‘An assessment of asset and liquidity quality as indicators of performance within the European banking sector’

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Abstract

Almost a decade after the initial impact of the 2008 financial crisis, questions remain regarding the fundamentals of the European banking sector. This study investigates the relationship between asset quality and liquidity, and their impact on European bank performance. A longitudinal analysis is conducted using a number of financial ratios for the time period of 2009 to 2013. A non parametric method (Kruskal-Wallis H test) is employed in order to measure the impairment, liquidity and profitability of six hundred and twenty six banks against a European Central Bank benchmark. The results find statistically significant evidence to suggest that the impairment level is affecting the performance in the larger asset banks. However, the liquidity level appears to affect the larger asset class only when subject to external market factors such as a low net interest environment. When combining both poor asset and liquidity quality, the findings suggest that the larger asset banks are more affected by impairment quality and can absorb a poorer liquidity result provided normal market conditions prevail. The impact of impairment quality appears to differ when assessing the non large banks. These banks show a capacity to absorb bad debt losses, despite a growing percentage of impairment. This was an unexpected finding and indicates the relationship between performance and impairment differs, dependent on asset size. This also suggests that impairment as an indicator of performance is subject to certain *caveats*. Liquidity quality appears to impact the non large banks in a manner comparable to the large banks. This would suggest that the non large asset class can also absorb a combination of both poor impairment and liquidity results under normal market conditions. The empirical evidence presented can be used as a benchmark and a basis for further investigation into the factors that impact on European bank performance.

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List of Abbreviations

AQR - Asset Quality Review

AR - Action Research

CEE - Central Eastern European

EBA - European Banking Authority

EEA - European Economic Area

EVA - Economic Value Added

IFRS - International Financial Reporting Standards

MM - Modigliani and Miller

NFSR - Net Stable Funding Requirement

NM - Net Interest Margin

NPL - Non Performing Loan

OBS - Off Balance Sheet

RAQ - Risk Assessment Questionnaire

RoA - Return on Assets

RoE - Return on Equity

SHVR - Shareholder Value Ratio

SMEs - Small and Medium Size Enterprises

SPSS - Statistical Package for the Social Sciences

SSM - Single Supervisory Mechanism

UFIRS - Uniform Financial Institutions Rating Syste

I. Introduction

'A robust asset quality review (AQR) will be crucial to restoring the confidence in the European banking sector that was lost during the financial crisis'.

(Moody's, 2014).

'Bank capital, and a bank's liquidity position, are concepts that are central to understanding what banks do, the risks they take and how best those risks should be mitigated'.

(Farag, Harland and Nixon, 2013 p.201).

Bank performance is based on the effective management of two areas: the loan book (its main asset) and the volume of available deposits (the immediate liquidity accessible to fund this lending).

It has been proposed that the basic function of a bank is to collect deposits from savers and extend loans to investors and that lending and funding activities comprise the core of every commercial bank (Guru, Staunton and Balashanmugam, 2002; Mercan et al. 2003). In essence, banks rely on two key items to return a profit: the quantity and quality of lending extended and the volume and availability of deposits to fund this lending (Wall, 1983; Hassan and Bashir, 2003).

The purpose of this study is to provide insights into factors that impact on European bank performance. It is intended that this will assist key stakeholders (including analysts, investors, senior management and credit agencies) in making more informed decisions regarding the performance of European banks. Specifically this will be achieved by presenting empirical evidence on European bank asset quality and liquidity and their impact on performance.

To describe the current European banking climate as challenging would be an understatement (Wehinger, 2012). In recent times, the regulatory and operational environment has become increasingly demanding and complex. It has been claimed that the origins of the Euro crisis were, in fact, embedded in a transatlantic banking crisis (Welfens, 2011). Since it operates in a global environment, Vallascas and Keasey (2013) note that the European banking system is vulnerable not only to local but also to international shocks.

Irrespective of its source, the impact on Europe was unprecedented, exposing both systematic and banking fragilities. In order to mitigate any risk of contagion, the stability of banking system fundamentals and performance is of paramount importance. When evaluating bank performance, the main factors to be considered are: the quality of both assets and liabilities, paying particular attention to the loan book and deposit base (Moodys, 2014; Farag et al. 2013).

Asset quality has been recognized to be of fundamental importance, from studies performed on Eastern and Central European banking systems (Škarica, 2014), to research within the Indian banking system (Bandyopadhyay and Ganguly, 2012). Although Škarica concentrates on loan impairment and Bandyopadhyay and Ganguly review the total asset portfolio, both note the possibility of an association between asset quality and default with the resultant impact on performance.

The importance of liquidity quality has also been the focus of previous research. When analyzing the Australian banking system, Hawtrey (2009) maintains that a sound liquid position provided resilience during the crisis. The importance of sufficient liquidity has also been highlighted in an examination of the South African banking system (Claassen and Rooynene, 2012) and further echoed by Mehta (2012) when analyzing the UAE banking sector. All studies give credence to the comfort a liquidity buffer can offer. In essence, both asset and liquidity quality are seen as indicators of performance and stability in the global banking industry and therefore the significance of their interaction should not be ignored (Brunnermeier, 2009).

While previous studies agree that there is a significant relationship between deposits, loans and the performance of banks (Dezfouli, Hasanzadeh, and Shahchera, 2014; Song and Thakor, 2007), the question remains as to the volume of credit that should be extended and the quantity of funding that should be kept on reserve. Identifying the optimal mix of risk and performance is vital to the survival and stability of individual banks and the financial sector in Europe and throughout the world. Mester (1996) concludes that a bank can have high levels of profits; however, this performance can be borne from excessive and risky lending, whereas Ezeoha (2011) contends that a conservative lending policy, i.e. a large underutilized liquid deposit base, can also prove suboptimal due to resultant lower profits.

From the preliminary examination of literature and industry reports, there appears to be three significant gaps. Although numerous studies of bank asset and liquidity quality have been

performed on a country wide basis, there appears to be limited literature in regards to a more regional focus. From an industry standpoint, the European Central Bank provides a comprehensive analysis of systematically important banks on a semiannual basis. This report, while providing useful benchmarks focuses mainly on asset size (ECB, 2014). Furthermore the sample that provides the basis for its analysis is limited to fifty seven banks. When concluding his evaluation of the Greek banking system, Pasiouras (2008) indicated that limited attention had been paid to the analysis of domestic and foreign banks operating within Europe and as such future research could investigate this.

This study attempts to address all three gaps through the analysis of six hundred and twenty six peer banks across the European banking system. The study will conduct a longitudinal analysis based on five years of data. In order to provide both breadth and depth the sample pool will be selected from approximately twenty different banking systems within Europe. The research focuses on both domestic and foreign banks operational in Europe taking in the suggestion of extending the existing literature. This study will examine the bank asset and liquidity quality of the sample banks, benchmarking the results against the performance metrics provided by the European Central Bank.

As a focus for this study, the specific main objectives are to investigate the relationships between bank performance and:

i) Asset quality;

ii) Liquidity; and

iii) The combination of asset quality and liquidity.

The remainder of this study shall be structured as follows:

Section II will present a current literature review. This will focus particularly on the importance of asset, liquidity and performance quality but will also contain an in depth review of significant associated factors. Section III will explain the methodology and approach taken in this study. This section will discuss the data sample and explain the statistical model employed. Section IV will combine an in-depth analysis and discussion of current trends and key performance indicators in relation to asset quality, liquidity and performance. This section will also present and evaluate the results of the specific research objectives. The conclusion, limitations and recommendations associated with this study shall be discussed in section V.

II. Literature Review

> *'…the banks can and do, create money. And they who control the credit of a nation direct the policy of Governments and hold in the hollow of their hands the destiny of the people'.*
>
> *(McKenna, 1925).*

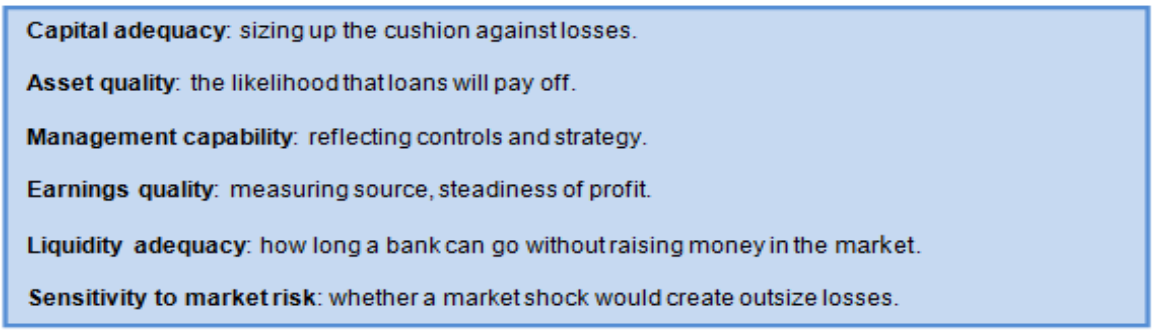
II.i Introduction to Literature Review

The European Banking System is of fundamental systematic importance. Bank performance has a significant impact on national stability (McKenna, 1925; Moodys, 2014). Therefore a good quality of financial performance and information is vital. Early predictors and warning signs of a decline in financial performance are becoming ever more significant. Repeatedly, the question arises as to how to define a bank's financial position.

Thalassinos and Liapis (2011) consider both corporate financial reporting and risk management procedures as integral to measuring a bank's financial performance. Sharma (2014) argues that a bank's performance be measured though a combination of financial and human aspects. The majority of research, however, approaches the examination of financial performance primarily through an evaluation of both financial and operational criteria (Moore & Wayne, 2011).

Figure 1

CAMELS System: Explanation of the CAMELS framework. Information available from the Wall Street Journal.



In order to define performance certain empirical studies conducted on the banking sector place emphasis on one or more factors of the CAMEL rating system (Najjar, 2013; Adesina, 2012). This structure has its origins in the "Uniform Financial Institutions Rating System" (UFIRS), brought into place by US regulators and the Federal Reserve in 1979 (Federal Reserve, 1996). Recent literature appraising one or more of the CAMEL factors include Fayed (2013) and Adesina (2012). Fayed examined the Egyptian banking system concluding that management capability could be improved, whereas Adesina combined earnings quality and capital adequacy in order to rank Nigerian bank performance. Both studies credit the CAMEL measures as providing both breadth and depth to an analysis. This study will specifically measure the asset quality, earnings quality and liquidity adequacy of the European banking sector.

Najjar (2013) cites the importance of financial ratios in analyzing current trends toward decline. He places particular emphasis on the significance of ratios in assessing a firm's financial performance and/or predicting impending bankruptcy. Halkos and Salamouris (2004) suggest that certain studies measure bank performance though an observation of change in earnings based financial ratios. They propose two of the key ratios to include Return on Assets (RoA) and Return on Equity (RoE). This study will mirror such research by making use of three particular financial ratios to investigate the asset, liquidity and the profitability quality of the European banking sector. The study intends to measure overall bank performance through the Return on Equity.

II.ii Specific bank measurements, frameworks and the importance of asset and liquidity quality on profitability

Focusing on specific measures of evaluation, empirical studies consider the analysis of the Balance Sheet and Income Statement as integral when evaluating bank results (Chiorazzo et al. 2008; Oberholzer et al. 2010). Recent empirical research of the UAE banking sector made use of and analysed both the Balance Sheet and Income Statement as a means of calculating banks' financial performance (Mehta, 2012). The majority of empirical studies are based on analysis of both the Balance Sheet and Income Statement (Haneef et al. 2012). Oberholzer proposes that although the Income Statement and Balance Sheet performances tend to be related, there is evidence of a significant gap between firms' performance according to these measurements (Oberholzer, 2013). Therefore, it is of vital importance to analyze both sets of statements in order to fully understand a bank's performance. Significant indicators of a bank's performance can be measured through the metrics of asset and liquidity quality contained in the Balance Sheet. These results in turn impact the profitability which can be analyzed through the Income Statement. The question is how much pressure do these indicators exert on profitability?

Both industry and literature place fundamental importance on the asset and liquidity quality of banks. From an industry perspective, Moody's propose their rating methodology to focus on "the bank's asset quality, its capital adequacy and strength of earnings, the appropriateness of its funding structure and its access to liquid assets" (Moody's, 2014). Standard and Poor second this framework suggesting bank specific factors to include, risk positioning, capital and earnings, and liquidity and funding (Standard and Poor, 2011). From a literary perspective, many articles have been written mirroring the importance of such measures (Ezeoha, 2011; Olson and Zoubi, 2008).

Empirical research performed on the fragility of the Zimbabwean banking sector during the recent crisis indicates that liquidity was one of two main causes of bank financial distress (Nkomo et al. 2013). When analyzing the Australian banking system, Hawtrey (2009) maintains that a sound liquid position provided resilience during the crisis. Equally, research conducted on the Pakistani banking system argues that deteriorating asset quality has an impact on overall profitability (Haneef et al. 2012). This is seconded by Škarica (2014), when analysing the banking systems of Central and Eastern European countries. Bodla and Verma

(2006) in turn discuss the impact that both asset and liquidity quality can have on the overall profitability of the bank. Varying opinions exist as to whether asset, liquidity or the combination of both factors impact bank performance.

There is a gap in the literature to suggest that further empirical research be attained in regard to asset and liquidity quality and its impact on profitability though a more regional focus of systematically important European financial institutions. In order to measure whether either indicator suggests a more dominant effect on the bank's profitability, the performance will be evaluated through three distinct ratios.

II.iii The banking sector- indicators of asset quality, liquidity, profitability and codependence

Asset Quality:

In the current climate, the asset quality of the European banking system is under severe scrutiny. From an industry perspective, merely look to the market to grasp a concept of the gravity of a bank's asset quality. To quote Moody's rating agency, "A robust Asset Quality Review (AQR) will be crucial to restoring confidence in the European banking sector that was lost during the financial crisis" (Moody's, 2014). Moore and Wayne support this considering the characteristics of an individual bank's asset portfolio to have a formal impact on institutional performance (Moore and Wayne, 2011).

But what defines asset quality? Asset quality, as it states, is the quality and structure of a bank's assets. One important factor when determining asset quality is its core, the loan book. This study notes the loan book as a bank's primary source of "income". Hence, when analyzing asset quality, the non-performing loan book or NPL is of significant importance. The literature provides contemporary examples which concentrate on the performance of the loan book and NPL. Recent research conducted on the Nigerian banking system focused on non-performing loans as a dependent variable in ascertaining the quality of bank assets (Ezeoha, 2011). Milenković, Pjanić and Andrašić (2013) deliberate this further, citing the NPL as a valid measure in determining asset quality. As a bank's core source of revenue, it could be assumed that the higher the volume of lending the better. However, this is not necessarily

true, reckless lending can lead to impairment which in turn can impact the profitability (Adewale, 2014). However, a conservative lending policy, meaning that a large liquid deposit base remains untouched, can also prove suboptimal (Ezeoha, 2011).

