufficient to finance the expansion of credit that occurred before the 2007 crisis (Perotti & Suarez, 2011). This increase in demand was satisfied by non-financial corporations and institutional investors who have used these types of financing as ways to save and apply its growing cash reserves (Pozsar, 2011). In fact, these were good short term investments because they served as deposits which could be redeemed very quickly and were endowed with high collateral rate offering a quick, allegedly safe, turnover.

As it was demonstrated in the recent financial crisis, to trust these sources to finance long-term investments can be very risky since the increased rates on the subprime mortgage market in the first half of 2007 made investors remain uncertain about the value of the subprime mortgage-backed securities. The uncertainty has reached a high point in August 2007, when investors became fearful and consequently stopped buying this type of funding. With that they stopped financing the actions of the financial institutions operating with these financing instruments. In turn, these financial institutions very rapidly began to suffer a severe shortage of liquidity and were forced to find a replacement for these financial instruments in order to avoid bankruptcy. The result was a collapse in interbank funding markets, leading to a response from the US Federal Reserve and other central banks in order to bring more liquidity to the financial system, avoiding in that way the collapse of the entire system. Due to the increase of losses on subprime mortgages and the collapse of the housing market at the end of 2007, even the "safe" instruments of financing (referred above) started failing and could only be rescued by lower values (Gerardi, Lehnert, Sherlund, & Willen, 2008).

Finally, the downfall of Lehman Brothers in September 2008 triggered a large-scale systemic crisis, during which other major US institutions like Wachovia and Washington Mutual collapsed after suffering the executions and bailouts by its creditors. In this way, the systemic crisis in the financial markets was followed by a

period of great recession in the United States and a major economic downturn on a global scale, affecting the economy of the entire planet (Sun, Stewart, & Pollard, 2011).

1.3 Theory that supports the liquidity management

The recent crisis and recession have suggested the need for a new, improved and greater regulation of liquidity mechanisms in the financial markets and also showed how the liquidity risk in a relatively small segment of the system, in this specific case the subprime mortgage market, could culminate in a liquidity problem in the entire financial system, a credit crisis and a severe, long, global recession. A prominent approach to regulate liquidity in the financial sector requires a buffer of liquid assets that financial institutions can use in an event of a liquidity crisis, preventing the spread of the problem, and dealing immediately with the situation (Slovik & Cournèd, 2011).

A good example of that is the case of Lehman Brothers, who claimed to have a "fortress" of liquidity of approximately \$ 40 billion in cash and liquid assets on a balance sheet of approximately \$ 700 billion (Valukas, 2010; Kowalik, 2013). However, the liquidity reserves of Lehman Brothers were quickly depleted to pay the creditors who had become increasingly uncertain about the company's ability to meet its obligations. Therefore, without their own liquid assets and unable to obtain additional liquidity from foreign investors, Lehman Brothers was unable to answer for its debt obligations and officially declared bankruptcy (Valukas, 2010; Kowalik, 2013).

What the Lehman Brothers called liquidity "fortress" was clearly not enough to avert its failure, which led to their complete breakdown and the costs of their collapse were extended to everyone through the general financial crisis (Kowalik, 2013). The liquidity buffers can reduce the risk of systemic crises through: i) liquidity can make the institutions less vulnerable to redemptions made by creditors because the buffers increase the confidence of creditors in the capacity of institutions to meet their obligations (Hartlage, 2012); ii) large reserves of liquid assets can decrease the dependency of the institutions on sales of assets as a means to obtain liquidity (Hartlage, 2012); iii) if institutions experiencing a situation of liquidity risk, liquidity buffers can give the management team the needed time to find solutions to their liquidity needs (BCBS, 2010); and iv) liquidity buffers reduce the necessity of the financial institutions in the central banks as suppliers of liquidity in times of crisis (Kowalik, 2013).

When institutions forestall that a central bank will supply liquidity in times of crisis, they have less encouragement to maintain their own liquidity buffers. This reduces the incentives of institutions to manage their own liquidity cautiously in good times, which in turn increases the prospect of a severe liquidity crisis and contribute to financial instability (Farhi & Tirole, 2012).

1.4 Original Basel III Agreement

When the BCBS (2010) issued the Basel III agreement in December 2010, it was defined that financial institutions need to maintain liquidity buffers of a size that would be defined by each institution in accordance with a measure called the Liquidity Coverage Ratio (hereinafter, “LCR”). LCR is the ratio of the value of the shares of high-quality liquid assets (hereinafter, “HQLA”) for an estimated value of the total value of the institution and the institution's cash liquidity, on a hypothetical scenario with 30 days duration (BCBS, 2010). Thus the LCR was calibrated to ensure that the institution would have sufficient liquid assets to meet its liquidity needs. The assets that institutions could use as part of the reserve would have necessarily to be liquid, even in times of great pressure and crisis, ideally eligible as collateral for central banks. The assets can be divided into two categories (BCBS, 2010): i) level 1 assets – such as central bank reserves, money that can be drawn during crises, and low-risk sovereign debt – could be included in the reserve without limit; and ii) level 2 assets – which would include higher-risk sovereign debt and highly rated corporate bonds, that could make up to 40 percent of the reserve, after discounting 15 percent in its market value.

The dimensions used to calculate the LCR of one institution were defined as the difference between the input and output flows of liquidity. The outputs are the liquidity resulting from liabilities of a financial institution, such as deposits and other forms of obligation, as well as lines of credit. For each category of responsibility or commitment that could force a way out of liquidity, the amount to be carried out by the institution would be multiplied by a rate estimated by the BCBS (2010).

Another important demanding dimension of the original Basel III agreement was the rules associated to the use of the buffers by the institutions and the agreement stipulated that the buffer could be released in a stress scenario. However, they also required that the institutions would have to maintain their LCR at levels equal to or

greater than 1 at all times. Consequently, institutions would have been able to use the buffer only if their LCR had been greater than 1 (Kowalik, 2013; BCBS, 2010).

1.5 Basel III Revision

When Basel III conditions were first issued in 2010, the BCBS committed to evaluate the use of the LCR during a first period and reviewing its effects on the financial markets. During the subsequently three years the banking industry and experts on the matter produced a series of comments and recommendations. In January 2013 the BCBS issued the revised Basel III agreement (Kowalik, 2013).

The mainstream view was that the original provisions of the agreement were too stern and would force some financial institutions to cut in some of their financial products available for the retail customers. Other specialists defended that the requirement to keep the LCR above 1 at all times meant that this instrument would be many times useless, since the institutions could only use it in very limited scenarios in order to respect the impositions (Slovik & Cournèd, 2011; Kowalik, 2013).

The revisions on the Basel III agreement introduced several important changes, mainly affecting buffers' size, composition, and availability (BCBS, 2010). First of all, the revision inserted the run-off rate lowering from 5% to 3%, which reflected an evaluation that pointed that the initial estimates of run-off rates were disproportionately high. Secondly, the revisions changed the composition of the buffer by adding a new asset category – Level 2B: lower-rated corporate debt and common equity shares, both discounted from their market value by 50%, and certain residential MBS, discounted by 25% – and this assets must not comprise more than 15% of the total stock of HQLA (Kowalik, 2013).

1.6 Comparison of the main changes in the 2013 review:

Effectiveness and improvements

When we refer to the effectiveness of the LCR in regulating liquidity buffers, the authors (Alloway & Bullock, 2013; Kowalik, 2013; Slovik & Cournèd, 2011) mention three main factors.

- **The size of the buffers:** For a liquidity buffer to be effective its size should mirror an institution's liquidity necessities in a crisis. However, determining these liquidity needs may be very trying mainly because i) legislators face considerable

uncertainty in the evaluation of the institutions future liquidity necessities and also there is no information about institutions behavior and consequently their future needs, in an environment where liquidity regulation is in place, making the assessment of liquidity needs particularly challenging. Moreover since ii) the liquidity needs of individual institutions rest on the institutions specific characteristics, such as the arrangement of their obligations and capital, their risk profile, size, business activities and the various environments in which they operate. Dimensions which are very difficult to assess with the approach presented by the Basel III model, henceforth under such model, a well-diversified institution (less susceptible to liquidity shocks) bears the same cost of insuring against liquidity shocks as a less-diversified institution (more susceptible to liquidity shocks). This methodology might have further adversarial consequences, for instance, it might encourage well-diversified institutions to take on superior risk to compensate for the fact that their diversification is not compensated with a lower liquidity buffer.

In conclusion, an uncompromising approach to run-off and inflows rates opens the likelihood that financial institutions may seek to exploit ambiguities in the regulation, engaging in internal regulations in order to lower the cost of holding liquidity buffers. An equal problem may surface with the classification of liabilities that are subject to the LCR standard, with certain financial institutions already devising strategies to avoid having certain liabilities classified as subject to the LCR standard (Alloway & Bullock, 2013).

- **The composition of the buffers:** For liquidity buffers to achieve their role, the assets that encompass the buffers have to be satisfactorily liquid at the time the institution needs them. As a consequence, when choosing which assets may be included in liquidity buffers, legislators need to achieve a balance between a definition of eligible assets that is too all-encompassing and a definition that is too narrow. On one hand, if the definition is too all-encompassing, a portion of the liquidity buffer might not be liquid when needed, on the other hand, if the definition of eligible assets is too narrow, financial institutions may face an inadequate supply of such assets resulting in several consequences. In order to reduce the scope for some of these limitations, the new Basel provisions widened the definition of suitable assets, not only reducing the mandatory total of liquid assets for regulatory purposes by lowering some of the run-off rates but also allowing financial institutions to use more classes of assets (Level 2B).
- **The availability of the buffers in crisis:** Another crucial requirement for well-functioning liquidity buffers is that they must be available to institutions when they need them, else institutions will have to maintain an additional liquidity buffer for handling their regular liquidity needs. Additionally, institutions not allowed to use the regulatory buffer would have to resort to the same means of obtaining liquidity as if they had no regulatory buffer.

The original Basel III requirements stated that institutions would have to maintain the LCR above 1 in all situations including during a crisis. Nevertheless, in the 2013 revisions it was acknowledged that such requirement had to be plunged in order to allow banks to use the buffer in phases of stress. As a consequence, the national superintendents were given freedom of choice about the use of buffers and how they would respond to the banks use of their buffers.

1.7 Basel III – LCR Methodology

The new regulatory package of Basel III is the first comprehensive framework for the regulation of the liquidity risk. This new regulation helps to mitigate the externalities imposed on the rest of the financial system (and, ultimately, on the real economy) arising from excessive maturity mismatches between assets and liabilities.

The need to regulate the liquidity risk was perhaps one of the most important lessons of the global financial crisis. The proposals in the Basel III package represented an important step in this process, by defining a harmonized set of rules for international banks.

This creates the necessary regulation for the banks to be able to reduce imbalances maturity structure and avoid excessive reliance on short-term financing incentives.

In addition, banks will have to hold a significant amount of HQLA which will allow them to react more easily to unexpected liquidity shocks without resulting in immediate asset sales.

Despite this remarkable progress, there is an element that may be missing in the new framework: the regulation of systemic component of liquidity risk. At this respect (IMF, 2011) "(...) the risk of systemic liquidity is the trend that financial institutions have to collectively underestimate liquidity risk in periods of financial stability, as they assume that the central bank will likely intervene in times of stress to maintain financial stability, avoid bankruptcy of financial institutions and thus limit the impact of illiquidity and other financial institutions in the real economy."

The regulation of liquidity risk can be justified by the fact that banks do not take into account the social optimum when they optimize the relationship between risk and return. The ex-ante regulation of bank liquidity can mitigate this behavior (Acharya et al., 2011; Allen & Gale, 2004a & 2004b; Brunnermeier et al., 2009; Cao & Illing, 2010; Gale & Yourlmazer, 2011; Holmstrom & Tirole, 1998; Rochet, 2004; Tirole, 2011).

However, there is no consensus about the way to mitigate the liquidity risk, both in academic and political regulatory framework, despite was achieved a remarkable progress during the last years. Traditionally, reserve requirements on bank deposits was the main tool for managing liquidity risk, though they also played an important role in the implementation of monetary policy (Robitaille, 2011). Additionally, the deposit guarantee systems are widely recognized as an important tool in preventing raising deposits.

Some recent discussions have suggested the possibility of increasing capital requirements to include liquidity risk (Brunnermeier et al., 2009). However, this perspective is not consensual. As discussed, liquidity risk financing is partly related to problems of asymmetric information about the creditworthiness of banks (Ratnovski, 2007).

Increasing the solvency without reducing the problem of asymmetric information would not reduce refinancing risk (Perotti & Suarez, 2011).

Several authors have discussed the importance of holding a liquidity buffer. In a recent article it was discussed the trade-offs between the imposition of quantitative requirements for risk liquidity and improving the incentives of the customers as the last resource of the system (Ratnovski, 2009). In the same article, the author said that the quantitative requirements can help banks to achieve the optimal level of liquidity and is therefore a more efficient solution.

However, the transparency appears to be a critical problem in this case (Ratnovski, 2007). There are many other contributions in academic literature that point to the possibility of imposing minimum buffers of liquid assets (Acharya et al., 2011; Allen & Gale, 2004a & 2004b; Farhiet al., 2009; Gale & Yorulmazer, 2011; Rochet & Vives, 2004; Tirole, 2011; Vives, 2011). However, other authors: (Wagner, 2007b) showed that, paradoxically, holding more liquid assets may induce greater risk to the banks; (Freixas et al., 2011) showed that central banks can manage interest rates in order to induce banks to hold more liquid assets, i.e., monetary policy can help promote financial stability.

There were other authors (Turn & Bengui, 2010) found arguments to support a tax on short-term debt, while other (Cao & Illing, 2011) showed that ex-ante imposition of minimum liquidity requirements for banks is a key condition for sustainability policies

of customer as the last resource of the system. Finally, (Diamond & Rajan, 2005; Wagner, 2007a) analyzed ex-post interventions.

In this context, the new regulatory framework of Basel III is essentially based on the definition of minimum buffers of liquid assets and restrictions on financial institutions short-term funding. Overall, the regulation of the liquidity risk was perhaps one of the most overlooked aspects before the financial crisis, with the lack of internationally harmonized rules (Rochet, 2008). However, the role played by liquidity during the global financial crisis made it clear that an international framework of this regulation is necessary. In December 2010, the BCBS (2010) released the final version of this new international framework for regulating liquidity risk, which is an important part of the new Basel III regulatory package. This new regulation creates the necessary incentives for banks to maintain adequate liquidity buffers and not rely excessively on short-term financing.

1.7.1. Objective and relevance for financial markets

LCR was developed by the BCBS (2013)¹ in order to turn the banks into more resilient financial institutions through the development of a ratio that allows the assessment of the short-term resilience of their liquidity risk profile.

BCBS (2013) paragraph 14 states that this ratio allows the supervision, assessment and monitoring of the liquidity risk profile of banks by ensuring that they have sufficient HQLA – assets that can be converted easily and immediately in private markets into cash – to sustain a significant stress scenario or market volatility lasting over 30 calendar days.

This LCR is an important tool in risk liquidity supervision, assessment and monitoring by the supervisor entities of each bank as an internal management ratio, assuming that it will allow improving the banking sector's ability to absorb shocks arising from financial and economic stress, whatever the source, thus reducing the risk of spillover from the financial sector to the real economy.

To be noted that BCBS (2013) refers that the LCR is, individually, insufficient to measure all dimensions of a bank's liquidity profile. In this sense, BCBS (2013)

¹ On the path of reform introduced by Basel III.

developed a set of monitoring tools to further strengthen and promote global consistency in liquidity risk supervision, tools which are supplementary to the LCR.

The objective is the introduction of the LCR as a mandatory monitoring for supervision entities (and as such, for banks) on the 1st January 2015, in a graduated approach, with the minimum requirement set at 60% and increases in equal annual steps to reach 100% on the 1st January 2019. This graduate approach, coupled with the revisions made to the 2010 publication of the liquidity standards, is designed to ensure that the LCR can be introduced without material disruption allowing an order strengthening of the banking systems or the ongoing financing of economic activity.

The Committee established that, individual countries that are receiving financial support for macroeconomic and structural reform purposes may choose a different implementation schedule for their national banking systems, consistent with the design of their broader economic restructuring programs.

As already referred, the LCR aims to ensure that a bank has an adequate free stock of HQLA that consists of cash or assets that can be converted into cash at little or no loss of value in private markets, to meet its liquidity needs for a 30 calendar day liquidity stress scenario.

BCBS (2013) paragraph 16 states that, at a minimum the free stock of HQLA should enable the bank to sustain on a short term (thirty days) in case of a stress scenario, time that is assumed as necessary to take the appropriate corrective actions by management and supervisors in an order way. Furthermore, it gives the Central Bank additional time to take appropriate measures, if they find it necessary. Accordingly to paragraph 19 of the BCBS (2013), the LCR emerges as an important tool for the monitoring of stressed scenarios².

In accordance, from the supervisor point of view, LCR should be viewed as a minimum supervisory requirement for banks.