Liquidity:

"The market turmoil that began in mid-2007 re-emphasized the importance of liquidity to the functioning of financial markets and the banking sector" (Préfontaine, Desrochers and Godbout, 2010 p.65). "Bank capital, and a bank's liquidity position, are concepts that are central to understanding what banks do, the risks they take and how best those risks should be mitigated" (Farag, Harland and Nixon 2013, p.201). In order to explain the concept of liquidity and its uses: commercial banks, as financial institutions, take funds in the form of deposits from the public. These deposits provide financing to the demanders of funds in the form of lending (Al-Khouri, 2012). There has been a myriad of studies performed on the importance of liquidity, the significance of which is indisputable (Kao et al. 2012; Hawtrey, 2009). However, it is the interaction between asset quality and liquidity that is the key to profitability. For a bank, its liquidity base can be equated to its core liability. The liquidity base, a more cost effective method of funding, essentially allows the bank to "sell" its main product. A sufficient liquid base and adequate capital allows a bank to refrain from turning to the market for substantial amounts of borrowings. In determining commercial banks' profitability, Demirgüç-Kunt and Huizinga (1999) indicate that well-capitalized banks are more profitable. This is attained through the limitation of borrowing costs, as significant amounts of financing can damage profitability (Demirgüç-Kunt and Huizinga, 1999).

The liquidity for the loan book is sourced primarily from the customer deposit base. However, this is quite the paradox as the higher the deposit base, the cheaper the available funding. On the other hand, a high volume of deposits merely "sitting" on the balance sheet, presenting an opportunity cost, is also not optimal (Khawaja, 2011). A credit agency will upgrade a bank's rating on sound deposit base, yet in the same breath downgrade the bank on a poor earnings capacity. This poor earnings quality can be due to a conservative approach when using that deposit base for liquidity. Where is the equilibrium? For in any form of business, with banking being no exception, it's all about the bottom line.

Profitability:

A recent study of both Islamic and conventional banking suggests that conventional banks are guided by profit maximization (Olson and Zoubi, 2008). As the sample in this study comprises of conventional banks, profitability is a key metric. Bank profitability itself can be measured though a number of ratios. Derbali (2011) notes that accounting-based studies of bank performance commonly use comprehensive data from financial statements in order to identify the indicators of bank profitability. He further indicates these as measured by RoA, RoE or Net Interest Margin (NiM). This research study proposes to use the RoE as the primary measure of performance. This will then be measured against a grading framework provided by the European Banking Authority. It must be acknowledged that the RoE is not the sole option of measurement and has its critics. According to Jenkins (2011) banks should look beyond RoE. However, in appraising the ratio, Jenkins also admits that "Still today, most banks around the world use return on equity - RoE- as their main metric of profitability," (Jenkins, 2011, para.3). This ratio was selected as it has been widely employed in existing studies (Wiyono and Rahmayuni, 2012; Almazari, 2014) and is used extensively in the current industry.

Regarding asset and liquidity quality, how does either indicator affect profitability? A recent paper on the Iranian banking system in 2014 proposes "there is a significant relationship between the volume of deposits, liquidity reserves, liquidity gap, saving the deferred loans, and profitability of banks" (Dezfouli, Hasanzadeh, and Shahchera, 2014, p.192). The main question is as to the strength of each relationship.

II.iv The interaction of asset, liquidity and profitability quality and the measurements of performance

After critiquing the significance of asset, liquidity and profitability quality individually, the interaction and impact of deterioration that these factors can have on a bank's overall performance must be examined. Although Kao et al. (2012) opine that a bank can still default when the quality of the fundamentals are high, they acknowledge however that the fundamentals in question can and do enhance the quality of each other. Wall (1983)

concludes that a bank's asset and liability management, its funding management and the non-interest cost controls can all have a significant effect on the profitability record.

With reference to the financial crisis, the deterioration of debt market liquidity caused severe financing difficulties for banks (Brunnermeier, 2009; Krishnamurthy, 2009). This in turn exacerbated the fundamentals of bank assets. In order to effectively measure asset and liquidity quality, this study proposes to analyze the loan book and deposit base, as combined, both elements comprise the basic function of a bank (Mercan et al. 2003). Guru, Staunton and Balashanmugam, (2002) surmise that both areas directly affect performance and profitability. He further contends that bank efficiency or performance can be measured through its ability to generate revenue (the loan book) and control costs (deposit base for funding).

Hassan and Bashir (2003) propose the quality of financial institutions' loan portfolios to be closely related to the financial soundness and profitability of the particular institution. The quality of the loan book directly impacts performance through impairment charges which appear as a cost on the Income Statement, the Income Statement being the primary measure of performance. When evaluating deposits as liquidity indicators, the main concern is the ability to generate funding and associated costs that may impact profitability. Hassan further explores liquidity in the Islamic banking system, suggesting that high interbank lending indicates more risk. A high borrowing rate will reflect directly upon the Income Statement as an interest cost, thus damaging the profitability and performance. In the words of Song and Thakor (2007 p.2129) "Banks will wish to match the highest value-added liabilities with the highest value-added loans and that doing so simultaneously minimizes the bank's fragility".

II.v Recent significant banking policies and bank size

"The on-going reform of the Basel Accord relies on three "pillars": capital adequacy requirements, supervisory review and market discipline. Yet, the articulation between these three instruments is far from being clear" (Decamps, Rochet and Roger, 2003 p.1).

Some of the more significant impacts on global banking have originated from the Basel committee. The committee itself was established in 1974 in response to the financial market

turmoil caused by the Bretton Woods breakdown (Bank for International Settlements, 2014) The monetary breakdown which ensued, caused large foreign currency losses, particularly in the banking industry (Bank for International Settlements, 2014). The Basel framework has been released and enhanced three times.

The Basel framework can be identified through three pillars which find their origins in the aforementioned Bretton Woods system of currency exchange. The first framework, referred to as the "Basel Capital Accord" focused primarily on bank capital (own funding). This was fueled by occurrences such as the Latin debt crisis which heightened concerns of insufficient banking capital. It was released to banks in 1988 (Bank for International Settlements, 2014). The 1988 Basel Accord called for a minimum capital ratio of capital to risk-weighted assets of 8% to be implemented by the end of 1992. Criticized as being too crude (Jones, 2000), the Committee issued a proposal for a new capital adequacy framework in June 1999 in order to replace the 1988 Basel Accord (Bank for International Settlements, 2014). Basel II: the "New Capital Framework" was released in 2004.

The Basel II framework sought to improve the original Basel directive. Although the framework maintained a core focus on sufficient capital, one important difference was that each individual bank had the ability to calculate its own risk weighted assets. Hence the bank could set minimum capital accordingly. "In this approach, institutions will be allowed to use their own internal measures for key drivers of credit risk as primary inputs to the capital calculation, subject to meeting certain conditions and to explicit supervisory approval" (Basel Committee on Banking Supervision, 2005 p.1).

Basel II has had several ramifications on both bank liquidity and asset quality (Jones, 2000) including, but not limited to, curtailment of the loan book. Jones opines that as the loan book itself constitutes a "risky asset", a limitation of risky lending could lead to a better capital ratio but could also result in an inferior performance (Jones, 2000). Recent literature contends that of the three pillars, "supervisory review" and "market discipline" can enhance bank performance, however "capital requirements" can have a negative effect on bank profit efficiency i.e. performance (Pasiouras, Tanna and Zopounidis, 2009). One effect of such a restriction could be the potential interference with interest earnings and as such performance. The reviews remain mixed.

Size:

The most recent Basel enhancement, “Basel III”, coincided with the Lehman brothers collapse and focused on the ideal that banks entered the financial crisis with insufficient liquidity, poor governance and poor risk management policies. Basel III focuses mainly on credit and liquidity risk. The approach tackles liquidity through the increase in common equity. It also interestingly attempts to push a “countercyclical” liquidity approach on the banking system; in times of credit boom, avoid excessive lending. This can be likened to Keynesian economics and fiscal governance policies. Although released in 2013, it will not be fully implemented until 2018. While the policy is noted for moving in the right direction, Basel III also faces the common criticisms associated with a “one size fits all” policy (Repullo and Suarez, 2013).

Research presented on banking has analyzed data from the standpoint of asset size among other factors. In particular, certain studies have opted to divide assets into large, medium and/or small size subsets, or to make a distinction through other means such as ownership (Halkos and Salamouris, 2004; Mercan et al. 2003). Bank size has always been distinguished in markets, albeit categorized differently. In Europe, the ECB and the Single Supervisory Mechanism (SSM) which entered into force as of November 2014, differentiate between bank size and supervision (ECB, 2014). There are two classes of banks considered. The first being “significant”. Banks with assets in excess of 30 Billion Euro, or anything over 5 Billion, (if the institution exceeds 20% of GDP) are deemed “significant”. The remainder are classified in general as “less significant” (ECB, 2014). That being stated, various other criterions can be applicable dependent on the bank in question. The “significant” institutions are directly supervised by the ECB and therefore potentially more strictly regulated.

However, while this study acknowledges the SSM’s new categorization system, it seems unclear as to whether this division is truly based on bank asset size or more focused on the national systematic importance of the bank in question. The U.S. Federal Reserve however, classify a “large commercial bank” as a bank with assets of 300 Million dollars or more (Federal Reserve, 2014). For the purposes of this dissertation banks will be analyzed in full and then divided into two sub asset classes, mirroring the Federal Reserve classifications.

II.vi International Financial Report Standards and the significance of financial statements within research and performance evaluation

Financial statements as regulated through IFRS, provide information to a wide range of stakeholders (Fifield et al. 2011). In 2002, the European Union adopted IFRS as the required financial reporting standards for the consolidated financial statements of all European companies whose debt or equity securities trade in a regulated market in Europe. This became effective in 2005 (IFRS, 2013). In essence, the harmonization of financial statements allowed for a "common financial reporting language" within Europe (Moqbel, Charoensukmongkol and Bakay, 2013).

Agostino, Drago and Silipo (2011) postulate that the introduction of the new accounting standards has enhanced the information content of both earnings and book value for the more transparent intermediaries. They continue by citing large banks as a good example of transparent entities. Jindřichovská and Kubíčková (2014) however, are of the opinion that although the values of key financial ratios have been impacted by the transition to IFRS, it is difficult to prove that such differences have been statistically significant. Although sentiments differ as to whether the introduction of such standards has had a significant impact on financial performance indicators, it is generally agreed that conversion to IFRS has at least improved the quality of information. This has been primarily driven through the enhancement of comparability (Zeghal, Chtourou and Fourati, 2012). These standards allow for a clean and more simplistic mode of comparison and analysis within the European banking system.

In relation to this particular study, the direct comparability provided by the IFRS system ensures a reputable and reliable measure of cross-institutional evaluation. It allows for an "even playing field." Financial statements are fundamental to all stakeholders in order to ascertain bank performance. "For credit risk assessment, and therefore also for the evaluation of the total bank risk, the investors use available audited financial statements of the relevant banks" (Milenković, Pjanić and Andrašić, 2013 p.1083). These stakeholders include but are not limited to analysts within the global banking industry and credit agencies which make use of key reported figures in order to assign a bank rating and methodology.

II.vii Existing Literature and classical theories

Classical theories in relation to the microeconomics of banking are of the view that both credit and liquidity risk are closely related (Samuelson, 1958; Bryant, 1980). One such work is that of Samuelson (1958) and the “pure consumption-loans” model. The model pursues loan consumption and interest rates, perceiving the ideal that people live two periods. The periods are defined as “earning” and “non-earning”. The seminal work of Bryant (1980) builds a more complex measurement based on Samuelson’s model. Bryant (1980) argues that the structure of bank asset and liabilities are deemed connected, particularly regarding bank default and fund withdrawals. Bryant analyzes Samuelson’s principle of concern, which lies in the mismatch of liquidity and potential bank runs, and pays particular attention to liquidity risk. The seminal work of Diamond and Dybvig (1983) argues that an important function of banks is to create liquidity; to offer deposits that are more liquid than the assets that they hold. In stating the importance of the liquidity function, they also explore the risk of bank runs and liquidity mismatch. In a simplification of the former model, Diamond (2007) puts forward the argument that although the creation of liquidity can serve a bank well, if investor confidence is lost, severe damage can be caused. In essence both Bryant and Diamond and Dybvig allude to the same typology of risk, the mismatch of liquidity.

Diamond (1984) also acknowledges a further function of financial institutions which is to monitor borrowers and enforce loan covenants. In arguing the interconnectedness of credit and liquidity risks, Diamond (2007) states that the reason for creation of liquid assets, i.e. demand deposits, stems from the demand for liquid assets, i.e. loans. In terms of credit risk, there are numerous articles articulating the importance of loan quality. Earlier works such as Altman and Saunders (1997) propose that loan losses endanger the very existence of the lending institution. Altman concentrates more on the probability of default and the connection of credit risk. He does argue, however, that the “risk of ruin” model, i.e. bankruptcy stems from the market liquidation value of a firm’s assets falling below its external debt obligations. This furthers the argument that asset and liability structure are somewhat codependent.

II.viii Recent Literature and the incorporation of ratios

Table 1

A glossary of ratios discussed in the literature review and selected for this research

Variable Name	Unit	Description		Article
Liquidity risk	%	Cat fat / total assets		Relationship between liquidity risk and credit risk in banks (Imbierowicz, B. and Rauch, C, 2014)
Capital ratio	%	Total (tier 1 and tier 2) equity divided by total assets reported on balance sheet		
Efficiency ratio	%	Operating expenses as reported on the profit and loss / by total revenues as reported on the profit and loss		
Return on assets	%	Net income as reported on profit and loss / by total assets reported on balance sheet		
Credit risk	%	Loan charge offs- loan recoveries / loan loss allowance		
Total assets	USD	Total assets as reported on balance sheet		
Non-performing loans		Non-performing loans/gross loans		Efficiencey and Risk in European banking (Fiordelisi, F., Marques-Ibanez, D. and Molyneux, P. 2011)
Capital ratio	%	Equity / total assets		The impact of bank ownership concentration on impaired loans and capital adequacey (Shehzad, C. T., de Haan, J. and Scholtens, B. 2010)
Impaired loans/gross loans	%	Impaired loans * 100 / loans + loan loss reserves		
Cost : income	%	Overheads *100 /other operating income + net interest revenue		
Capital ratio	%	Equity / total assets		The good & bad news about the new liquidity rules of Base 111 (Western European countries (Dietrich, A., Hess, K. and Wanzenried, G. 2014)
Return on assets	%	Net profit / average total assets		
Return on equity	%	Net profit / average total equity		
Loan loss ratio	%	Period loan loss provisions / total loans		
Net interest margin	%	Net interest margin defined as net interest income / by total average assets		
Funding cost	%	Interest expense / average total deposts		
Shareholder value ratio	%	SHVR is the ratio between the economic value added "EVA" and the capital invested in a bank		Economic value, competition and financial distress in the European banking system (Cipollini and Fiordelisi, 2012)
Credit risk	%	Annual ratio of loan loss provisions / total loans		
Liquidity reserves	%	Liquid assets / total assets ratio		
Total assets	%	Total assets as reported on balance sheet		
Capital ratio	%	Equity / total assets		
Asset Quality			Common symbols	
Loan loss reserves /gross Loans	%	Loan loss reserves *100 / loans + loan loss reserves	LLR	Available on bankscope
Impaired loans / equity	%	Impaired loans *100 / equity	IE	Available on bankscope
Impaired loans/gross loans	%	Impaired loans* 100 / loans + loan loss reserves	CR	Using
Profitability Quality				
Net Interest revenue /total assets	%	Net Interest ratio*100 / total assets	NIR	Available on bankscope
Cost / income	%	Overheads*100 / other operating income + net interest revenue	CI	Available on bankscope
Return on equity	%	Net Income *100 / equity	RoE	Using
Capital ratio	%	Equity / total assets	CI	Available on bankscope
Liquidity Quality				
Liquid assets /deposits and borrowing	%	Liquid assets * 100 / deposits and short term funding + other interest bearing liabilities - hybrid capital + subordinated debt	LIA	Available on bankscope
Loans /Customer deposits	%	Gross Loans / total customer deposits * 100	LD	Using
Total assets	USD	Total assets as reported on balance sheet	TA	Using

Table one illustrates the components of the ratios that will be discussed in the next section. The first five sets of ratios have been used in existing studies and the final section contains the ratios used in this study. The ratios for this study have been divided as applicable to

asset, liquidity and profitability. Alternate ratios have also been noted. However, the particular ratios selected for this study mirror the approach of the ECB (ECB, 2014).