² Considering that it “(...) combined idiosyncratic and market-wide shock that would result in: (a) the run-off of a proportion of retail deposits; (b) a partial loss of unsecured wholesale funding capacity; (c) a partial loss of secured, short-term financing with certain collateral and counterparties; (d) additional contractual outflows that would arise from a downgrade in the bank’s public credit rating by up to and including three notches, including collateral posting requirements; (e) increases in market volatilities that impact the quality of collateral or potential future exposure of derivative positions and thus require larger collateral haircuts or additional collateral, or lead to other liquidity needs; (f) unscheduled draws on committed but unused credit and liquidity facilities that the bank has provided to its clients; and (g) the potential need for the bank to buy back debt or honour non-contractual obligations in the interest of mitigating reputational risk.”.

The Committee defines that the LCR should be assessed based in the division of the value of the stock of HQLA in stressed conditions by the total net cash outflows, calculated according to the scenario parameters outlined below, as follows:

$$\text{LCR} = \frac{\text{Stock of HQLA}}{\text{Total net cash outflows over the next 30 calendar days}}$$

Being a traditional liquidity coverage ratio, the LCR methodology should be used internally by banks to assess exposure to contingent liquidity events. The total net cash outflows for the scenario are to be calculated for the next 30 calendar days.

The standard requires that, in case of an absent financial stress situation, the value of the ratio should not be lower than 100%, meaning that the stock of HQLA should at least be equal to the total net cash outflows in order to serve as a defense against the potential effect of liquidity stress.

However, during a period of financial stress, the banks may use their stock of HQLA and consequently their LCR will be below 100%. Maintaining the LCR below 100% could produce negative effects on the bank and other market participants.

1.7.2. Stock of HQLA

As referred above, the numerator of the LCR is the stock of HQLA.

Under the BCBS (2013) standard banks must hold a stock of free stock HQLA to cover the total net cash outflows over a 30 calendar day period under a potential stress scenario.

In order to qualify as HQLA, assets should be liquid in markets during a period of stress and, ideally, be central bank eligible. Additionally, assets are considered to be HQLA if they can be easily and immediately converted into cash at little or no loss of value which depends on the underlying stress scenario, the volume to be monetized and the timeframe considered.

Additionally, paragraph 24 of BCBS (2013) states that the characteristics that an asset must have in order to be considered as HQLA³.

Despite the characteristics mentioned above, paragraph 46 of the BCBS (2013) defines that there are two categories of assets that can be included in the stock:

- Level 1 – Assets can comprise an unlimited share of the share pool and are not subject to a haircut under the LCR (HQLA should be measured at an amount no greater than their current market value). National supervisors may require haircuts for Level 1 securities based on, among other things, their duration, credit and liquidity risk, and typical repo haircuts; and
- Level 2 – Assets (comprising Level 2A assets and any Level 2B assets permitted by the supervisor) can be included in the stock of HQLA, subject to the requirement that they comprise no more than 40% of the overall stock after haircuts have been applied.

1.7.3. Total net cash outflows

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. It is 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

³ “(i) **Fundamental characteristics**

Low risk: assets that are less risky tend to have higher liquidity. High credit standing of the issuer and a low degree of subordination increase an asset’s liquidity. **Low duration:** low legal risk, low inflation risk and denomination in a convertible currency with low foreign exchange risk all enhance an asset’s liquidity. **Ease and certainty of valuation:** an asset’s liquidity increases if market participants are more likely to agree on its valuation. Assets with more standardised, homogenous and simple structures tend to be more fungible, promoting liquidity. The pricing formula of a high-quality liquid asset must be easy to calculate and not depend on strong assumptions. The inputs into the pricing formula must also be publicly available. In practice, this should rule out the inclusion of most structured or exotic products. **Low correlation with risky assets:** the stock of HQLA should not be subject to wrong-way (highly correlated) risk. For example, assets issued by financial institutions are more likely to be illiquid in times of liquidity stress in the banking sector. **Listed on a developed and recognised exchange:** being listed increases an asset’s transparency.

(ii) **Market-related characteristics**

Active and sizable market: the asset should have active outright sale or repo markets at all times. This means that: There should be historical evidence of market breadth and market depth. This could be demonstrated by low bid-ask spreads, high trading volumes, and a large and diverse number of market participants. Diversity of market participants reduces market concentration and increases the reliability of the liquidity in the market. There should be robust market infrastructure in place. The presence of multiple committed market makers increases liquidity as quotes will most likely be available for buying or selling HQLA. **Low volatility:** Assets whose prices remain relatively stable and are less prone to sharp price declines over time will have a lower probability of triggering forced sales to meet liquidity requirements. Volatility of traded prices and spreads are simple proxy measures of market volatility. There should be historical evidence of relative stability of market terms (eg prices and haircuts) and volumes during stressed periods. **Flight to quality:** historically, the market has shown tendencies to move into these types of assets in a systemic crisis. The correlation between proxies of market liquidity and banking system stress is one simple measure that could be used.”

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.

1.7.3.1. Cash outflows

The Committee established in the paragraph 73 of the BCBS (2013) that cash outflows that should be considered to LCR computation are as follows:

- **Retail deposits run-off:** Deposits placed in a bank by a citizen and deposits from legal entities, sole proprietorships or partnerships are captured in wholesale deposit categories⁴;
- **Unsecured wholesale funding run-off:** Liabilities and general obligations that are raised from non-citizens (i.e. legal entities, including sole proprietorships and partnerships) and are not collateralized by legal rights to specifically designated assets owned by the borrowing institution in the case of bankruptcy, insolvency, liquidation or resolution. Additionally, can be considered obligations related to derivative contracts are explicitly excluded from this definition⁵;
- **Secured funding run-off:** Liabilities and general obligations that are collateralized by legal rights to specifically designated assets owned by the borrowing institution in the case of bankruptcy, insolvency, liquidation or resolution⁶;
- **Additional requirements:**
 - Derivatives cash outflows⁷;
 - Increased liquidity needs related to downgrade triggers embedded in financing transactions, derivatives and other contracts⁸;
 - Increased liquidity needs related to the potential for valuation changes on posted collateral securing derivative and other transactions⁹;
 - Increased liquidity needs related to excess non-segregated collateral held by the bank that could contractually be called at any time by the counterparty¹⁰;
 - Increased liquidity needs related to contractually required collateral on transactions for which the counterparty has not yet demanded the collateral be posted¹¹;

⁴ For further potential options for alternative treatment please see paragraphs 74 up to 84 of the BCBS (2013).

⁵ For further potential options for alternative treatment please see paragraphs 85 up to 111 of the BCBS (2013).

⁶ For further potential options for alternative treatment please see paragraphs 112 up to 114 of the BCBS (2013).

⁷ For further potential options for alternative treatment please see paragraphs 115 up to 116 of the BCBS (2013).

⁸ For further potential options for alternative treatment please see paragraphs 118 of the BCBS (2013).

⁹ For further potential options for alternative treatment please see paragraphs 119 of the BCBS (2013).

¹⁰ For further potential options for alternative treatment please see paragraphs 120 of the BCBS (2013).

- Increased liquidity needs related to contracts that allow collateral substitution to non-HQLA assets¹²;
- Increased liquidity needs related to market valuation changes on derivative or other transactions¹³;
- Loss of funding on asset-backed securities, covered bonds and other structured financing instruments¹⁴;
- Loss of funding on asset-backed commercial paper, conduits, securities investment vehicles and other such financing facilities;
- Drawdowns on committed credit and liquidity facilities¹⁵;
- Other contingent funding obligations¹⁶;
- Contractual obligations to extend funds within a 30-day period¹⁷;
- Other contingent funding obligations¹⁸;
- Non contractual obligations where customer short positions are covered by other customers' collateral¹⁹;
- Other contractual cash outflows²⁰.

1.7.3.2. Cash inflows

The Committee established in the paragraph 142 of the BCBS (2013) that cash inflows that should be considered to LCR computation are as follows:

- **Cap on total inflows:** In order to prevent banks from relying solely on anticipated inflows to meet their liquidity requirement, and also to ensure a minimum level of HQLA holdings, the amount of inflows that can offset outflows is capped at 75% of total expected cash outflows as calculated in the standard. This requires that a bank must maintain a minimum amount of stock of HQLA equal to 25% of the total cash outflows, such as:

- Secured lending, including reverse repos and securities borrowing²¹;
- Committed facilities²²;
- Other inflows by counterparty²³;

¹¹ For further potential options for alternative treatment please see paragraphs 121 of the BCBS (2013).

¹² For further potential options for alternative treatment please see paragraphs 122 of the BCBS (2013).

¹³ For further potential options for alternative treatment please see paragraphs 123 of the BCBS (2013).

¹⁴ For further potential options for alternative treatment please see paragraphs 124 of the BCBS (2013).

¹⁵ For further potential options for alternative treatment please see paragraphs 125 of the BCBS (2013).

¹⁶ For further potential options for alternative treatment please see paragraphs 126 up to 131 of the BCBS (2013).

¹⁷ For further potential options for alternative treatment please see paragraphs 132 up to 133 of the BCBS (2013).

¹⁸ For further potential options for alternative treatment please see paragraphs 134 up to 139 of the BCBS (2013).

¹⁹ For further potential options for alternative treatment please see paragraphs 140 of the BCBS (2013).

²⁰ For further potential options for alternative treatment please see paragraphs 141 of the BCBS (2013).

²¹ For further potential options for alternative treatment please see paragraphs 145 up to 148 of the BCBS (2013).

²² For further potential options for alternative treatment please see paragraphs 149 of the BCBS (2013).

²³ For further potential options for alternative treatment please see paragraphs 150 up to 157 of the BCBS (2013).

- Other cash inflows²⁴.

1.8. Key challenges for financial institutions

Financial institutions with a strategy focused on extensive short-term funding or with insufficient HQLA may face important operating costs when meeting the new liquidity requirements.

In order to produce LCR, financial institutions would most likely have to adapt their strategy to focus on Basel III requirements (Villafranca & Mohammed, 2013). The authors continued by saying that financial institutions will have to adjust their balance sheets, for instance and as already referred by:

- European Banking Authority (2013), holding more HQLA and measure the encumbrance of the assets in order to reduce the level of structural subordination;
- European Banking Authority (2013), identifying deposits subject to higher outflows via factors such as: volatility, volume, currency, location of deposits and the relationship with customers;
- BCBS (2013), improving additional medium and long-term wholesale funding;
- BCBS (2010) said that global banks will have to manage both central and local requirements to meet the Basel III requirements with a minimum impact on their ability to move funding and liquidity;
- BCBS (2013) said that the implementation of Basel III requirements, would more likely impact both business model and organizational structure of financial institutions. Indeed, financial institutions will have to create stress and test scenarios, meet new reporting requirements and model cash flows in order to respond to the new liquidity requirements, thus financial institutions should expect to face significant operating cost pressures in the short-term.

²⁴ For further potential options for alternative treatment please see paragraphs 150 up to 160 of the BCBS (2013)

2. Methodology

On the first chapter of this dissertation, we started with an explanation of the Basel III agreement, explaining its conditions and requirements. We also made a brief historical approach of the precedents to the Basel III agreement, focusing on the 2007 systemic crisis, with the objective of contextualizing the emergence of the agreement.

After the literature review, we will analyze the existing balance sheets and liquidity data from the 5 largest banks in Portugal (Caixa Geral de Depósitos, Banco Espírito Santo, Banco Santander Totta, Banco Millennium BCP, e BPI), from 2005 to 2013. We will make this analysis in order to assess, and understand, the impact of the Basel III conditions in these Portuguese banking institutions. This analysis will provide us a view on the evolution of the banks financial condition and their capacity to adapt to the measures imposed by the Basel III.

In our opinion, we define our dissertation as a data comparison study, by compiling the official data available on the banks, comparing it with the data prior to the implementation of the Basel III agreement and resume the major changes and implications.

2.1. Type and sample database

The process of decision making needs, unquestionably, to have clear information about the object under investigation, in order to be as efficient as possible (Costa & Pimenta, 2004).

The sampling is the process of selection of the sample, in other words, a subset of the population that corresponds to the set of elements on which you want to infer, which allows to take the necessary inferences about the subject under investigation (Barbetta, Bornia & Reis, 2004).

Summarizing, the sampling process should follow the following steps, which are based on a sampling plan consisting of several phases, including (Costa & Pimenta, 2004): definition of the objects of investigation; the definition of the population; identification, selection and analysis of existing information; the choice of the sampling method; quantifying the sample; the choice of method of data collection; and the presentation of results.

The methodology that was applied in the present investigation was slightly different, given the object of investigation and the nature of the sample needed to be used. In this sense, below are defined all the steps performed in order to investigate the object of the present investigation.

The main object under investigation is based on the perception of whether the banks have sufficient stock of HQLA that can be converted easily and immediately in private markets into cash, in order to sustain the significant market volatility or stress scenarios lasting over 30 calendar days or not. This analysis will allow obtaining information and further conclusions about the resilience of the liquidity risk profile of the banks selected for this purpose, on the short-term path of reform introduced by Basel III.

The financial system comprises the set of financial institutions which are essentially channeling savings into investment in the financial markets by buying and selling financial products. These institutions ensure the operation of payment systems allowing local markets to develop their activity and individuals and businesses to move and act in distant places respectively. The absence of a well-structured banking system would not allow the circulation of money and would make more difficult to create the goods and services markets, as well as the movement of people and goods.

According to *Associação Portuguesa de Bancos (APB)*²⁵, the number of financial institutions – banks – in the Portuguese market was 34. However, out of the total population of Portuguese financial institutions, was selected a sample of 5 financial institutions which, as of 31.12.2012²⁶, represented the most relevant financial institutions with retail banking activities²⁷ (investment banking activities and other were excluded from the present investigation) in the Portuguese “banking market” considering the categories of assets and liabilities selected for this purpose (please see section below). The financial institutions selected were: Banco BPI, S.A. (hereinafter “BPI”); Banco Comercial Português, S.A. (hereinafter, “BCP”); Banco Espírito Santo,

²⁵ Financial institutions exert different specific activities, in addition to the feature, allow to classify them based on their role. The Legal Framework of Credit Institutions and Financial Companies (Legal Framework) splits the financial entities into two main groups: Credit Institutions and Financial Companies.

²⁶ Boletim Informativo n.º 48, 2012 – Anual, APB. Last information for the financial sector made available by BdP.

²⁷ In fact, as at 31st December 2013, these 5 financial institutions represent 76% of the “*Stock of HQLA*” (items considered as stock of HQLA for purposes of the present dissertation) and 56% of the “*Total net cash outflows over the next 30 calendar days*” (items considered as total net cash outflows over the next 30 calendar days for purposes of the present dissertation) of the sum of all financial institutions. Please see tables 1, 2, 3 and 4 for further analysis.

S.A. (hereinafter, “BES”); Caixa Geral de Depósitos, S.A. (hereinafter “CGD”); and Banco Santander Totta, S.A. (hereinafter “STB”).

The timeframe of the analysis of this investigation are the economic exercises of 2005 to 2013.

After the subject population is defined, it is important to identify, select and analyze the existing and necessary information so that we can infer about the object of investigation, and a collection of statistical information is very important to ensure consistency and assertiveness.

The selection of the sample should pursue the object in investigation.

The method of data collection consists in a sampling process, which comprehends the collection, coding, verification, analysis and interpretation of the desired information.

This investigation was constructed based on data developed by APB which is built on a yearly basis with aggregate information from all banks or similar institutions.

The data for this investigation was constructed through the balance sheet items prepared for the purposes of recognition and measurement in accordance with International Financial Standards Reporting (IFSR) issued by the Bank of Portugal and on that date, and the data collected correspond to the individual activity of each target database, thus contemplating the individual results and non-consolidated accounts.

This choice was due to the fact that, while the consolidated reporting (economic group), the financial information available includes other impacts of activity, i.e., is one that relates to the overall activity and not to the individual activity.

At this respect, to be noted that the year 2005 stands out as a profound regulatory change regarding the presentation of accounts due to the implementation of IFRS, materialized by the European Parliament and of the Council Regulation on July 19, 2002, which determines national companies, in respect of each year beginning on or after January 1, 2005, companies with values securities admitted to trading on a regulated market of any member state to prepare their consolidated accounts in accordance with IFRS accounts standards.

2.2. Liquidity Coverage Ratio – Harmonization

As already referred, the object under investigation is based on the investigation of whether a sample of Portuguese financial institutions have sufficient stock HQLA that can be converted easily and immediately in private markets into cash in order to sustain the significant market volatility or stress scenarios lasting over 30 calendar days or not.

The standard requires that, absent a situation of financial stress, the value of the ratio should not be lower than 100%, meaning that the stock of HQLA should at least equal total net cash outflows in order to serve as a defense against the potential onset of liquidity stress.

Also, as already referred, LCR monitoring will be mandatory for supervision entities (and the such, is banks) from the 1st of January 2015, in a graduated approach, with the minimum requirement set at 60% and rise in equal annual increases to reach 100% on the 1st of January 2019. However, for the investigation purposes it was considered that the above mentioned graduated approach was already at its full application, meaning that it was not considered any graduated approach and, therefore, it was assumed a minimum LCR of 100% (explained in the next section).

The methodology used in the present investigation could not be (totally) based on the BCBS (2013) methodology, due to many aspects and the difficulties encountered in the course of this investigation.