A recent study referred to in Table one investigates the relationship between two factors associated with bank default: liquidity risk and credit risk (Imbierowicz and Rauch, 2014). The results do not show a meaningful reciprocal relationship between these two risk categories. Imbierowicz and Rauch contend however, that both sources can and do influence the probability of bank default. Their research takes credit, liquidity risk and bank stability into account through the use of financial ratios. Imbierowicz and Rauch consider liquidity risk through ratios such as Berger and Bowman's (2009) "Cat fat/total assets". The Berger and Bowman measure represents a bank's total liquidity creation. It shows the US dollar denominated amount of liquidity a bank creates for the economy. Liquid items held by the bank are therefore labelled illiquid as the banks extract liquidity from the economy. The idea is that banks provide depositors with availability of their deposits and contemporaneously use deposited money to grant loans. The Cat fat measure (also including OBS or off balance sheet liquidity creation), as used by Imbierowicz and Rauch, has been taken from publicly available data. The measure is standardized by total assets. They further measure credit risk through a ratio of "loan charge offs". In order to assess stability and performance, Imbierowicz and Rauch use ratios such as the "efficiency ratio" (also known as "cost to income"). The efficiency ratio has been used in many studies and provides a comprehensive insight into bank performance.

A recent paper concentrating on the Basel III requirements researches the implications for banks. The study notes that banks should become more "liquidity-efficient" but also implies that this efficiency can have a negative impact on performance (Dietrich, Hess and Wanzenried, 2014). The paper builds from existing literature in regard to funding risk and the danger of bank runs (Diamond and Dybvig, 1983). The research also notes the peak build-up of abnormal liquidity preceding the US banking crisis (Berger and Bouwman, 2009). This further strengthens the argument of funding risk. In terms of performance, it was argued that the higher the reliance on non-deposit wholesale funding, the lower the RoA (Demirgüç-Kunt and Huizinga, 2010). Dietrich, Hess and Wanzenried, (2014) continue to explore the implications of funding risk and RoA through an increased Net Stable Funding Requirement (NSFR). Gathering data from Bankscope, the NSFR is calculated through ratios such as the "capital ratio" and the "funding cost ratio". The stability of the bank is measured through

metrics such as RoA, RoE and NiM. The paper concludes that although an increase in NSFR will strongly affect a number of Western European banks, having a low NSFR may not in fact negatively affect profitability. The research found that although lower liquidity levels did not affect performance in the past, increased liquidity may challenge future performance due to limitations.

Dietrich, Hess and Wanzenried (2014) observe credit risk though the use of the "loan loss ratio". Loan loss provisions are a key component of this ratio. Further studies in regard to bank financial distress also measure credit risk through the ratio of "loan loss provisions" (Fiordelisi, Marques-Ibanez. and Molyneux, 2011; Cipollini and Fiordelisi 2012). In this research, the "loan loss provisions" ratio was used in examining the impact that liquidity, credit, bank size, income, market power, macroeconomic situations and banking concentration have on bank financial distress.

The measure of financial distress is also based on bank performance and analyzed via the Shareholder Value Ratio (SHVR). The SHVR is calculated as the ratio between the Economic Value Added (EVA) and the capital invested in the bank. Cipollini and Fiordelisi cite this measure of performance as more practitioner focused than alternatives such as Altman's Z score. The conclusion interestingly finds that an increase in liquid assets does not directly mean a corresponding improvement in bank performance. A small volume of liquid assets can, however, increase the probability of observing a distressed SHVR. Findings in all models focusing on credit risk, however, show an increased probability of observing a distressed SHVR. Taking another focus, Shehzad, Haan and Scholtens, (2010) examine two indicators of bank riskiness: loan impairment and capital adequacy. Selecting a sample of banks from Bankscope, the study employs the aforementioned total capital ratio. In this case, the study measures poor loans through the impaired loan ratio as per this study. It also analyses the "cost to income" or ("efficiency ratio") as measured through Bankscope data.

II.ix Performance, bank stability and the Return on Equity in this study

This study uses available data from the Bankscope database. Although the efficiency ratio is obtainable, it is limited in that it does not include the figure for impairment charges when calculating total cost. It is therefore deemed of lesser value to the particular objective presented. In the writer's experience, including the cost of impairment is integral when measuring the actual performance. As impairment remains a legacy issue of the financial crisis, its impact still weighs significantly on profitability (Bailie, 2015).

The RoE will be employed as the measure of performance. This ratio accounts for the cost of impairment and can be applied to all business models and organizational types (Chen, 2013). For example, Dess and Robinson (1984) have noted that this ratio has been extensively used to measure business performance and the effectiveness of organizational strategy. More recent examples include research into financial risk and its impact on shareholders' wealth as measured through RoE (Fathi, Zaire and Esfahani, 2012). A more diverse perspective in Pakistan researches the association that RoE presents in conjunction with inflation growth (Ghafoor et al. 2014). This is not to say that RoE is all encompassing. Every ratio is limited and one critic cites the measure of RoE as a popular yet flawed measure of corporate performance (De Wet and Du Toit, 2007).

Chapter III. Methodology

This study uses an Action Research (AR) methodology. AR aims to deal with practical problems and to contribute to the theoretical body of knowledge on the chosen topic (Lewin, 1948; Rapoport, 1970). The practical issue addressed in this study is the need for assessment of the impact of asset quality and liquidity on European bank performance. The selection of this topic for investigation was influenced by this writer's work experience and perceived need to improve bank credit analysis.

However, because of this close involvement by the researcher with the data and the associated value laden preconceptions, combined with its emphasis on practical issues, AR has been accused of lacking in scientific rigor (Dickens and Watkins, 1999). Such criticism is usually leveled at AR by writers that advocate a positivistic approach to research (Susman and Evered, 1978). The introduction of positivism to the social sciences has been credited to the French philosopher August Compte and has its origins in a nineteenth century approach to science assuming value free data and methods (Hjørland, 2005). This assumption is incorrect as evidenced by the remarks of Watts and Zimmerman (1990, p.146) who were advocates of positivism applied to accounting theory but who stated "we concede scientific findings cannot be value free." Further evidence that values must infiltrate all data can be seen from consideration of the data that provide the basis for this study. The data is compiled from information contained in the financial statements of banking organizations. Events since 2008 highlight how estimates of bad debt and loan loss provisions are based on opinions that can be inaccurate.

To deal with this issue, this study combined quantitative and qualitative research methods. AR facilitates such a combination (Coughlan and Coghlan, 2002). While acknowledging the inevitable influence of values and subjectivity this study uses quantitative methods to analyze large volumes of data. This requires the use of logical deductive methods in order to develop and test explanatory hypothesis (Popper, 1972).

These quantitative findings are complemented with evidence obtained from qualitative methods such as interviews with key informants. In this way an AR project such as this study can ensure its scientific rigor and the validity of its findings due to the following methodological procedures:

- A comprehensive survey of existing theory
- Developing clearly stated research questions and hypothesis
- Gathering empirical evidence, both qualitative and quantitative
- Critically analyzing both primary and secondary sources of information (Whelan, 2012; Brannick and Roche, 1997).

III.i Data sample

According to Budd and Budd (2011) the homogeneity of data is critical when comparing relative performances of banks in country and cross border. This clarity also offers the possibility for this methodology to be mirrored by other researchers in alternate global regions. All data analyzed in this study has originated from one database. The database referred to is “Bankscope”. Bankscope can be found as part of the fundamental database in Columbia University and Trinity College Dublin among others, referred to by Trinity College as being a world banking information source (Trinity College, 2014).

Bankscope:

The Bankscope database contains detailed financial statements; the statements are in multiple formats including a universal format to compare banks globally. Bankscope has been described as the definitive tool for bank research and analysis (Bureau Van Dijk, 2015). Bankscope database has been cited throughout empirical studies on the global banking industry. While the Bankscope database can be found extensively in the Journal of Finance and Banking (Shehzad, de Haan, and Scholtens, 2010; Imbierowicz and Rauch 2014; Dietrich, Hess and Wanzenried 2014) it has not been limited solely to banking journals. Bankscope has also been cited in the Strategic Management Journal (Miller and Parkhe, 2002), the International Business Journal and the Economics Research Journal (Budd and Budd, 2011) among others.

Size:

Lenth (2001) opines that in order to present a meaningful statistical analysis the sample size must be carefully planned as, “big enough”, yet not too vast. He advocated sample size as important for economic reasons, maintaining that an undersized study could be a waste of resources lacking capability to produce credible results. Yet an oversized study could risk using more resources than would be necessary.

With regard to sampling, this writer assumed a manor comparable to the research conducted by the EBA in their risk assessment of the European banking area. The representative banks in the EBA sample were specified as covering at least fifty percent of the total assets of each national banking sector across twenty EEA countries (EBA 2014). The EBA report covers fifty seven banks in total and considers this sample a fair representation of the European banking pool. In as much as possible the writer has sought to adhere to these particular guidelines and structure. While acknowledgement is made that not all representative banks that cover fifty percent of the total asset size in each national banking sector are included in the sample, this study has, however, increased the sample size and maintained the broad country dynamic. The database used in this study focuses on the largest banks in the European banking sector. To ensure a robust representation of the European banking sector, the database consists of six hundred and twenty six banks in total. Five hundred and forty one are contained in the large class and eighty five are contained in the non large asset. These banks are located across the following nineteen countries:

- Germany
- Spain
- Netherlands
- Italy
- Finland
- Belgium
- Slovakia
- Lithuania

- Austria
- Greece
- Ireland
- Portugal
- Cyprus
- Luxembourg
- Slovakia
- Estonia
- Malta
- Latvia

III.ii Data Analysis, validity and reliability

As highlighted, financial ratios are widely credited as an excellent method for analyzing financial stability (Moore & Wayne, 2011; Najjar, 2013). The ratios in this study have been used extensively in research studies as independent and /or dependent variables, tailored to the study in question (Wiyono and Rahmayuni, 2012; Almazari, 2014; Ayaydin and Karakaya, 2014).

Independent variables used in this study:

(Asset quality)

- X1- Impaired loans *100 / loans + loan loss reserves.

  This ratio measures the impaired loans as a percentage of the total gross loanbook and reserves for loans

(Liquidity quality)

- X2- Gross customer loans *100 / total customer deposits.

  This ratio measures the total loanbook as a percentage of the customer deposits

Dependent variable used in this study:

(Profitability/performance quality)

- X3- Net Income*100 / total equity (RoE)

This ratio measures the net income returned as a percentage of shareholder equity

III.iii Approach adopted

The initial analysis performed was a critical examination of current impairment, liquidity and performance trends within the European banking area. The research analyzed six hundred and twenty six banks over five years of data on a continuum, subdividing the sample into full, large and non-non largelarge asset classes. The results were then examined and discussed. In order to ensure the robustness of findings, the discussion and analysis comprised a combination of descriptive statistics, input from key informants and both current research and industry information.

After critiquing the current trends of impairment, liquidity and performance thus providing a rich contextual background, the data was then analyzed through SPSS. According to Battaglia and Musar, (2000) research maintains that ‘’picking the correct benchmark’’, is vital. When investigating the asset and liquidity quality as indicators of performance within the European banking area, the results were measured through the European Banking Authorities benchmarking system. The EBA benchmarking structure comprised an extensive ratio analysis covering the fifty seven banks and incorporating the ratios employed in this

study. The benchmarking system presented three quartiles of result measurement. Making use of the three EBA quartiles, the classifications for this study were defined as:

- Poor quality
- Going concern
- Good quality

In order to analyze the data, a non-parametric method was employed. The Kruskal-Wallis H test, as had been relied on throughout existing financial studies (Walker, 2000; Kohers et al. 2004) was deemed appropriate to evaluate if any significant differences existed between bank performance based on the impairment and liquidity classifications.

Chapter IV. Analysis & Discussion

IV.i Key performance indicators and trends: descriptive statistics

Impairment

The impaired loan ratio measures loans that are outstanding ninety days or more as a percentage of the full loan book. Therefore a lower ratio would be considered a more favorable result. A study conducted by KPMG indicated that average levels of impairment in the UK banking system stood at 5.6% as of year-end 2012 (KPMG, 2013). This compares positively when equated with the average levels of impairment across the European banking system from 2009 to 2013. As there is a difference in the average result, the impairment level on a country wide basis is a topic worthy of further research.