The complexity of the methodology established by the BCBS (2013), specifically regarding the definition of the stock of HQLA and total net cash outflows (which have never been applied in practical examples and requires a more detailed explanation and practice and beyond from that available).

Assuming that the methodology of the present investigation would be based, in part, on methodology adopted by BCBS (2013), the gathering of the necessary information would be extremely complex, namely due to the insufficient detail of the information required and made available to the public consultation by the own banks.

In face of the above mentioned difficulties encountered in the course of this investigation, we processed to the harmonization of the components of the LCR indicator, as explained below. The data collected for all the economic years under investigation were based on the following categories of assets and liabilities:

- **Assets**
 - Cash and deposits at central banks;
 - Loans and advances to credit institutions;
 - Loans and advances to credit institutions – other loans and advances;
 - Financial assets held for trading;
 - Financial assets available for sale.
- **Liabilities**
 - Deposits from credit institutions;
 - Deposits from central banks;
 - Financial liabilities held for trading;
 - Deposits from clients and other loans.

As regards to the stock of HQLA, although these items do not represent (accurately) the stock of HQLA as defined in paragraph 24 of the BCBS (2013) we believe that the above mentioned items are those that can represent more accurately the stock of HQLA, considering their fundamental characteristics (low risk, easiness and certainty of valuation, low correlation with risky assets) and their market-related characteristics (active and sizable market, low volatility and flight to quality), as such below:

- **Cash and deposits at Central Banks:** The balance Central Banks includes deposits in the Central Bank to satisfy the legal requirements to maintain a cash reserve for which the value is based on the value of deposits and other liabilities. The cash reserve requirements, according to European Central Bank System for Euro Zone, establishes the maintenance of a deposit with the Central Bank equivalent to 1% of the average value of deposits and other liabilities, during each reserve requirement period;
- **Loans and advances to credit institutions – Repayable on demand:** Deposits placed in credit institutions, which are in order to cash and can be used at any time;
- **Loans and advances to credit institutions – Other loans and advances:** Deposits placed in credit institutions, which are the term cash but can be used at any time; and

- **Financial assets held for trading and Financial assets available for sale:** The trading and available for sale portfolios, are recorded at fair value in accordance with the accounting policy. The balance listed instruments includes securities valued with stock exchange market prices, valued according to price providers and securities listed in other organized markets.

As already mentioned for the case of the stock of HQLA, the items selected do not represent (accurately) the total net cash flows as defined in BCBS (2013). However, according to the characteristics defined in BCBS (2013), we believe that the above mentioned items are those that can represent more accurately the total net cash flows, considering their characteristics (the retail deposits run-off, the unsecured wholesale funding run-off and the secured funding run-off), as such below:

- **Deposits from credit institutions:** Deposits from credit institutions, which are in order to cash and can be used at any time;
- **Deposits from central banks:** Deposits from central banks, which are in order to cash and can be used at any time;
- **Financial liabilities held for trading:** The trading and available for sale portfolios, are recorded at fair value in accordance with the accounting policy. The balance listed instruments includes securities valued at stock exchange market prices, valued according to price providers and securities listed in other organized markets; and
- **Deposits from clients and other loans:** Deposits from customers, which are in order to cash and can be used at any time.

Besides the above mentioned methodology, to be noted that as those are balance sheet items, they show the position of the bank's balance sheets at the end of each financial year.

In this sense, in order to harmonize the information required to compute the LCR, as well as to comply with the rule of 30 calendar days, to all accounting items (i.e., for each item, for each exercise and for each selected bank) was performed a preliminary division of the items by 12 representing the monthly harmonization of the annual amount discharged only in case of the *Deposits from clients and other loans*.

2.3. Limitations and sampling errors

The method of collecting the data necessary for statistical inference presented may be susceptible to some sampling errors (Costa & Pimenta, 2004). In this sense, it is relevant to point out potential errors arising from sampling methodology and harmonization of the indicator used to analyze the effects of the object under investigation.

The first potential error identified lies in collecting and coding information. This point may cause some kind of bias in statistical analysis since, as already mentioned in section above, the indicator used for purposes of this investigation suffered an adaptation in terms of their computation. Notwithstanding, that harmonized indicator was carefully explained in the section above. In accordance to the explanation given above, we believe that way misinterpretations are mitigated.

The second potential error is the inadequate coverage of the population (sample). This potential error occurs when the representative elements are not included in the sample who withdrew the universe. This might cause some kind of bias in terms of statistical analysis as compared to the universe of companies operating in the domestic market, will only be considered for purposes of this investigation a set of five financial institutions, as already referred. So, not having a high degree of coverage of the universe in question may have little validity amplification of the results obtained when taking the necessary inferences. However, the error identified becomes less important considering the level of market representation which, has already mentioned, is large due to the 5 financial institutions selected in the sampling process.

Finally, the third potential error in the process is the lack of response of some statistical units in particular with regard to compliance of the 30 calendar days rule, from which one can infer the impossibility of obtaining inferences and conclusions about the elements of sample. Given this limitation, we believe that this matter could be study in future investigations.

Considering the previously mentioned, it was possible to conclude that the sample used to infer and make conclusions about the object of investigation has levels of quality, appropriateness and clarity significant, which in turn ensures a coherent framework for conducting the necessary statistical inferences.

2.4. Hypothesis under investigation

The statistical inference is synonymous with statements about parameters of a population, where such methods exist to validate or not to allow these same statements. The authors still refer that statistical methods provide a contribution to the decision aid level, allowing the manager to make a decision based in a statistical support, with the error minimization.

In the case, pursuing the present dissertation objective, the hypothesis under investigation was defined as follows:

- **H0**: $LCR \geq 60\%$ - “The Portuguese financial institutions **have** sufficient stock of HQLA in order to sustain the significant market volatility or stress scenarios lasting over 30 calendar days”;
- **H1**: $LCR < 60\%$ - “The Portuguese financial institutions **do not have** sufficient stock of HQLA in order to sustain the significant market volatility or stress scenarios lasting over 30 calendar days”.

In fact, as we shall see, we performed several inferences, with the proper adaptation of H0 and H1 above defined, namely, through the study of LCR in terms of each individual financial institution in scope, its temporal evolution, as well as an aggregate analysis of Portuguese banking system through an average LCR.

2.5. Computation of data – LCR computation

The database that supports the present dissertation, previously identified, has the items that were required for the measurement and computation of LCR, as follows:

$$\begin{aligned} &+ \text{Cash and deposits at the Central Banks} \\ &+ \text{Loans and advances to credit institutions} \\ &\quad + \text{Financial assets held for trading} \\ &\quad + \text{Financial assets available for sale} \\ \text{LCR} = &\frac{\quad}{\quad} \\ &\quad + \text{Deposits from credit institutions} \\ &\quad + \text{Deposits from central banks} \\ &\quad + \text{Financial liabilities held for trading} \\ &\quad + \underline{\text{Deposits from clients and other loans}} \end{aligned}$$

12

3. Results

According to Basel III *standards* and to the methodology defined in the present dissertation, the Portuguese financial institutions are considered to have sufficient stock of HQLA if their LCR is above 60%. As already referred, this means that the institutions in scope had, in the period under analysis, sufficient stock of HQLA in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

Considering the reported values by the financial institutions for the stock of HQLA and for the total net cash outflows over the next 30 calendar days (please see Table 7 and Table 8, respectively), we were able to compute the LCR for each financial institution in scope and for every period under analysis (please see Table 9), according to the methodology defined in the previous section.

LCR values are presented in table 9, which is composed by (i) the LCR for each Portuguese financial institution in scope for all the periods under analysis, (ii) as well as the arithmetic mean of LCR for each financial institution during the analyzed period, and also (iii) the arithmetic mean of the LCR of the “banking market” for each period under analysis.

We believe that the last indicator above mentioned – the arithmetic mean of the LCR of the “banking market” for each period under analysis – could represent a relevant reference for the conclusions that will be assessed in the following chapter, namely because it is an indicator composed by the most representative financial institutions in the Portuguese “banking market”.

As already mentioned, the purpose of the present analysis was to obtain information and further conclusions about the resilience of the liquidity risk profile of the Portuguese “banking market” on the short-term path of reform introduced by Basel III.