The full asset sample:

Table 1

Impairment: Descriptive statistics for the full sample

Year	2009	2010	2011	2012	2013
Number of banks	626	626	626	626	626
Min	0.01	0.01	0.01	0.01	0.00
Max	44.27	47.08	49.05	99.97	99.97
Mean	6.33	7.29	8.15	9.53	11.30
Median	5.48	6.54	7.09	8.13	10.18
Standard Deviation	4.58	4.98	5.65	7.33	8.74

Figure 1

Impairment: Median and mean percentage for the full sample

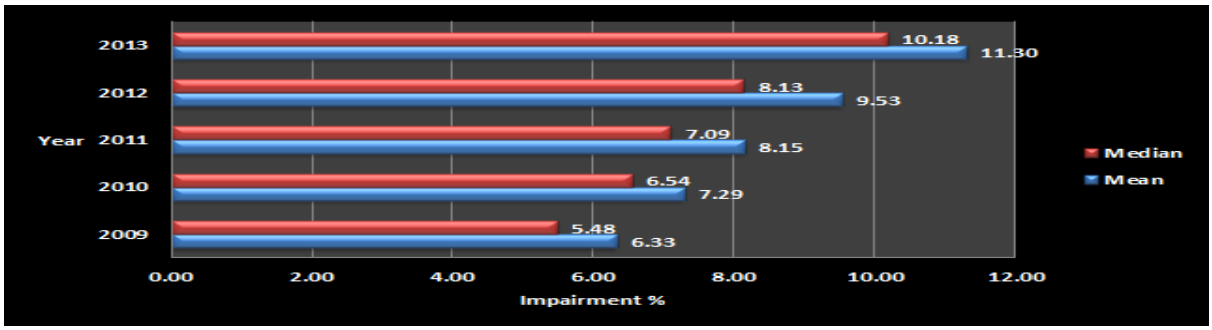
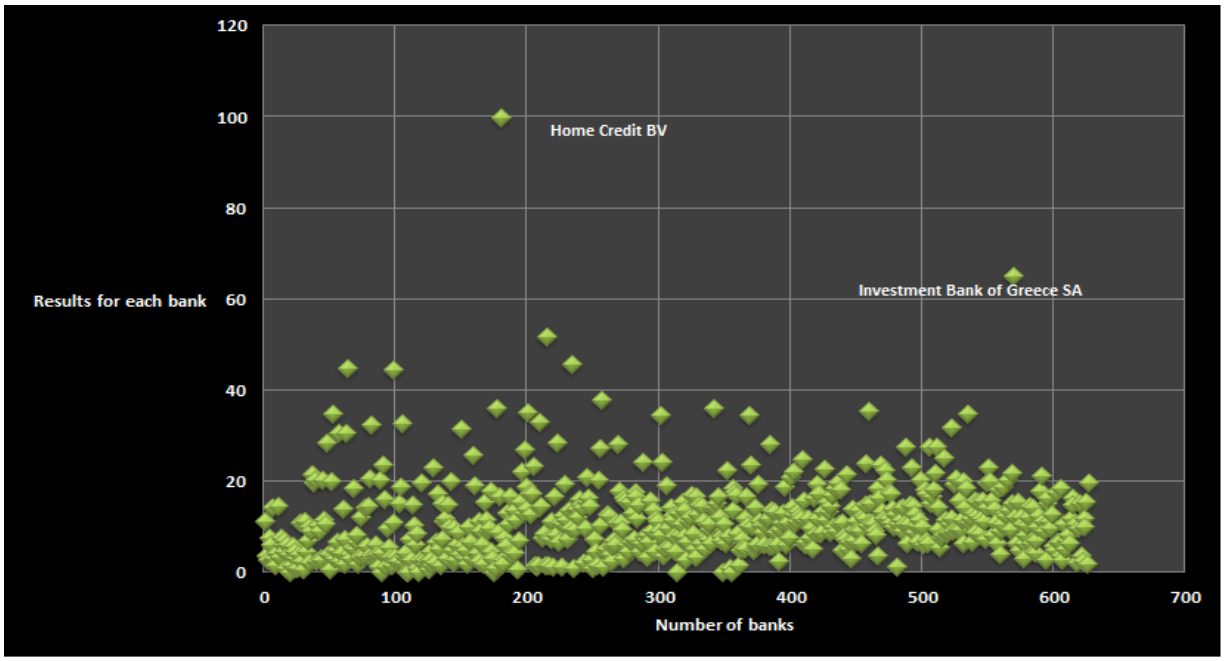


Table one presents descriptive statistics in relation to the full sample of banks. The total sample pool is six hundred and twenty six banks. Further clarity in relation to mean and median data of the sample is provided in Figure one. The mean is consistently higher than the median. For example in 2009, the mean was equal to 6.33% and the median equal to 5.48%. Similarly in the year of 2013 the mean value was 11.30% and the median was equal to 10.18%. This indicates that outliers with large impairment charges have distorted the results, causing a larger mean value for each of the five years. The most noteworthy observation is the clear trend of growth in both sets of figures.

Figure 2

Impairment: Impairment percentage for the full sample as of year 2013

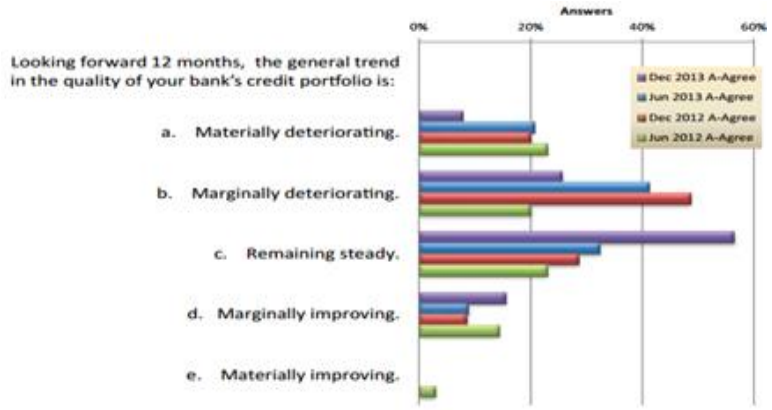


Although the financial crisis affected the banking system from 2008, the impairment percentage continues to grow from 2009 up until 2013. This is a somewhat unexpected result as a decline in bank impairment would have been anticipated. Figure two represents the impairment percentage of the full sample as of year 2013 where a number of outliers can be observed. When analyzing six hundred and twenty six of the largest banks within the European banking area, the average impairment result is 11.30%. This means that on average more than 11% of the total loan book is outstanding for more than ninety days. This is quite a large figure; according to key informants working in this industry (Pollock, 2015) anything greater than 5% is sub-par. Upon further analysis of the growth in impairment levels,

it can be noted that the EBA (European Banking Authority) acknowledge that deterioration in loan and asset quality continues to grow. The EBA also note however that a more stable trend is expected within 2015 (EBA, 2014).

Figure 3

Impairment: Risk assessment questionnaire (RAQ) conducted by the EBA - credit quality



The EBA conducts a semi-annual RAQ (Risk Assessment Questionnaire) aimed at a sample of the largest thirty five banks by asset size within the European banking area. Figure three illustrates the general trend of the credit quality. When key respondents/supervisors within the sample pool commented, the result was that the majority, approximately 57%, agreed that their particular credit portfolio remained “steady”. This has increased since mid-year 2013 where equivalent percentage was 32%. However, 34% of this sample poll still agreed that as of the December 2013 their credit portfolio was actually marginally or even materially deteriorating. Interestingly, the same sample poll of respondents did note that as of the end of 2013 the “impairment of credit” was now more evenly spread between borrowers. This is in contrast to mid-year 2013, where asset deterioration was primarily driven (27%) by SMEs (Small and Medium size Enterprises) (EBA, 2014). Therefore although deterioration still exists, the borrower concentration risk has been somewhat mitigated.

Figure 4

Impairment: Risk assessment questionnaire (RAQ) conducted by the EBA – impairment provisions

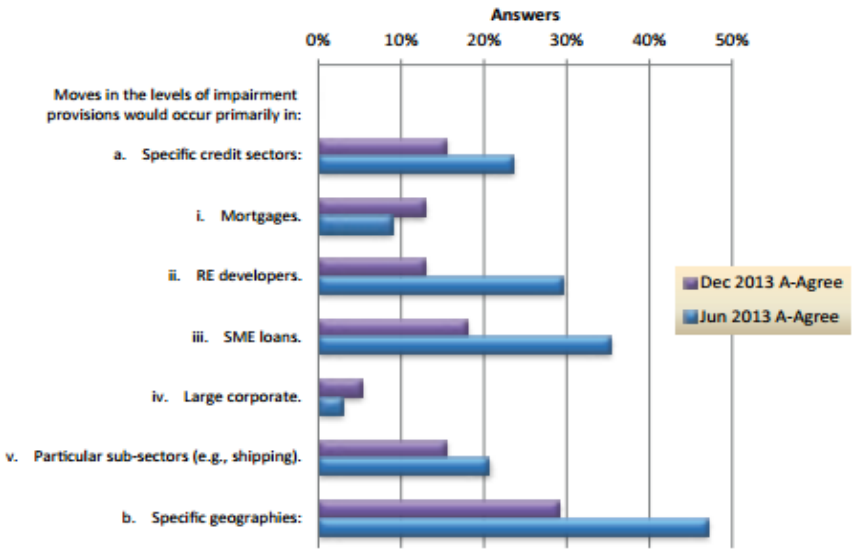


Figure four illustrates the movement in levels of impairment provisions in terms of lending sector. According to the EBA report, specific "stressed" geographies remain a risk. These geographies are accounting for approximately 28% of total provisions. The writer has much experience of working with this type of exposure and one such example of bank group and geographic concentration that could be noted is the "Raiffesien" banking group. The group is prominently exposed to the CEE (Central Eastern European) market. Although headquartered in Austria, Raiffeisen themselves refer to their extensive CEE network as their "home market" (Raiffeisen Bank International, 2015).

As has been noted, Table one illustrates the maximum and minimum amounts of the full sample where the maximum figure for the year 2011 is 49.05% followed by 99.97% for years 2012 and 2013. Further analysis of the maximum results reveals two particular banks that stand out as negative outliers. These are "Home Credit BV," a Dutch bank specializing in serving a class of borrowers with a "little or no credit history" (Home Credit, 2015) and the "Investment Bank of Greece". While the latter may not surprise the reader, the former stands out considerably. In this particular case impairment increased from less than 1% as of year 2011 to 99% as of year 2012.

Figure 5

Impairment: Impaired loans as a percentage of gross loans for Home Credit Bank from 2008 to 2014. Information available from Bankscope.

Figure five depicts the impairment trend of “Home Credit” between the years of 2008 to 2014. “Home Credit” is primarily active in the Russian, Czech, Belarusian and Kazakhstani markets. Further examination of the financials of “Home Credit” show that due to such large interest revenue generated, the bank reported a profit after tax until 2013. The bank performance has now deteriorated to show a loss as of year-end 2014. Interestingly the Worldbank have noted that this particular form of financial institution operates a framework of survival through exceptionally high interest rates to poor customers and/or transitioning economies. They also note that eventually the cost of operations and maintenance associated with this form of financial institution could become unsustainable. Inevitably, this translates to the volume and cost entailed in the monitoring and control of poor performing repayment (Rosenberg, Gonzalez and Narain, 2009). This could possibly be the case for “Home Credit”. This particular operating model is a topic that is worthy of further research.

The large and non large asset samples:

One specification to be noted when discussing the large and non large asset class is that this dissertation considers the “large class” of assets to be in line with the 2014 Federal Reserve guidelines. The Federal Reserve consider a large commercial bank to have a consolidated asset base in excess of USD 300 Million (Federal Reserve, 2014). Therefore for classification purposes the non large asset class that is analyzed cannot be equated with a savings bank or “small asset base” but must be treated as a “non large asset” bank.

Table 2

Impairment: Descriptive statistics for the large (541) and non large subset (85)

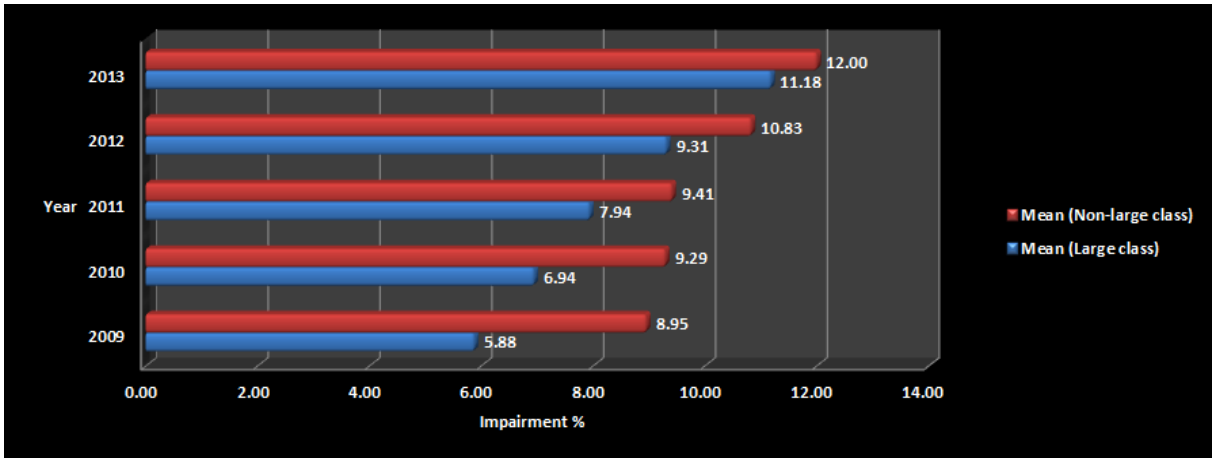
Year	2009	2010	2011	2012	2013
Number	541	541	541	541	541
Min	0.01	0.01	0.01	0.01	0.00
Max	28.33	30.38	34.19	99.97	99.97
Mean	5.88	6.94	7.94	9.31	11.18
Median	5.22	6.21	6.86	7.81	9.82
Standard Deviation	4.07	4.64	5.53	7.48	8.89

Year	2009	2010	2011	2012	2013
Number	85	85	85	85	85
Min	0.88	0.61	1.25	0.64	1.77
Max	44.27	47.08	49.05	39.68	65.12
Mean	8.95	9.29	9.41	10.83	12.00
Median	7.40	8.14	8.64	9.19	11.26
Standard Deviation	6.18	6.24	6.22	6.28	7.86

Further analysis of the large and non large asset classes revealed a lower mean and median value for the large asset class. The statistics presented for the larger asset class are consistent with the results of the initial full sample as would be expected with the large asset class accounting for 86% of the overall full sample.

Figure 6

Impairment: Average impairment for large class of banks and non large subset



The lower mean and median, as depicted in Figure six could potentially indicate that the larger asset class had a better performing loan book in comparison with the non large asset class grouping from year 2009 until 2013. As can be noted in both the large and non large asset classes the average impairment levels show a growth from 2009 until 2013.

Figure 7

Impairment: Maximum impairment for large class of banks and non large subset

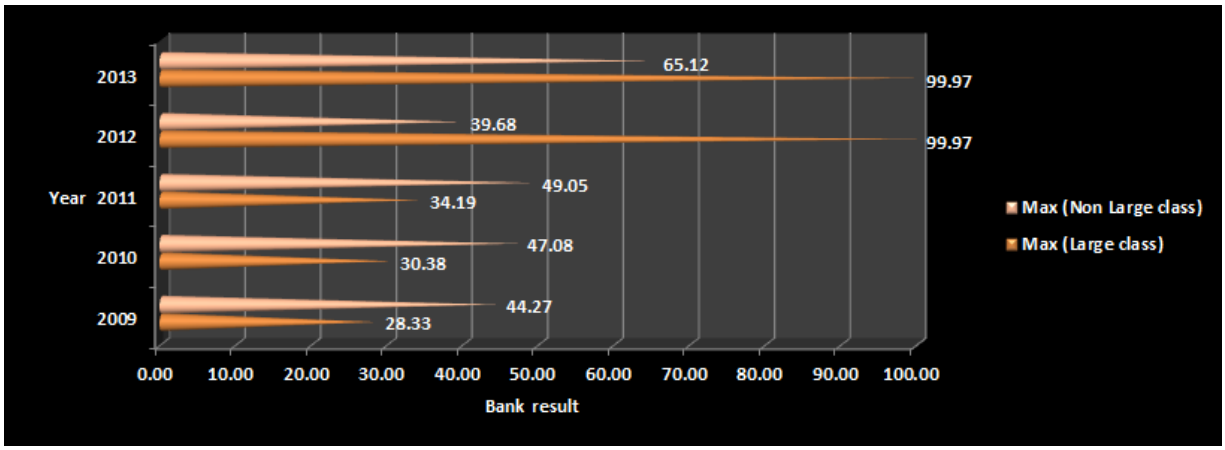


Figure seven illustrates the maximum results for both the large and non large asset class during the years 2009 to 2013. The outlier presented as the maximum in the large asset class of 99.97% was the previously discussed “Home Credit” bank. The maximum result of 65.12% observed in the non large asset class was the “Investment Bank of Greece”. Further analysis of the impairment results revealed that the maximum levels between 2009 and 2011 were

observed in the non large asset class. According to a key informant, this is a surprising result as standard industry practice would dictate that the non large asset class of bank would in general be a more “conservative” lender (Pollock, 2015). One potential possibility as to why the banks differ in regards to impairment results, particularly between 2009 and 2011 could be the implementation of Basel II. In his research on Basel II and its impact on cyclicality, Heid (2007) maintains that the capital buffers driving Basel II play a large role in limiting bank ability to lend. There is a possibility that larger scale banks were more strictly regulated (ECB, 2014). The result is interesting in that it warrants further research into the performance of “non large” banks and questions with respect to the effect that Basel II has had in relation to asset size.

Liquidity

Forbes explain that a “loan-to-deposit” ratio of 1 (100%) indicates that a bank lends a euro to customers for every euro that it brings in as deposits (Forbes, 2014). To put the results into context, a lower ratio shows more available funding; i.e. more available cash for contingencies. Therefore the lower the ratio the better. Forbes recommends that a combination of prudential and regulatory requirements in the U.S. implies that 80-90% is an adequate benchmark (Forbes, 2014). Taking this into account, Table three reveals interesting results.

The full asset sample:

Table 3

Liquidity: Descriptive statistics for the full sample

Year	2009	2010	2011	2012	2013
Number	626	626	626	626	626
Min	6.63	7.54	5.10	4.84	5.35
Max	960.05	997.60	852.32	826.84	717.83
Mean	156.40	153.08	155.54	151.58	144.07
Median	143.20	143.41	145.33	141.58	136.56
Standard Deviation	105.44	91.03	90.24	81.30	74.78

Although the mean and median figures presented in table three have been decreasing steadily from 2011 to 2013, the most recent year (2013) still presents a mean loan to deposit ratio of 144.07%. Therefore within the largest six hundred and twenty six banks in Europe, for every 144 euro the average bank is lending, it is taking in 100 euro in deposits. Those figures indicate that as a whole the full sample may not have adequate funding, particularly when compared with the U.S. Benchmark (Forbes, 2014). This raises a related issue regarding the difference, if any between U.S. and European banking benchmarks - an area where further research might be warranted.

Figure 8

Liquidity: Maximum and minimum percentage for full sample

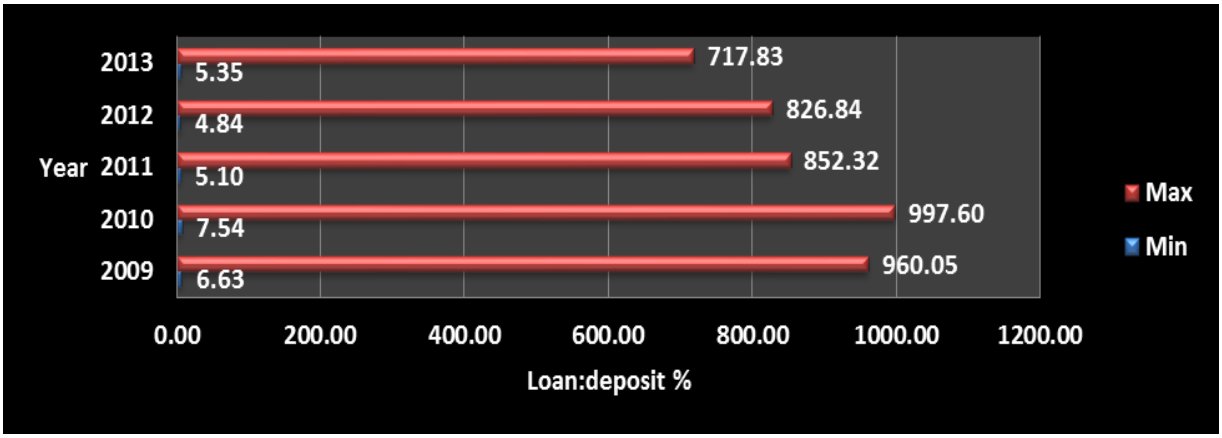


Figure eight illustrates the maximum and minimum results for the full sample from 2009 until 2013. According to industry experts, the risks that can be associated with high or poor loan to deposit ratios, include but are not limited to: larger interest costs from interbank lending; and/or difficulty in accessing liquidity (Bailie, 2015). Further analysis suggests that there are a minor amount of banks with a minimum loan to deposit ratio under 25%. These banks consist of investment arms such as “CM-CIC Securities SA” which is a subsidiary of “Crédit Mutuel-CIC,” and a state owned local financing group “Caisse des Dépôts et Consignations-Groupe Caisse des Dépôts” which the writer has had many dealings with. The latter exists to help local financing within France. While these banks appear to have “excellent” liquidity, due to being investment arms and/or state owned aid to local businesses, the banks are not aggressive lenders by nature.

Figure 9

Liquidity: Loan to deposit percentage for the full sample as of year 2013

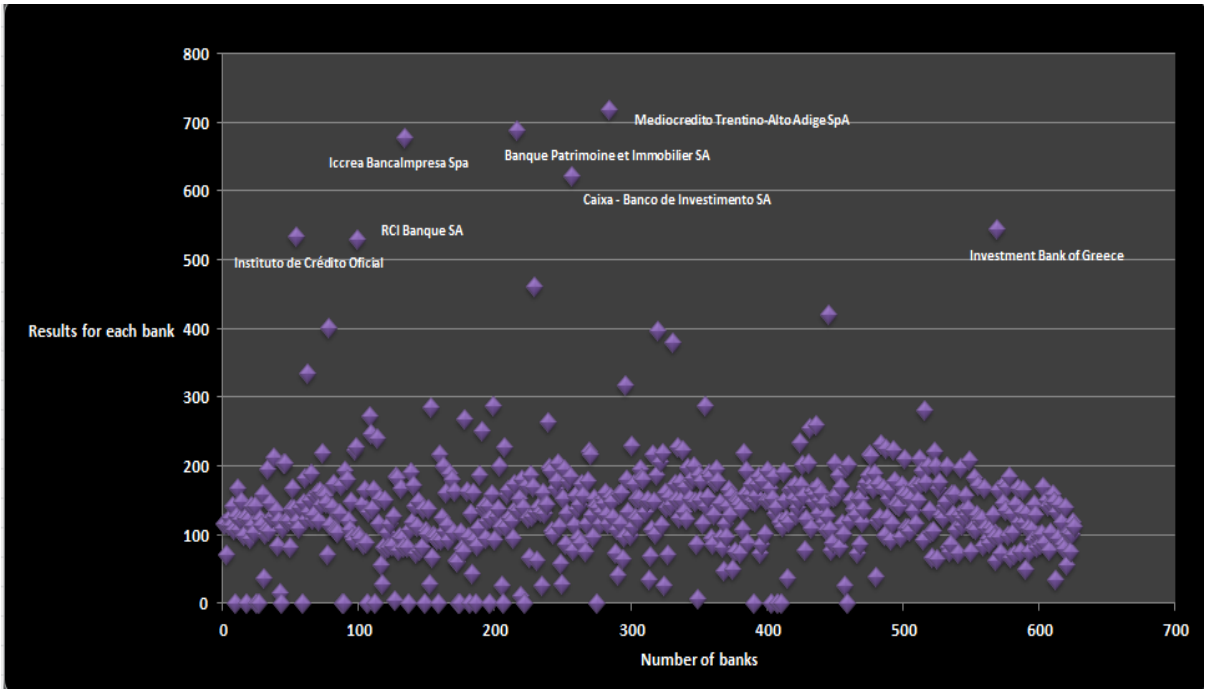


Figure nine illustrates the negative outliers. When examining Figure nine, it can be observed that there is still a surprising amount of outliers with loan to deposit ratios in excess of 200% as of year 2013. Furthermore, there are seven banks with a loan to deposit ratio exceeding 500%. These include the aforementioned “Investment Bank of Greece” among others. This directly relates to the key question of this study. Should a bank excessively lend, risking impairment or show a more conservative liquid base? Both methods offer inherent risks (Mester, 1996; Ezeoha, 2011).

The large and non large asset samples:

Table 4

Liquidity: Descriptive statistics for the large (541) and non large subset (85)

Year	2009	2010	2011	2012	2013
Number	541	541	541	541	541
Min	6.63	7.54	5.10	4.84	5.35
Max	960.05	997.60	852.32	826.84	717.83
Mean	163.35	159.62	161.04	155.88	148.08
Median	148.22	148.96	150.15	146.35	140.47
Standard Deviation	111.63	95.70	94.27	84.49	77.06

Year	2009	2010	2011	2012	2013
Number	85	85	85	85	85
Min	30.32	28.20	29.90	30.25	34.40
Max	295.75	256.90	404.54	485.79	544.63
Mean	118.93	117.83	125.77	128.47	122.47
Median	110.12	110.11	111.96	117.03	117.61
Standard Deviation	47.31	46.38	55.75	56.23	56.07

Table four presents descriptive statistics in relation to the large and non large sample of banks. Analyzing both the large and non large asset class, it can be noted that the large class of banks are more representative of the full sample in all years. The large class asset sample amounts to 86% of the total sample pool and therefore this was in line with expectations. For example, in 2009 the full sample had a mean value of 156.40%, the large sample had a mean of 163.35% and the non large sample a mean of 118.93%.

Figure 10

Liquidity: Maximum for large class of banks and non large subset

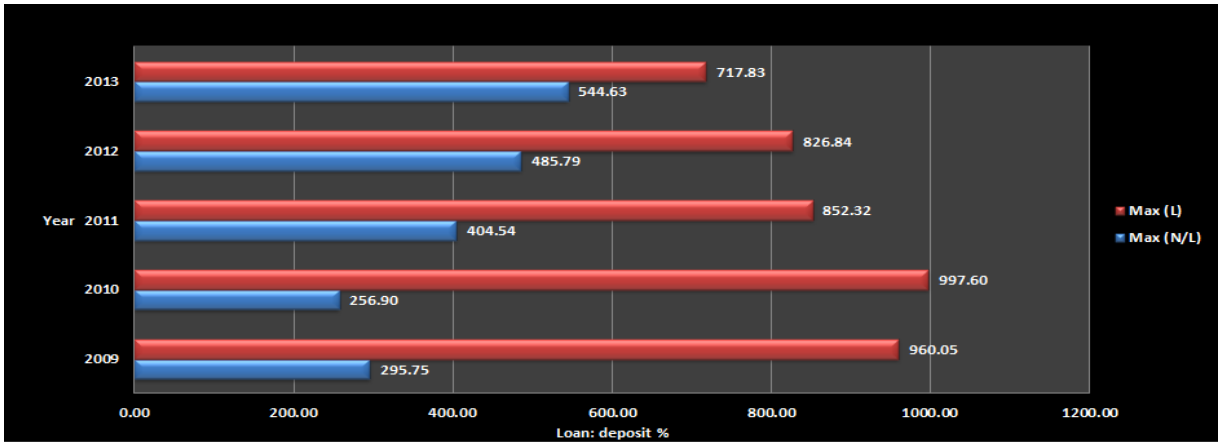
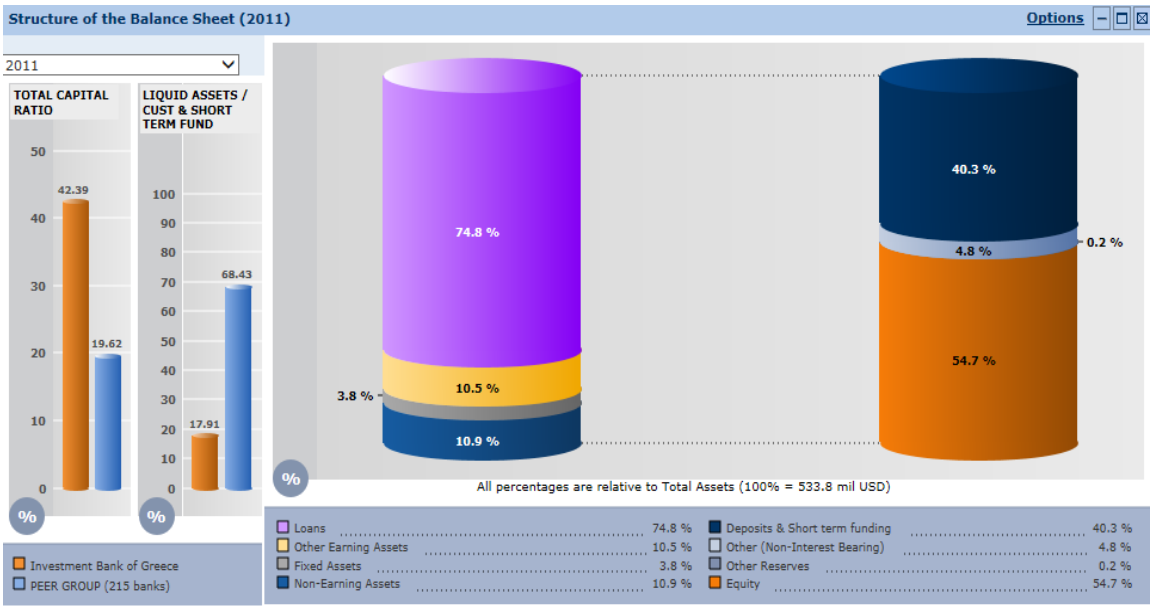


Figure ten illustrates the maximum loan to deposit ratio of the large and non large asset class. The full class is not shown, as actually the maximum amounts are the same for both the full and large sample. This pattern is inclusive from years 2009 to 2013 with 960.05% as of 2009, 997.60% in 2010, 852.32% in 2011, 826.84% in 2012 and 717.83% as of year 2013. Figure ten highlights a considerable difference in the maximum results between the large and non large asset class.

Figure 11

Liquidity: Structure of the Balance Sheet for the Investment Bank of Greece for the year 2011. Information available from Bankscope.



Further examination of the non large asset class reveals one bank that is worthy of further analysis: The “Investment Bank of Greece”. For each of the years 2011 to 2013 inclusive, this Greek bank reported the maximum ratio results of 404.54% in 2011, 485.79% in 2012 and 544.63% in 2013. Figure eleven depicts the liquidity profile of the “Investment Bank of Greece” in comparison with its peer group. The bank held 17.91% in liquid assets in 2011 versus 68.43% held by other banks (Bankscope, 2015). Figure eleven also illustrates that the structure of the balance sheet in relation to its loan and deposit amounts appears unbalanced. In the most recent year (2013) it can be noted that the “Investment Bank of Greece” has not only a high impairment result of 65.12% but a correspondingly high loan to deposit result of 544.63%. This adds strength to the argument that liquidity and impairment

levels are interrelated. There is also the issue of a possible trade off where banks with a high risk loan profile select particularly high loan to deposit ratios in order to achieve higher net interest margins (Angbazo, 2007).