3.1 LCR analysis of the financial institution, individually considered, for each financial period as at 31st December 2013

The first statistical test performed was based in the analysis of the LCR obtained by the financial institutions in scope, individually considered as of 31st of December 2013,

namely through the analysis of the LCR minimum requirement – 60% – was (or not) fulfilled:

- **BPI:** The bank showed a positive ratio in 7 of the 9 periods analyzed. BPI's LCR turned positive in 2007 and after that, it was always above the minimum required – 60%. The data obtained allowed to identify a positive increasing trend. At 31st of December 2013, BPI's LCR was 185% (please see Table 9).
- **BCP:** The bank showed a positive ratio in 5 of the 9 periods analyzed. BCP's LCR turned above the minimum required in 2009 and after that, it was always above the minimum required – 60%. The data obtained allowed to identify a positive and slightly increasing trend. At 31st of December 2013, BCP's LCR was 85% (please see Table 9).
- **BES:** The bank showed a positive ratio in 4 of the 9 periods analyzed. BES's LCR was above the minimum required – 60% – in 2007, 2009, 2010 and 2011. The data obtained does not allowed to identify any trend, due to the disparity; At 31st of December 2013, BES's LCR was 51% (please see Table 9).
- **CGD:** The bank showed a ratio above the minimum required – 60% – in all the 9 periods analyzed. CGD's LCR presents a positive and sustainable trend. At 31st of December 2013, CGD's LCR was 177% (please see Table 9).
- **STB:** The bank showed a positive ratio in 7 of the 9 periods analyzed. BPI's LCR turned above the minimum required – 60% – in 2008 (to be noted that 2005 was also a year on which the LCR was positive) and after that, it was always positive. The data obtained allowed to identify a positive slightly increasing trend. At 31st of December 2013, STB's LCR was 64% (please see Table 9).

According to the LCR values obtained, it was categorically possible to accept *H0*, due to fact that all financial institutions in scope (with the exception of BES, where *H1* was verify) presents a LCR above the minimum required of 60% on the short-term path of reform introduced by Basel III.

In fact, at the 31st of December 2013, BES presents a LCR of 51%. Thus, it was possible to conclude that BES was the only financial institution, of the financial institutions in scope, which does not have (at the moment) sufficient HQLA stock that could (in the referred period) be easily and immediately converted into cash (in private

markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

On the other side, at 31st of December 2013, there are some financial institutions that presented a LCR much higher than the minimum required, namely, BPI and CGD, with LCRs of 185% and 177% respectively. When comparing the referred LCRs to other LCRs obtained by the remaining financial institutions in scope, this LCR could represent outliers in the present sample. However, for the purposes of this analysis, we choose to accept these LCRs based in the assumption that it represents a better performance in the liquidity management from this two financial institutions.

3.2 Analysis of LCR average ratio presented by the financial institutions during the full period of analysis

The second statistical test performed was based in the analysis of the LCR average *ratio* during the full period in scope. Once more, assuming the minimum LCR requirement under Basel III *standards* – 60% –, this analysis allowed to conclude:

- **BPI:** The bank's LCR average ratio during the full period in scope was 99%, which is above the minimum requirement of 60%. Notwithstanding, please take into account the value obtained by BPI in 2013 (please see Table 9).
- **BCP:** The bank's LCR average ratio during the full period in scope was 54%, which is below the minimum requirement of 60% (please see Table 9).
- **BES:** The bank's LCR average ratio during the full period in scope was 60%, which is equal to minimum requirement of 60% (please see Table 9).
- **CGD:** The bank's LCR average ratio during the full period in scope was 98%, which is above LCR minimum requirement of 60%. Notwithstanding, please take into account the value obtained by CDG in 2013 (please see Table 9).
- **STB:** The bank's LCR average ratio during full period in scope period was 83%, which is above LCR minimum requirement of 60% (please see Table 9).

Considering the above analysis and the value obtained, it was possible to categorically accept *H0* in BPI, CGD and STB case. Therefore, we can conclude that the above mentioned financial institutions had sufficient HQLA stock, that could (in the referred period) be easily and immediately converted into cash (in private markets) in

order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days, considering the LCR average ratio during the full period under analysis. On other hand, in light of the present methodology, the opposite conclusion was stated for BES and BCP cases, i.e., BES and BCP did not present sufficient HQLA stock that could (in the referred period) be easily and immediately converted into cash (in private markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

3.3 Analysis of LCR of all financial institutions in scope in each period under analysis

As previously mentioned, we believe that the analysis of LCR of all financial institutions in scope in each period of analysis represents the most relevant analysis when the intent is to study in the Portuguese “banking market”, specifically due to the fact that this indicator is composed by the sum of the LCRs obtained by the financial institutions which are the most representative in the Portuguese “banking market”.

Therefore, the third statistical test performed was the analysis of LCR of all financial institutions in scope in each period under analysis against the perception if it was complying with the minimum LCR requirement under Basel III standards.

The methodology used was based in the computation of the division of the sum of the HQLA and the sum total net cash flows the financial institutions individually computed.

Through the average LCR obtained it was possible to observe that the Portuguese “banking market” started to present a LCR above the minimum required (60%) in 2008. Since 2008, this LCR was always above the minimum required (please see Table 9), and its trend was always positive, i.e., the LCR obtained in each period increased from exercise to exercise.

Thus, it was possible to conclude that the Portuguese “banking market” presents LCR clearly above the Basel III minimum requirement, insofar as the LCR value obtained was 102% for 2013 (please see Table 9). Therefore, it also can be realize that H_0 was categorically accepted in periods from 2008 further, which allows us to conclude that, Portuguese “banking market” have sufficient HQLA stock that could (in the referred period) be easily and immediately converted into cash (in private markets)

in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days since 2008. However, the above mentioned conclusion can be skewed considering the outliers identified in the cases of CGD and BPI (please see above our comment of the subject). Under the present hypothesis under study – analysis of LCR of all financial institutions in scope in each period of analysis – it was performed a quick test, namely through the exclusion of CGD and BPI’s LCRs.

With this quick test we were able to verify that, even excluding the above mentioned LCRs values, through the average LCR of the remaining financial institutions in scope, it was possible to observe that the Portuguese “banking market” started to present a LCR above the minimum required (60%) also in 2008 (please see Table 9). In spite of having a LCR always above the minimum required, its trend was not always positive, i.e., the LCR obtained in each period was not steadily increasing from exercise to exercise.

Performing a one-shot analysis, at 31st of December 2013, the Portuguese “banking market” presented a 102% LCR which is clearly above the Basel III minimum requirement. Moreover, not considering CGD and BPI’s LCRs, the Portuguese “banking market” obtained was 68% (please see Table 9), again above the Basel III minimum requirement.

3.4 LCR analysis of all financial institutions in each period under analysis – HQLA stress scenario

Finally, in the framework of the present dissertation, another statistical analysis was performed in order to identify which could be the minimum HQLA stock amount that the Portuguese “banking market” must have in order to present sufficient HQLA stock that could (in the referred period) be easily and immediately converted into cash (in private markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

This analysis was only performed at 31st of December 2013.

According to the previous analysis performed, it was possible to conclude that the Portuguese “banking market” LCR presented a value of 102% (please see Table 9). In this sense, assuming that the total net cash outflows over the next 30 calendar days items selected for the purposes of the present dissertation remain the equal, i.e., without

any variation in its amount, it was simulated the Portuguese “banking market” minimum HQLA stock in order to fulfill the LCR minimum requirement.

Therefore, it was possible to verify that the minimum HQLA stock is Eur 39.187.135 (please see Table 10), which represents a drop of approximately 59% of its value at 31st of December 2013 (to be noted that the sum of the HQLA stock presented by the Portuguese “banking market” was Eur 66.524.456 – please see Table 7).

4. Conclusion

The current financial crisis, marked by the instability and volatility of the financial markets, may cause relevant issues that the financial institutions management should take into account on a daily basis. Consequently, we believe that the liquidity management is a crucial matter that the financial institutions should focus on.

Over the last years, the liquidity risk theory and its consequent practical applications evolved significantly. The economic growth based on the easy access to credit created the need of new regulatory tools that may allow managing the liquidity risk in a more efficient way.

Financial institutions are included in the financial system which is regulated by its own rules and legislation. As a member of the EU, Portugal had to implement the Directives that led to the implementation of the Basel Methodology and Legislation. These agreements, issued by the BCSB, established the fundamental principles and recommendations in the supervision of the banking system and integrated the risk management issues.

In this framework, the new liquidity requirements form a key part of the Basel III framework and are intended to strengthen the resilience of global banking institutions. In this case, the LCR, which will require banks to hold (or not) a designated liquid assets buffer against a 30-day cash outflow.

The main the objective of the present dissertation was a preliminary analysis of the new regulatory package of Basel III.

Moreover, the purpose of the present dissertation was to investigate if the most representative Portuguese financial institutions had sufficient stock of HQLA, in the period between 2005 and 2013, that could (in the referred period) be easily and immediately converted into cash (in private markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

Through the average LCR obtained it was possible to observe that the Portuguese “banking market” started to present a LCR above the minimum required (60%) in 2008. Since 2008, this LCR was always above the minimum required and its trend was always positive, i.e., the LCR obtained in each period increased from exercise to exercise.