Figure 12

Liquidity: Average result of the large and non large sample between 2009 and 2013

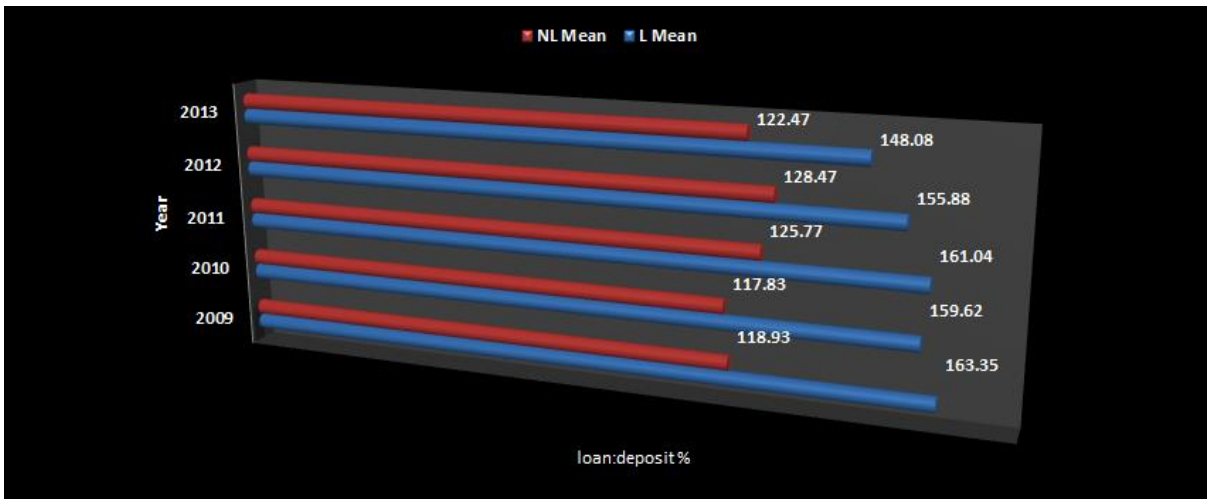
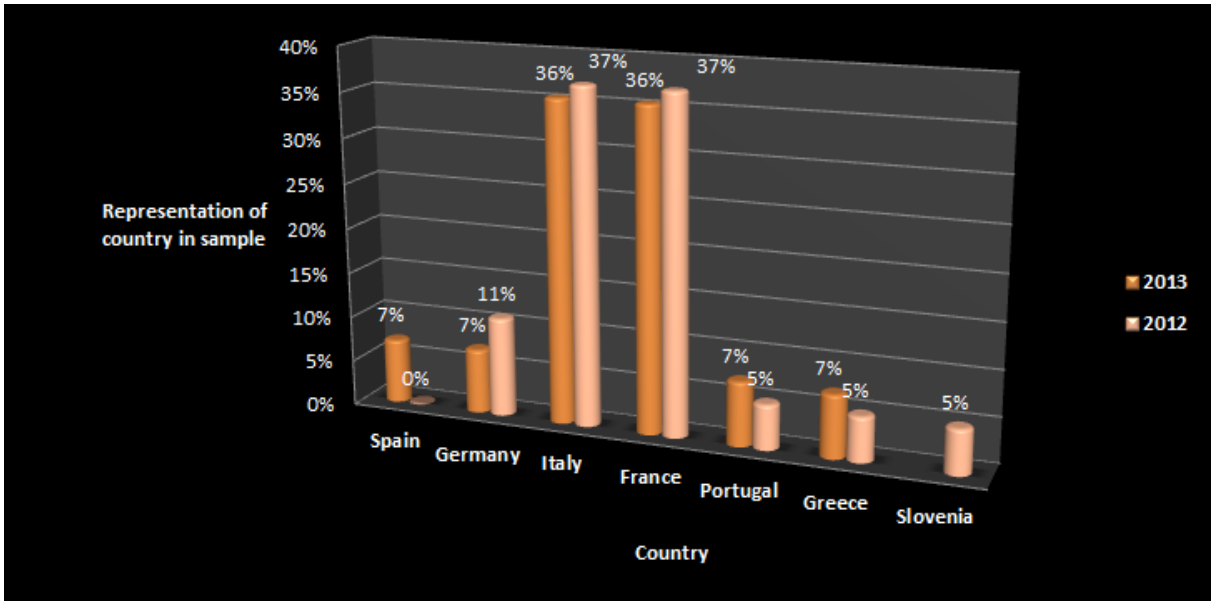


Figure twelve shows the gradual incline in the ratio for the non large asset class between 2010 and 2012. The result deteriorated from 117.83% as of year 2010 to 128.47% as of 2012. Returning to the difference between loans to deposit results and asset size, it appears that the large asset class is showing an improvement in the ratio between the years of 2011-2013. This could potentially be the more dominant effect of Basel II on the larger asset class. Basel II requires the banks to determine their capital requirements against credit risk (Ruthenberg and Landskroner, 2008). As banks are now calculating the risk weighted assets and capital buffers accordingly, it could be possible that larger banks may face more pressure in order to conform to the requirements. The Basel II requirements also represent a limitation to certain forms of lending, segments and emerging markets which could also have a knock on effect to the overall decline in the loan to deposit ratio.

Figure 13

Liquidity: Sovereign representation of this class of results. Fourteen banks in total that show a loan to deposit ratio in excess of 300% in the year 2012 and 2013.



One more element to note when considering the liquidity ratio and the total sample is the division by country. Figure thirteen notes the sovereign representation of this class of results. Of the fourteen banks in total that show a loan to deposit ratio in excess of 300% in the year 2012 and 2013, certain sovereigns can be noted as accounting for a majority of the results. Both Italy and France feature prominently in both years showing accountability of 36% in 2012 and 37% in 2013. Further research on a country by country basis could be warranted.

Performance

The performance ratio is represented by the RoE. This ratio is the net income (profit after tax) as a percentage of shareholder equity. Research in regards to the average RoE per sector indicates a benchmark of 8.8% within the regional banking sector (NYU Stern, 2015). In this case the higher the ratio result the better the performance.

The full asset sample:

Table 5

Performance: Descriptive statistics for the full sample between 2009 and 2013

Year	2009	2010	2011	2012	2013
Number of banks	626	626	626	626	626
Min	-130.72	-179.88	-992.29	-193.11	-168.45
Max	70.41	31.86	29.03	185.71	81.89
Mean	3.50	4.17	-1.05	1.56	0.49
Median	4.10	5.89	3.19	3.16	3.24
Standard Deviation	12.68	14.53	46.52	18.66	19.93

As can be observed in Table five, the European banking area has an average well below the 8.8% benchmark.

Figure 14

Performance: Average performance percentage for the full sample.

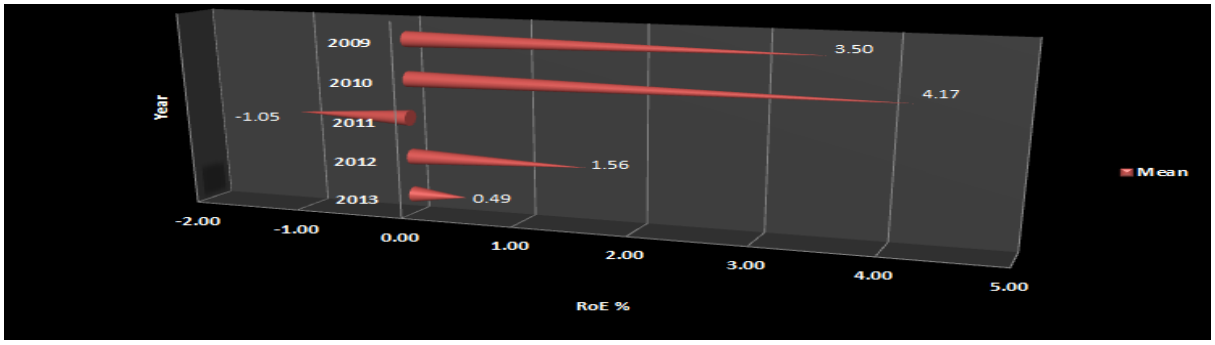


Figure fourteen illustrates the average performance of banks between the years of 2009 to 2013. Between the years of 2010 and 2011, RoE decreased from 4.17% to -1.05%. The capital requirements that came with the Basel I and II policies have had mixed reviews, with

banks often arguing that higher capital requirement can affect performance (De Bandt et al. 2014). The classic MM (Modigliani and Miller) framework however, suggests that funding sources have no effect on asset cash flows and propose that there is no reason that this framework cannot be applied to the banking sector (Miller, 1995). Of course there are conflicting views, such as impact on liquidity creation when capital is too high (Diamond and Rajan, 2001). This issue has been heavily debated and research suggests that higher capital buffers actually show a modest increase in banks RoE.

Figure 15

Performance: Performance percentage for the full sample as of year 2011

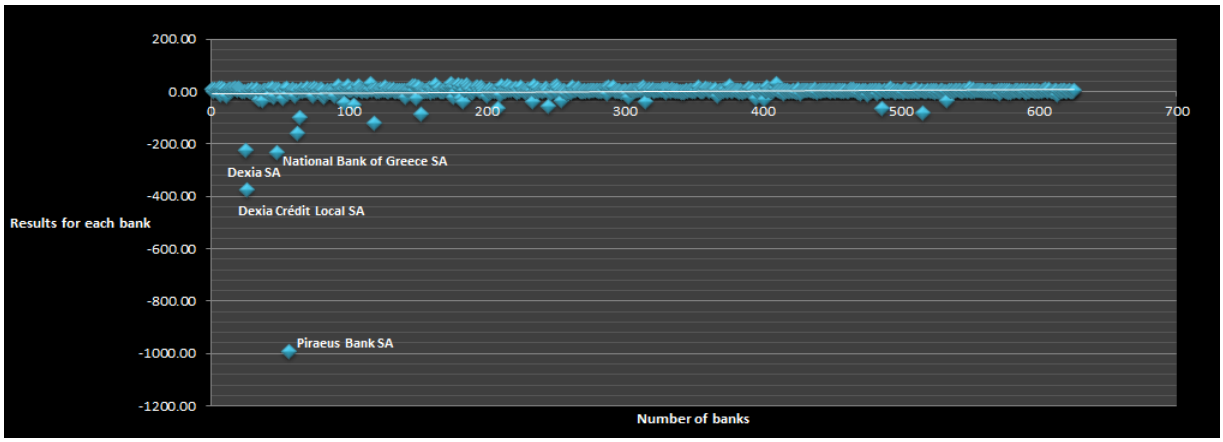


Figure fifteen represents the results of the full sample for the year 2011. 2011 was chosen as the results are the most dispersed with Piraeus Bank SA recording a RoE of -992.29%.

Figure 16

Performance: Outliers for the full sample as of year 2011

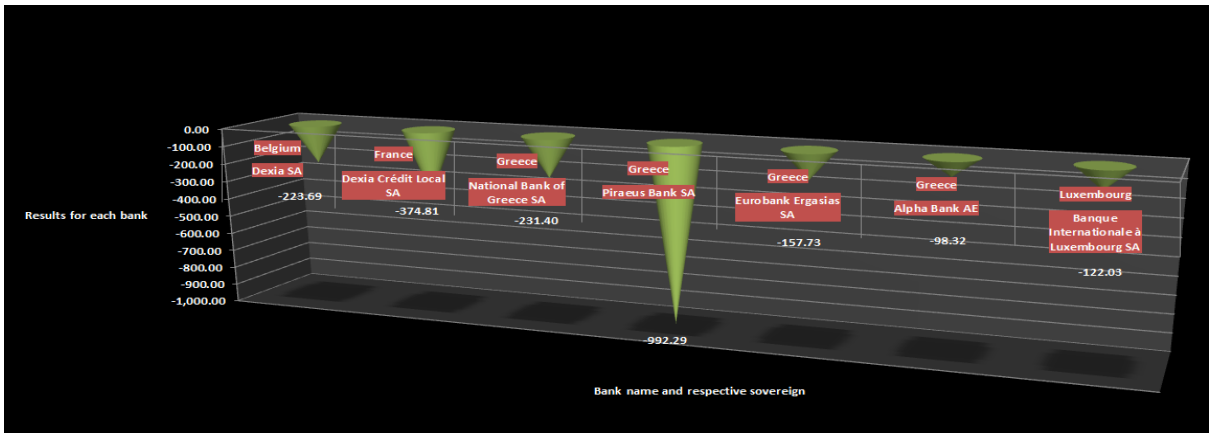


Figure sixteen identifies seven outliers. The banks illustrated have all recorded a negative RoE in excess of -98.32% as of year 2011. Greek owned banks represent 57% of this sample.

Figure 17

Performance: Structure of the Profit and Loss account for Piraeus Bank as of year 2011. Information available from Bankscope.

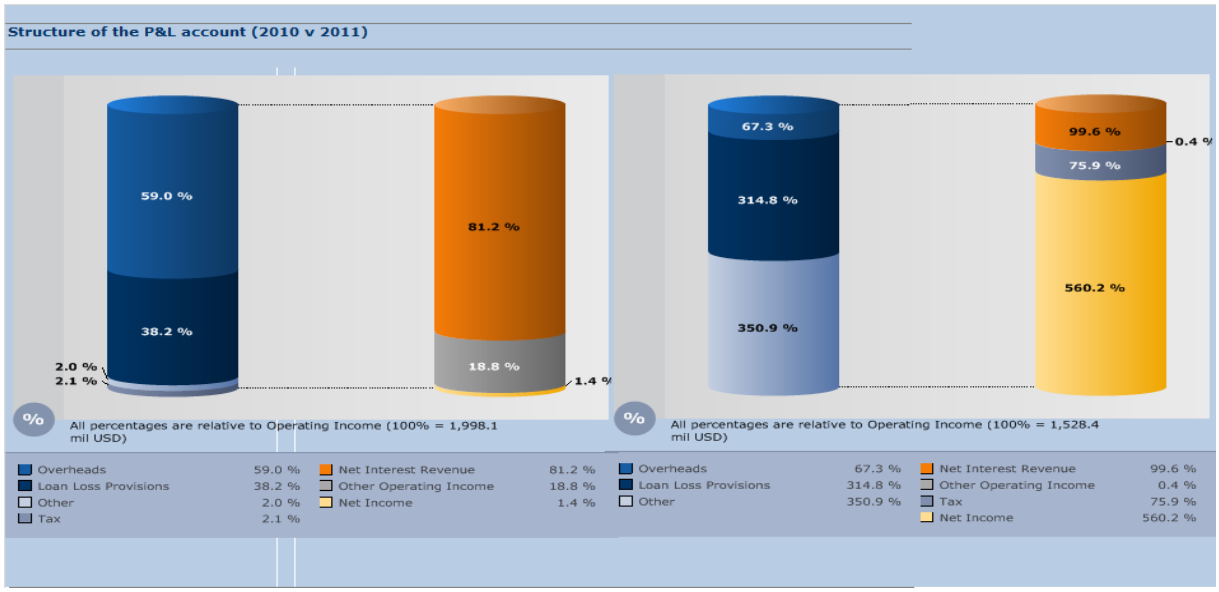


Figure seventeen illustrates the structure of the profit and loss account of Piraeus Bank. Piraeus Bank is a clear outlier with a RoE in excess of -900%. Upon further analysis, the variance between the structures of the P&L account can be noted year on year. As can be seen, the percentage of provisions relative to operating income increased from 38.20% in 2010 to 314.80% in 2011 (Bankscope, 2015). Clearly this is unsustainable and will eventually constrain the bottom line. These provisions originate in the impairment of the assets and eventually make their way as a cost on the P&L account. The provisions have a negative impact on income which in turn has an impact on the performance ratio.

The large and non large asset samples:

Table 6

Performance: Descriptive statistics for the large (541) and non large subset (85)

Year	2009	2010	2011	2012	2013
Number of banks	541	541	541	541	541
Min	-130.72	-179.88	-992.29	-193.11	-168.45
Max	70.41	31.86	29.03	185.71	81.89
Mean	3.65	3.77	-1.61	1.42	-0.05
Median	4.29	5.81	3.40	3.20	3.06
Standard Deviation	13.55	15.63	50.40	20.15	21.22

Year	2009	2010	2011	2012	2013
Number of banks	85	85	85	85	85
Min	-36.94	-4.23	-32.40	-18.13	-72.44
Max	10.53	22.04	11.53	12.60	25.11
Mean	2.58	6.42	2.05	2.29	3.54
Median	3.18	6.23	2.30	2.97	4.07
Standard Deviation	5.49	4.15	4.74	4.76	9.09

Further analysis of the large and non large asset class revealed the larger asset class to have a closer ratio result to the full sample of assets. The results indicate is a substantial difference between the mean and the median, particularly from 2011 where the mean value was -1.61% and the median value 3.40%. Similarly in year 2013 the mean value was -0.05% and the median equal to 3.06%. In this case the large outliers are skewing the data set. This is not as evident in the non large asset class. This could potentially indicate that the larger the asset class the poorer the performance, particularly during 2011 to 2013 but could also be due to the aforementioned negative outliers as presented in the full sample class. The non large asset class displays a closer mean and median value and the median is consistently higher barring one year, 2010 where the mean value is 6.42% and the median is 6.23%.

Figure 18

Performance: Average performance for the full, large and non large subset

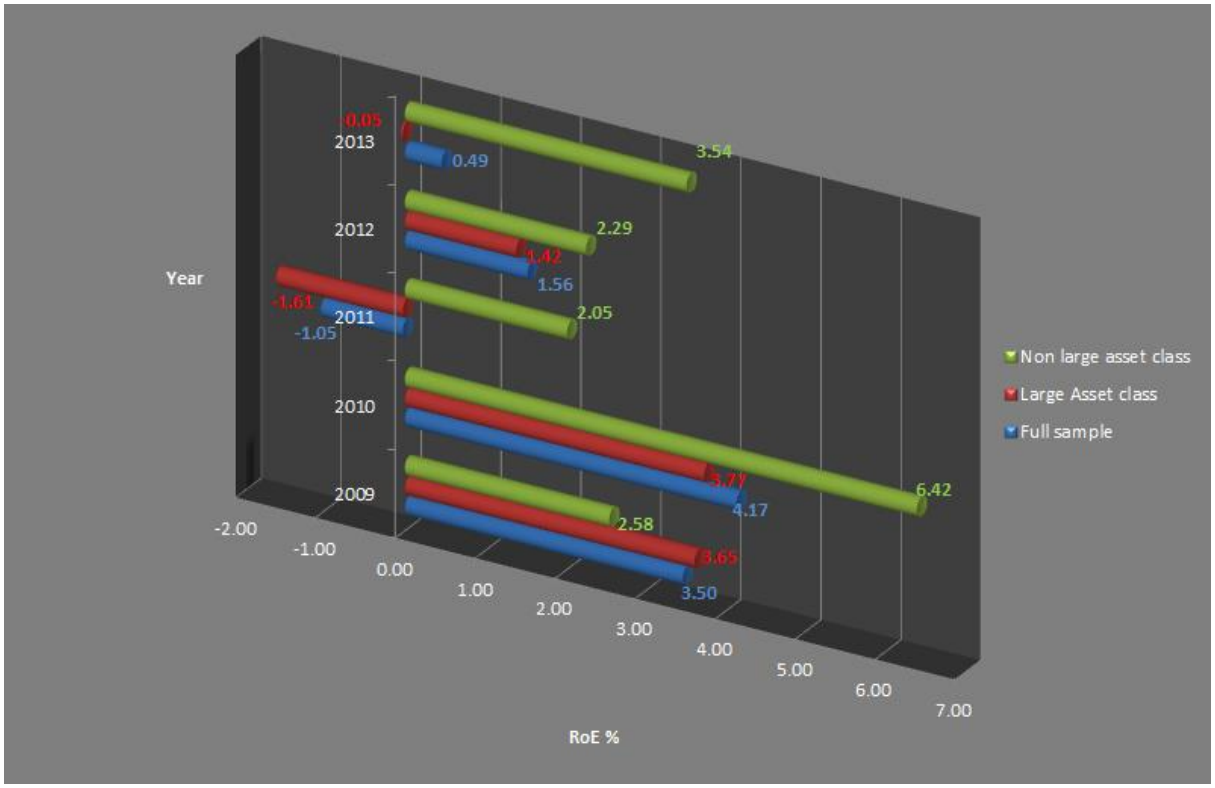
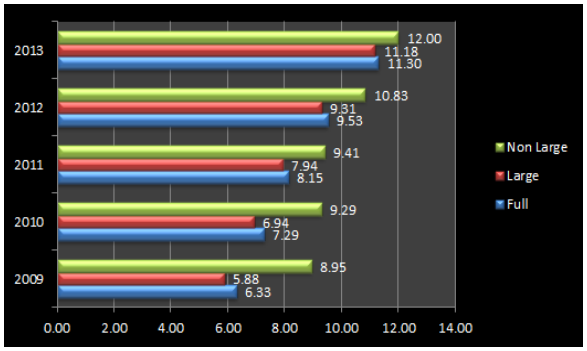


Figure eighteen highlights another important finding. The non large asset class shows an increasing and higher average value than both the full and large class asset sample from 2011 to 2013. In fact the non large asset class does not present any negative average result between the years of 2009 to 2013. As performance is a vital component to success, this issue merits further research in relation to bank size and performance results.

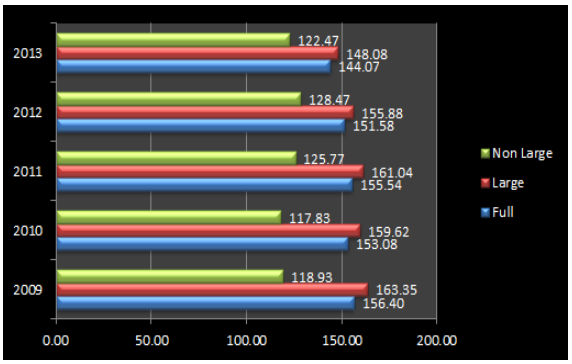
IV.ii Impairment and liquidity as indicators of performance

Figure 19

Impairment: Average impairment for full, large and non large subset



Liquidity: Average liquidity for full, large and non large subset



Impairment

Investigating the impairment trends, particular noteworthy findings include the growth pattern in all asset classes. This is illustrated in Figure nineteen. The full and large asset samples present a more favorable impairment result when compared with the non large asset class. Therefore the loan book in the full and large class samples appears to be performing better than the non large asset group. However, according to industry experts the larger asset class of banks generally show a riskier appetite (Pollock, 2015), yet figure nineteen illustrates the impairment ratio is of a better quality in these sample classes.

There are three potential possibilities to be considered when analyzing the difference in impairment results between the asset classes:

Basel II and bank size:

Basel II: The "New Capital Framework" was released in 2004. Among other stipulations, Basel II concentrated on the calculation of risk weighted assets in order to set minimum capital accordingly. The loan book is a clear risk weighted asset and as bank calculations affected their core capital, one possibility was the reduction of riskier lending. The larger the bank asset size the larger the necessary curtailment. This could potentially lead to a lower

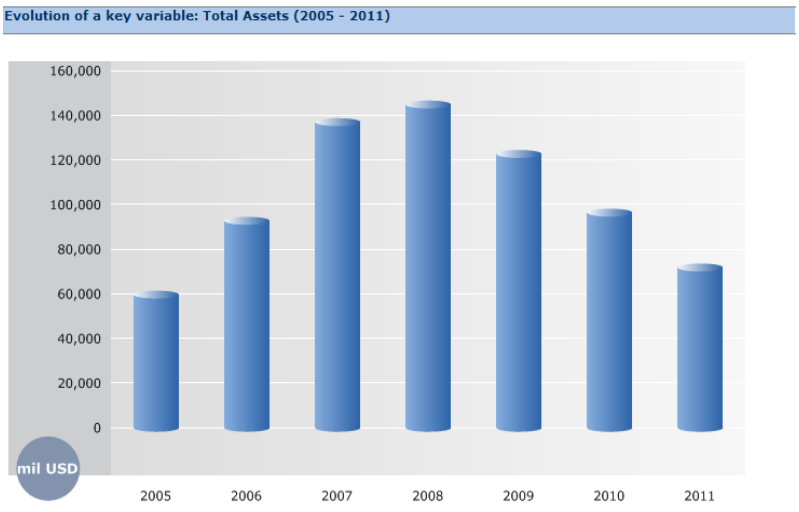
impairment result. One possibility is that Basel II requirements could have and may still be affecting banks differently dependent on asset size (Pollock, 2015).

Bank size and regulation:

The Single Supervisory Mechanism differentiates between bank size and supervision (ECB, 2014). Banks with assets in excess of 30 Billion euro, or anything over 5 Billion if the institution exceeds 20% of GDP are deemed "significant" (ECB, 2014). The "significant" banks are supervised directly by the ECB and as such regulation could be deemed as more "severe". Therefore credit risk policies could have potentially been and still be more strictly adhered to, particularly for banks considered as "significant". A number of banks that are classified as "significant" are included in the full and large asset class of this study. 18% of the full sample contains "significant" banks and the large class asset sample has 21%. These banks could face more stringent credit policies which could restrain the impairment result. Reversing this logic, it could be possible that less regulatory spotlight could have facilitated the expansion of the loan book for the non large asset class, thus facilitating risk appetite (Bailie, 2015).

Bank size and management:

Figure 20:
Performance: Evolution of the total assets for IBRC (Anglo Irish Bank) from 2005-2011 Information available from Bankscope.



When examining the non large asset class, a specification noted was that this sample could not be likened to a savings bank or "small asset class" but needed to be treated solely as a "non large asset" bank. In actuality many of these banks present a large asset base and only

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just fall short of Federal Reserve guidelines used in this study. Therefore, there is an argument that this sample size could be deemed as “medium sized banks”. According to key informants, a rapid asset growth to a more medium size can leave the bank in a “grey zone”. This asset class no longer fits in with the conservatism often adopted by smaller savings banks but try to gain market share by competing with the larger banks. However, often this medium size bank may not have the necessary intellectual property/training to assess the extended risk implicit in the expansion of the loan book (Pollock, 2015). A classic example that can be considered is the former Anglo Irish Bank. Figure 20 illustrates the speed of the asset expansion of the former Anglo Irish Bank. Bank impairment remained at an excellent 0.51% until 2007 but quickly rose to 26.64% as of 2009 and 62.37% as of 2011 (Bankscope, 2015).

Liquidity

From a liquidity standpoint, each asset class shows an unfavorable result when equated with the Forbes recommended benchmark. This is illustrated in Figure nineteen. Forbes (2014) consider a loan to deposit ratio of 80-90% to be adequate However, what must be noted is that this benchmark, which is a combination of prudential and regulatory requirements, is applicable to the U.S. An alternate industry perspective considers a loan to deposit ratio of 110% to be adequate (Bailie, 2015). It can be noted that the non large asset class compare positively when equated with the large and full sample. However, the non large asset class does not show any clear trend with the ratio growing from 117.83% in 2010 to 128.47% in 2012 and then falling again to 122.47% in 2013. The large and full asset samples however show poor ratio results, with the large asset class peaking at 163.35% in 2009. However, both the large and full sample also show a continuous improvement between 2011 and 2013 meaning an effort to improve the ratio is being made.

There are three potential possibilities to be considered when analyzing the improving result of the large and full size asset class:

Basel II:

The Basel II “New Capital Framework” could also be impacting the loan to deposit ratio. For example, the impact of any potential curtailment/decrease in lending regardless of any

movement in the deposit base would “improve” the loan to deposit ratio. But the question is whether this is actually an increase in the deposit base or just a reduction in loans. If the latter is true then deposit and funding may not actually be being stimulated (Bailie, 2015).

The cost of bad debt:

The larger the bank asset base, the larger the cost of bad debt provisions. While it would be imagined that operating income would also be higher relative to asset size, in the current low net interest environment, revenue in the banking system has remained relatively stagnant (Bailie, 2015). Banks cannot continue to absorb such large losses and have potentially strengthened their credit risk policies in order to mitigate such risk. As such this would manifest as a decrease of the loan book and not necessarily a growth in deposits, however the ratio would improve.

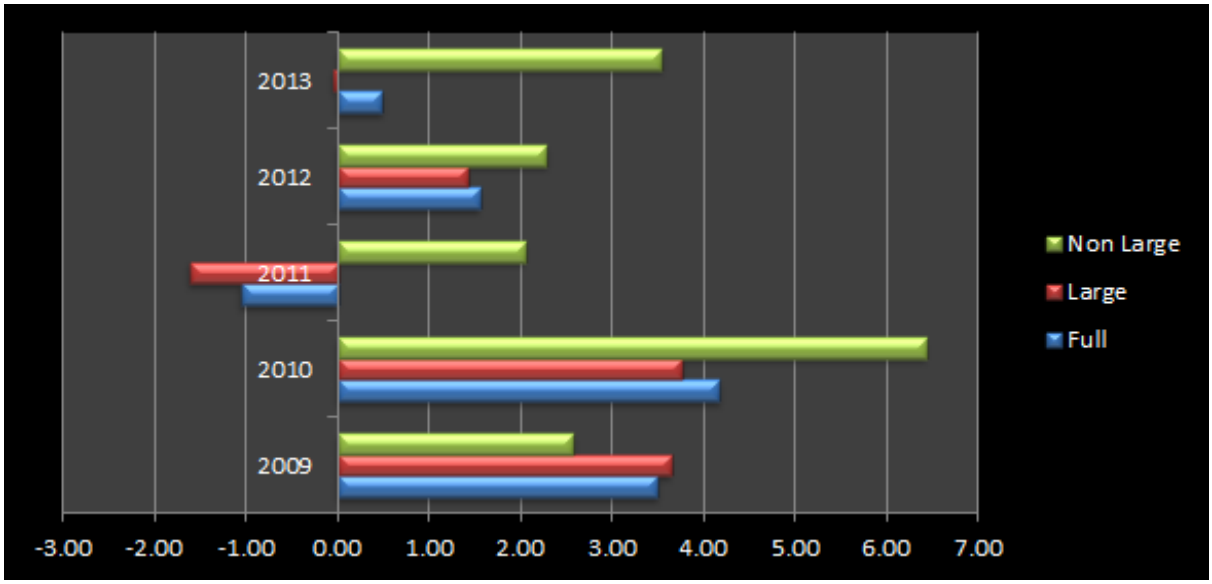
The cost of borrowing and the current interest rate environment:

Interest income to a bank is its core revenue stream. When a bank presents a poor loan to deposit ratio, it is a predetermined choice, a method to stimulate interest revenue. For many years this approach had a favorable impact on performance (Pollock, 2015). However current interest rates are poor and interest revenue is being negatively impacted. Accessing interbank lending has also become more difficult (Bailie, 2015). Therefore when balancing additional borrowing needed to fund an extended loan book against the loss of interest revenue due to the current poor interest environment, increasing the deposit base may be a more practical option (Bailie, 2015). Possibly equipped with superior intellectual property, the full and large sample of banks may realize this fact quicker than the non large asset class and therefore be showing a more active approach to extending the deposit base. Through this approach the ratio would improve.