Therefore, it was possible to conclude that the Portuguese “banking market” presents LCR clearly above the Basel III minimum requirement, as the LCR value obtained was 102% for 2013. Thus, it also can be concluded that *H0* was categorically accepted in periods from 2008 further.

However, the above mentioned conclusion can be skewed considering the outliers identified in CGD and BPI cases. Notwithstanding, even excluding the above mentioned LCRs values, it was possible to observe that the Portuguese “banking market” started to present a LCR above the minimum required (60%) also in 2008.

In an one-shot analysis, as at 31st of December 2013, the Portuguese “banking market” presented a 102% LCR which is clearly above the Basel III minimum requirement. Moreover, not considering CGD and BPI’s LCRs, the Portuguese “banking market” obtained was 68%, again above the Basel III minimum requirement.

In all the cases, for the purposes of the present dissertation, considering the above conclusion on the “banking market” (i.e., not only the conclusion obtained on the financial institutions analyzed individually), it was possible to conclude that the “banking market” had sufficient HQLA stock that could (in the referred period) be easily and immediately converted into cash (in private markets) in order to sustain a significant market volatility or stress scenarios lasting over 30 calendar days.

In a simulated stress scenario, we were able to verify that the minimum “banking market” high quality liquidity assets stock could drop approximately 59% of its value at 31st of December 2013 and still be in conditions to fulfil the Basel III minimum requirement (60%).

Through the analysis performed, we were able to verify, categorically, that the Portuguese “banking market” is well prepared for financial stress scenarios, largely due to the low liquidity risk profile presented in light of the LCR methodology used under the present dissertation.

Moreover, we also verified that most of the Portuguese financial institutions in scope were able to adjust their liquidity buffer to the new Basel III liquidity requirements, which is based on a positive trend identified in the LCR over the period in analysis. Notwithstanding, the same conclusion could be assessed for a Portuguese “banking market” through the analysis of the average LCR of the Portuguese “banking market”.

The only financial institution in scope that, at 31st of December 2013, presented a LCR below the minimum required in the new Basel III requirements was BES. Moreover, BES's LCR trend over the period under analysis was always undefined, without any remarkable trend. Thus, for all above referred, we were able to conclude that BES's liquidity risk profile is high.

In BES's case, the above mentioned conclusion is in accordance to the latest events and developments in the Portuguese "banking market". As is public knowledge, BES was/is involved in an operation where the bank's liquidity was low and, consequently, among other reasons, BES was recapitalized by a special fund of recapitalization of financial institutions created for this purpose. Prior to this operation, BES was also one of the Portuguese financial institutions that had state intervention, through a recapitalized plan implemented under IMF economic and financial intervention in Portugal, due to liquidity issues and other capital requirements.

In line with the above mentioned, BCP is another Portuguese financial institution that does not present comfortable LCR values over the period under analysis. In fact, BCP was one more Portuguese financial institution that had state intervention through the same recapitalization plan. However, BCP's case, in light with the LCR methodology used is not as critical as it is BES's case.

From a management point of view, we believe that the new liquidity risk minimum requirements are expected to influence both internal processes and business models of financial institutions.

Therefore, considering the subject of the present dissertation, we could conclude that the management of the HQLA stock corresponds to one of the main objectives that the financial institutions management should be focus on pursuing the Basel III requirements.

Regarding the LCR, we believe that is important that financial institutions start programs quickly in order to assess the challenges that they will face in the process of meeting the new requirements.

Daily frequency and increased granularity have become the new benchmark for liquidity risk management. This will represent new challenges and financial institutions will have to quickly identify data and system needs and how to address them better.

We believe that a detailed study of those challenges should be performed in new empirical works in order to clearly identify the risks and challenges of the LCR and the remaining requirements of Basel III.

Consequently, one of the relevant issues in the computation of the LCR will be the data quality of the elements that will be necessary for the LCR calculation.

Information management, quality and the definition of the necessary information for the calculation of the LCR are critical for the ability of financial institutions in defining the components of the calculation, as well as for the effects of the self monitorization and support in the activities management and decisions that might cause changes in the LCR of financial institutions.

On the other side, we stress the fact that financial institutions must focus on keeping the integrity of the data used, i.e., reports must be based in reliable data and with a high degree of alignment to sources as the LCR will be accessible to everyone (we believe that in this situation, the discipline imposed by the market could help the financial institutions having a better management of liquidity risk).

Besides integrity levels, we believe that the completeness level is relevant since, in our opinion, financial institutions must report to supervising entities that must contain sufficient data to cover the enterprise-level position.

Fundamental information, probably defined by supervising entities will be the timeliness, more precisely the fact that reports must be generated on a regular basis following a formal (not ad hoc) schedule. Reports should be timely to the risks being run and demonstrate short generation timelines.

Additionally, we must refer that aligned with the timeliness, reports must also be flexible. Financial institutions must have the ability to produce reports on demand and in a flexible way, allowing users to assess emerging risk and facilitating timely decision making.

Finally, please note that the presented dissertation faced several potential errors regarding the sampling and methodology definition process. The first potential error identified lies in the collection and coding of information, which may cause some kind of bias in statistical analysis since the indicator used for purposes of this investigation suffered an adaptation in terms of their computation. The second potential error that can be pointed out is the inadequate coverage of the population (namely due to the selection

of the only 5 financial institutions). However, we believe that the present error becomes less important considering the level of market representation which is very high. Finally, the third potential error in the process is the lack of response of some statistical units in particular with regard to compliance of the 30 calendar days rule, from which one can infer the impossibility of obtaining inferences and conclusions about the elements of sample.

Given the above mentioned limitations, we believe that these matters could consist in a solid base for future investigations, such as: i) a future investigation regarding the LCR components in order to validate if those are the most feasible and if they express the banks liquidity risk in order to prevent future financial crisis, and ii) a future investigation, using the same methodology used in the present investigation but extending the sample, through the use of data from all Portuguese financial institutions.

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6. Annex - Tables

Table 1. Portuguese financial institutions – Amount of stock HQLA (components) as at 31.12.2012

Amounts in m Eur

Financial institutions	Assets			
	Cash and deposits at Central Banks	Loans and advances to credit institutions	Loans and advances to credit institutions	Financial assets held for trading
Banco BIC	74.895	50.518	13	59.727
Banco BPI	233.053	175.570	435.270	14.807.920
BPI	163	57.029	96.078	40.629
Millennium bcp	2.397.317	716.221	1.527.707	11.879.830
Activobank	247	34.612	0	1.972
BII	4	60.634	0	2.343
BIG	14.054	19.699	17.408	700.096
BES	626.558	275.887	1.851.506	9.007.032
Besi	1.067	23.522	840.486	339.974
BAC	3.781	18.333	0	18.639
Best	0	91.039	0	80.990
Finantia	16.547	4.114	90.728	742.113
Invest	4.835	4.761	73.356	211.911
Banif	168.268	78.556	1.097	3.817.234
Banif Inv	3.257	27.304	114.790	266.324
Banif Mais	144	1.186	3.897	84.725
CCCAM	433.900	79.338	87	2.130.280
Montepio	247.587	57.370	132.857	6.730.502
CGD	924.055	424.551	2.609.076	17.360.930
CBI	14.541	3.227	869.524	599.797
Finibanco	0	11.749	42.501	0
BBVA	43.061	37.731	91.876	27.324
Itaú	1.441	36.085	440.052	131.512
Popular	171.349	54.743	56.738	1.105.359
Sant Consumer	44	2.718	1.808	0
Santander Totta	352.236	333.759	2.332.457	5.102.777
BB	7.826	5.429	0	63.368
Barclays	117.693	166.686	2.293	879.956
BNP	1.756	79.210	0	230.600
BNP SS	0	1	0	0
Fortis	717	2.794	0	0
TOTAL	5.860.396	2.934.376	11.631.605	76.423.864
Source : Annual report and accounts Individual			TOTAL	96.850.241

Table 2. Portuguese financial institutions - Amount of total net cash outflows over the next 30 calendar days (components) as at 31.12.2012

Amounts in mEur

Liabilities			
Financial institutions	Deposits from credit institutions	Deposits from customers	Financial liabilities held for trading
Banco BIC	233.927	1	436.180
Banco BPI	4.270.918	338.753	5.861.452
BPI	0	26.863	40.088
Millennium bcp	12.126.784	1.255.155	5.997.462
Activobank	0	0	1
BII	0	3	8.905.269
BIG	260.248	1.016	6.480
BES	10.238.986	1.630.363	7.138.799
Besi	151.087	714.730	1.242.642
BAC	0	0	10.034
Best	0	27	18.190
Finantia	493.216	127.661	467.002
Invest	228.442	63	7.255
Banif	2.414.205	9.466	933.743
Banif Inv	334.818	101.871	268.961
Banif Mais	42.249	0	106.908
CCCAM	1.907.790	452	240.228
Montepio	1.776.514	984	1.125.074
CGD	7.057.438	2.296.505	6.045.877
CBI	216.717	899.787	752.338
Finibanco	0	0	0
BBVA	352.545	82.699	3.002.254
Itaú	0	435.298	625.901
Popular	1.605.143	40.181	1.423.759
Sant Consumer	348.343	0	534.311
Santander Totta	5.837.242	2.115.705	2.212.784
BB	0	0	532.693
Barclays	2.464.621	4.520	21.022.437
BNP	0	0	733.788
BNP SS	0	0	7.153
Fortis	0	0	574.118
TOTAL	52.361.233	10.082.103	70.273.181
Source: Annual report and accounts Individual		TOTAL	132.716.517

Table 3. Portuguese financial institutions – Percentage in the total stock HQLA (components) as at 31.12.2012

Financial institutions	Assets			
	Cash and deposits at Central Banks	Loans and advances to credit institutions	Loans and advances to credit institutions	Financial assets held for trading
Banco BIC	1%	2%	0%	0%
Banco BPI	4%	6%	4%	19%
BPI	0%	2%	1%	0%
Millennium bcp	41%	24%	13%	16%
Activobank	0%	1%	0%	0%
BII	0%	2%	0%	0%
BIG	0%	1%	0%	1%
BES	11%	9%	16%	12%
Besi	0%	1%	7%	0%
BAC	0%	1%	0%	0%
Best	0%	3%	0%	0%
Finantia	0%	0%	1%	1%
Invest	0%	0%	1%	0%
Banif	3%	3%	0%	5%
Banif Inv	0%	1%	1%	0%
Banif Mais	0%	0%	0%	0%
CCCAM	7%	3%	0%	3%
Montepio	4%	2%	1%	9%
CGD	16%	14%	22%	23%
CBI	0%	0%	7%	1%
Finibanco	0%	0%	0%	0%
BBVA	1%	1%	1%	0%
Itaú	0%	1%	4%	0%
Popular	3%	2%	0%	1%
Sant Consumer	0%	0%	0%	0%
Santander Totta	6%	11%	20%	7%
BB	0%	0%	0%	0%
Barclays	2%	6%	0%	1%
BNP	0%	3%	0%	0%
BNP SS	0%	0%	0%	0%
Fortis	0%	0%	0%	0%
TOTAL	100%	100%	100%	100%

Source : Annual report and accounts Individual

Table 4. Portuguese financial institutions - Percentage in the total net cash outflows over the next 30 calendar days (components) as at 31.12.2012

Financial institutions	Liabilities		
	Deposits from credit institutions	Deposits from customers	Financial liabilities held for trading
Banco BIC	0%	0%	1%
Banco BPI	8%	3%	8%
BPI	0%	0%	0%
Millennium bcp	23%	12%	9%
Activobank	0%	0%	0%
BII	0%	0%	13%
BIG	0%	0%	0%
BES	20%	16%	10%
Besi	0%	7%	2%
BAC	0%	0%	0%
Best	0%	0%	0%
Finantia	1%	1%	1%
Invest	0%	0%	0%
Banif	5%	0%	1%
Banif Inv	1%	1%	0%
Banif Mais	0%	0%	0%
CCCAM	4%	0%	0%
Montepio	3%	0%	2%
CGD	13%	23%	9%
CBI	0%	9%	1%
Finibanco	0%	0%	0%
BBVA	1%	1%	4%
Itaú	0%	4%	1%
Popular	3%	0%	2%
Sant Consumer	1%	0%	1%
Santander Totta	11%	21%	3%
BB	0%	0%	1%
Barclays	5%	0%	30%
BNP	0%	0%	1%
BNP SS	0%	0%	0%
Fortis	0%	0%	1%
TOTAL	100%	100%	100%

Source: Annual report and accounts Individual

Table 5. Financial institutions in scope – Percentage in the total stock HQLA (components) as at 31.12.2012

Assets				
Financial institutions	Cash and deposits at Central Banks	Loans and advances to credit institutions	Loans and advances to credit institutions	Financial assets held for trading
Banco BPI	4%	6%	4%	19%
Millennium bcp	41%	24%	13%	16%
BES	11%	9%	16%	12%
CGD	16%	14%	22%	23%
Santander Totta	6%	11%	20%	7%
SUB TOTAL	77%	66%	75%	76%
TOTAL - Average				76%

Table 6. Financial institutions in scope - Percentage in the total net cash outflows over the next 30 calendar days (components) as at 31.12.2012

Liabilities			
Financial institutions	Deposits from credit institutions	Deposits from customers	Financial liabilities held for trading
Banco BPI	8%	3%	8%
Millennium bcp	23%	12%	9%
BES	20%	16%	10%
CGD	13%	23%	9%
Santander Totta	11%	21%	3%
SUB TOTAL	75%	76%	39%
TOTAL - Average			56%

Table 7. Financial institutions in scope – Stock HQLA amount between 2005 and 2013

Amounts in mEur

HQLA STOCK						
Year	BPI	BCP	BES	CGD	S'IB	Total
2005	1.852.451	6.831.561	7.355.327	8.906.961	11.640.545	36.586.845
2006	3.108.880	9.164.332	8.830.595	10.949.353	3.644.541	35.697.701
2007	5.167.395	9.505.444	9.870.689	12.188.490	5.871.107	42.603.125
2008	4.040.601	12.575.914	12.187.101	11.607.624	9.724.056	50.135.296
2009	10.759.217	16.772.822	12.526.884	15.613.946	13.150.368	68.823.237
2010	10.166.918	22.114.201	14.923.059	22.633.757	15.819.048	85.656.983
2011	11.754.907	20.722.632	16.881.375	19.387.782	14.426.443	83.173.139
2012	15.651.813	16.521.075	11.760.983	21.318.612	8.121.229	73.373.712
2013	15.013.334	14.654.225	8.114.942	20.807.651	7.934.304	66.524.456

Source: Annual report and accounts Individual

Table 8. Financial institutions in scope - Total net cash outflows over the next 30 calendar days amount between 2005 and 2013

Amounts in mEur

TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS						
Year	BPI	BCP	BES	CGD	STB	Total
2005	5.276.352	26.580.109	14.391.869	9.967.208	12.835.852	69.051.390
2006	5.941.703	33.531.680	15.933.470	11.210.432	6.136.521	72.753.806
2007	6.374.213	31.600.903	16.167.274	15.517.329	10.243.980	79.903.699
2008	6.554.067	25.252.198	20.684.637	12.999.139	9.907.901	75.397.942
2009	12.279.446	24.355.052	18.184.105	16.424.229	15.914.168	87.157.001
2010	11.519.395	31.418.679	24.831.947	23.469.557	17.635.340	108.874.918
2011	10.150.248	27.767.171	24.575.398	24.117.056	11.805.222	98.415.094
2012	11.948.110	22.104.224	21.530.753	20.253.807	11.948.687	87.785.581
2013	8.112.560	17.325.765	15.775.963	11.789.012	12.308.591	65.311.891

Source: Annual report and accounts Individual

Table 9. Financial institutions in scope - LCR between 2005 and 2013

LCR RATIO							
Year	BPI	BCP	BES	CGD	STB	Average All	Average BCP BES and STB
2005	35%	26%	51%	89%	91%	53%	48%
2006	52%	27%	55%	98%	59%	49%	39%
2007	81%	30%	61%	79%	57%	53%	44%
2008	62%	50%	59%	89%	98%	66%	62%
2009	88%	69%	69%	95%	83%	79%	73%
2010	88%	70%	60%	96%	90%	79%	72%
2011	116%	75%	69%	80%	122%	85%	81%
2012	131%	75%	55%	105%	68%	84%	65%
2013	185%	85%	51%	177%	64%	102%	68%
Average	99%	54%	60%	98%	83%	N.A.	N.A.

Source: Own construction

Table 10. Financial institutions in scope – Stock of HQLA minimum in 31.12.2013

Amounts in mEur

HQLA STOCK						
Year	BPI	BCP	BES	CGD	STB	Total (a)
2013	15.013.334	14.654.225	8.114.942	20.807.651	7.934.304	66.524.456

Amounts in mEur

TOTAL NET CASH OUTFLOWS OVER THE NEXT 30 CALENDAR DAYS						
Year	BPI	BCP	BES	CGD	STB	Total (b)
2013	8.112.560	17.325.765	15.775.963	11.789.012	12.308.591	65.311.891

Average All	102%	(c) = (a) / (b)
LCR minimun	60%	(d)
HQLA stock minimun	39.187.135	(a) / (d) x (c)