Performance

Figure 21

Performance: Average performance for full, large and non large subset



With regard to bank performance, figure twenty one highlights one very clear trend. From 2010 to 2013 the non large asset class performed consistently better than its counterparts. Profitability has remained positive for each of the five years and the pattern shows consistent growth between 2011 and 2013.

IV.iii Impairment, liquidity and the strength of the relationship with bank performance

When analyzing the impairment and performance levels of each asset category it can be noted that the full and large sample of assets show a more favorable impairment level when compared with the non large asset class between 2009 and 2013. The non large asset class however show a superior performance result. When analyzing this finding it would initially appear as though impairment has little relationship with the bank performance. However this could be a naive presumption and not necessarily the case (Bailie, 2015).

Firstly, although the full and large samples show a more positive impairment result, this is solely when compared with the non large asset class and is not indicative of a "good impairment result". In fact when examined with the industry benchmark of anything above 5% being subpar, the overall results are quite poor. In 2013 the full sample of assets presented a ratio of 11.30% and the large class a ratio of 11.18%. This volume of impairment should surely affect performance. (Bailie, 2015)

Secondly, the ratio of impairment itself measures the total impaired loans as a percentage of the gross loan book. The volume of the loan book when compared with total assets is not being accounted for. Larger banks can often show a total loan to asset base percentage in excess of 70% (Pollock, 2015). The non large asset class may only be lending to the volume of 50% of total assets, particularly before expansion. If this were the case, the cost of bad debt as opposed to the ratio related to impairment would be higher for the larger bank class. This cost would directly impact the profit and loss account and therefore impact performance.

In regard to liquidity and performance, the non large asset class presents a more favorable loan to deposit ratio from the years 2009 to 2013. Their performance level is better than other sample classes from the year of 2010 until 2013. When comparing the acceptable industry ratio result of 110%, the non large asset class of banks shows a much closer result with a range from 117.83% as of 2010 to a peak of 128.47% as of 2012. Using the year 2010 as an example it can be noted that the non large asset class showed both the best loan to deposit ratio at 117.83% and the best performance result with a RoE of 6.42%. The worst result of performance was found in the large asset class in 2011 at -1.61% and the corresponding liquidity result was a loan to deposit ratio of 161.04%. 161.04% was among the two poorest

results observed in all sample classes between the years of 2009 and 2013. Although not in line with the writer's initial expectations, these figures do suggest the possibility that a more solid loan to deposit result could have a positive effect on performance.

This analysis has observed that both asset and liability quality remain weak within the European banking sector. From the trend analysis and discussion, there appears to be evidence to suggest that both factors could have a strong relationship with performance.

IV.iv An assessment of asset and liquidity quality as indicators of performance within the European banking sector

The research results-SPSS

The initial analysis and discussion examined the current trends and key performance indicators of the European banking area. This provided critical insight into the financial stability of the banking sample from both an asset and liquidity standpoint.

The objective of this next section is to investigate whether significant differences exist between the performances of each sample class of banks based on a certain classification of impairment and liquidity. The European Banking Authorities ranking framework has been used as the benchmark to provide these classifications. The benchmarking structure ranks the results and places both the impairment and liquidity variables into three quartiles. In this study these quartiles are presented as:

- Poor quality
- Going concern
- Good quality

The first section will present a composite table of the overall findings and a discussion of the results. The second section will investigate and discuss the performances of the full, large and non large asset classes based on the impairment classification between the years of 2009 and 2013. Section three will examine and discuss the performance of each of the three groups based on the liquidity classification between the years of 2009 and 2013. After the analysis of both sets of results, a concluding discussion to the research question will be presented.

The results have been analyzed through SPSS. Due to identified deviations in normality, the Kruskal-Wallis H test was relied upon to test if significant differences exist.

Table 7

Presentation of the research results: The Kruskal-Wallis H test outcome. The full, large and non large asset class can be observed.

To test if significant differences between performance based on impairment and liquidity classifications exist.

Y - *Indicates a significant difference exists*
N - *Indicates that no significant difference exists*

	Impairment				
Year	2009	2010	2011	2012	2013
Sample Size	Full sample				
Kruskal-Wallis H test indication of Significant difference	Y	Y	Y	Y	Y
Sample Size	Large asset class				
Kruskal-Wallis H test indication of Significant difference	Y	Y	Y	Y	Y
Sample Size	Non large asset class				
Kruskal-Wallis H test indication of Significant difference	N	Y	N	N	N
	Liquidity				
Year	2009	2010	2011	2012	2013
Sample Size	Full sample				
Kruskal-Wallis H test indication of Significant difference	N	N	N	Y	Y
Sample Size	Large asset class				
Kruskal-Wallis H test indication of Significant difference	N	N	N	Y	Y
Sample Size	Non large asset class				
Kruskal-Wallis H test indication of Significant difference	N	N	N	N	Y

Table seven illustrates the overall results of the Kruskal-Wallis H test for both the impairment and liquidity samples. The Kruskal-Wallis H test was performed on the full, large and non large sample of both categories.

In the category of impairment, the results indicate a significant difference exists between the performance based on the impairment classification in both the full and large asset classes

for the years of 2009 to 2013 inclusive. In regard to the non large asset class, for the years of 2009 and 2011 to 2013 inclusive there is no significant difference observed between the performance based on the impairment classification. 2010 differs however, and the results note a significant difference between the performance based on impairment classification in this year.

The liquidity sample presents more varied results. The results of the Kruskal-Wallis H test indicate that no significant difference exists between the performance based on the liquidity classification in both the full and large class asset sample for the years of 2009 to 2011 inclusive. However this changes to a significant difference in both the years of 2012 and 2013. The non large asset class presents no significant differences from the years 2009 to 2012 inclusive but a significant difference as of 2013.

IV.v Impairment

Central Bank impairment and performance (full sample split by years)

Table 8

Impairment: Tests of Normality Central Bank impairment and performance for the full sample in 2009

Tests of Normality[a]

	CentralBankImpairementIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.274	99	.000	.655	99	.000
	Going Concern	.314	388	.000	.442	388	.000
	Good Quality	.269	139	.000	.487	139	.000

a. Year = 2009

b. Lilliefors Significance Correction

This study considered a total of 626 European banks, of which 99 were classified as having poor quality impairment, 388 with going concern impairment and 139 being classified as having good quality impairment. The results of the Shapiro-Wilk's Tests of Normality were relied on for inferring the presence or absence of normality in each of the samples associated with each of the three levels of bank impairment. The null hypothesis associated with the Shapiro-Wilk's Tests of Normality assumes normality of the sample under consideration. Table eight illustrates that in all three cases the results indicate significant deviations from normality (Wpoor-quality = .655, df = 99, p < .000), (Wgoing-concern = .442, df = 388, p < .000) and (Wgood-quality = .487, df = 139, p < .000).

Table 9

Impairment: Ranks for the full sample in 2009

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	99	246.33
	Going Concern	388	310.53
	Good Quality	139	369.64
	Total	626	

a. Year = 2009

Table 10

Impairment: Test statistics for the full sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	27.156
df	2
Asymp. Sig.	.000

a. Year = 2009

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

Due to identified deviations in normality, the Kruskal-Wallis H test was relied upon to test if significant differences exist between the performances of each of the groups of banks classified as having: poor quality impairment, going-concern impairment and good-quality impairment. In particular, the Kruskal-Wallis H test tests for differences in mean ranks between all groups. The null hypothesis associated with the Kruskal-Wallis H test being one of no difference between the groups mean ranks. The results of this test are shown in Tables nine and ten. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 246.33), (Mdngoing-concern = 310.53), (Mdngood-quality = 369.64), ($\chi 2 = 27.516$, $p < .000$).

In all results to follow, the null hypothesis has been excluded from within the narrative for both tests of normality and tests of differences of mean ranks. In particular, all tests of normality indicated significant deviations from normal.

Table 11

Impairment: Ranks for the full sample in 2010

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	120	235.94
	Going Concern	411	326.80
	Good Quality	95	353.92
	Total	626	

a. Year = 2010

Table 12

Impairment: Test statistics for the full sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	29.040
df	2
Asymp. Sig.	.000

a. Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2010 are shown in Tables eleven and twelve. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 235.94), (Mdngoing-concern = 326.80), (Mdngood-quality = 353.92), ($\chi 2 = 29.040$, $p < .000$).

Table 13

Impairment: Ranks for the full sample in 2011

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	72	211.74
	Going Concern	486	315.60
	Good Quality	68	406.26
	Total	626	

a. Year = 2011

Table 14

Impairment: Test statistics for the full sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	40.752
df	2
Asymp. Sig.	.000

a. Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2011 are shown in Tables thirteen and fourteen. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 211.74), (Mdngoing-concern = 315.60), (Mdngood-quality = 406.26), ($\chi 2 = 40.752$, $p < .000$).

Table 15

Impairment: Ranks for the full sample in 2012

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	63	199.67
	Going Concern	483	316.72
	Good Quality	80	383.73
	Total	626	

a. Year = 2012

Table 16

Impairment: Test statistics for the full sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	37.173
df	2
Asymp. Sig.	.000

a. Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2012 are shown in Tables fifteen and sixteen. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 199.67), (Mdngoing-concern = 316.72), (Mdngood-quality = 383.73), ($\chi 2 = 37.173$, $p < .000$).

Table 17

Impairment: Ranks for the full sample in 2013

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	124	188.50
	Going Concern	424	333.95
	Good Quality	78	401.05
	Total	626	

a. Year = 2013

Table 18

Impairment: Test statistics for the full sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	82.932
df	2
Asymp. Sig.	.000

a. Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2013 are shown in Tables seventeen and eighteen. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 188.50), (Mdngoing-concern = 333.95), (Mdngood-quality = 401.05), ($\chi 2 = 82.932$, $p < .000$).

Central Bank impairment and performance (large class asset sample split by years)

Table 19

Impairment: Tests of Normality Central Bank impairment and performance for the large class asset sample in 2009

Tests of Normality[a]

	CentralBankImpairementIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.278	70	.000	.652	70	.000
	Going Concern	.319	342	.000	.455	342	.000
	Good Quality	.268	129	.000	.493	129	.000

a. AssetSize = Large Asset, Year = 2009

b. Lilliefors Significance Correction

This study considered a total of 541 European banks, of which 70 were classified as having poor quality impairment, 342 with going concern impairment and 129 being classified as having good quality impairment. Table nineteen illustrates that in all three cases the results indicate significant deviations from normality ($W_{poor\text{-}quality} = .652$, $df = 70$, $p < .000$), ($W_{going\text{-}concern} = .455$, $df = 342$, $p < .000$) and ($W_{good\text{-}quality} = .493$, $df = 129$, $p < .000$).

Table 20

Impairment: Ranks for the large sample in 2009

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	70	225.96
	Going Concern	342	263.41
	Good Quality	129	315.55
	Total	541	

a. AssetSize = Large Asset, Year = 2009

Table 21

Impairment: Test statistics for the large sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	17.094
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2009

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2009 are shown in Tables twenty and twenty one. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification ($Mdn_{poor\text{-}quality} = 225.96$), ($Mdn_{going\text{-}concern} = 263.41$), ($Mdn_{good\text{-}quality} = 315.55$), ($\chi 2 = 17.094$ $p < .000$).

Table 22

Impairment: Ranks for the large sample in 2010

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	91	202.16
	Going Concern	362	278.98
	Good Quality	88	309.35
	Total	541	

a. AssetSize = Large Asset, Year = 2010

Table 23

Impairment: Test statistics for the large sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	23.890
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2010 are shown in Tables twenty two and twenty three. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 202.16), (Mdngoing-concern = 278.98), (Mdngood-quality = 309.35), ($\chi 2 = 23.890$, $p < .000$).

Table 24

Impairment: Ranks for the large sample in 2011

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	60	170.28
	Going Concern	416	272.90
	Good Quality	65	351.84
	Total	541	

a. AssetSize = Large Asset, Year = 2011

Table 25

Impairment: Test statistics for the large sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	42.353
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2011 are shown in Tables twenty four and twenty five. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 170.28), (Mdngoing-concern = 272.90), (Mdngood-quality = 351.84), ($\chi 2 = 42.353$, $p < .000$).

Table 26

Impairment: Ranks for the large sample in 2012

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	52	163.88
	Going Concern	412	273.41
	Good Quality	77	330.45
	Total	541	

a. AssetSize = Large Asset, Year = 2012

Table 27

Impairment: Test statistics for the large sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	35.652
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2012 are shown in Tables twenty six and twenty seven. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 163.88), (Mdngoing-concern = 273.41), (Mdngood-quality = 330.45), ($\chi 2 = 35.652$, $p < .000$).

Table 28

Impairment: Ranks for the large sample in 2013

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	108	152.31
	Going Concern	360	290.28
	Good Quality	73	351.53
	Total	541	

a. AssetSize = Large Asset, Year = 2013

Table 29

Impairment: Test statistics for the large sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	87.115
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2013 are shown in Tables twenty eight and twenty nine. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 152.31), (Mdngoing-concern = 290.28), (Mdngood-quality = 351.53), ($\chi 2 = 87.115$, $p < .000$).

Central Bank impairment and performance (non large class asset sample split by years)

Table 30

Impairment: Tests of Normality Central Bank impairment and performance for the non large class asset sample in 2009

Tests of Normality*

	CentralBankImpairementIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		Shapiro-Wilk[b]
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.296	29	.000	.616	29	.000
	Going Concern	.122	46	.086	.962	46	.137
	Good Quality	.173	10	.200[-]	.939	10	.541

*. This is a lower bound of the true significance.
a. AssetSize = Non Large Asset, Year = 2009
b. Lilliefors Significance Correction

This study considered a total of 85 European Banks, of which 29 were classified as having poor quality impairment, 46 with going concern impairment and 10 being classified as having good quality impairment. Table thirty illustrates that in at least one case the results indicate significant deviations from normality (Wpoor-quality = .616, df = 29, p < .000), (Wgoing-concern = .962, df = 46, p < .137) and (Wgood-quality = .939, df = 10, p < .541).

Table 31

Impairment: Ranks for the non large sample in 2009

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	29	32.47
	Going Concern	46	48.18
	Good Quality	10	49.70
	Total	85	

a. AssetSize = Non Large Asset, Year = 2009

Table 32

Impairment: Test statistics for the non large sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	8.050
df	2
Asymp. Sig.	.018

a. AssetSize = Non Large Asset, Year = 2009
b. Kruskal Wallis Test
c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2010 are shown in Tables thirty one and thirty two. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the

performance of each of the three groups based on impairment classification (Mdnpoor-quality = 32.47), (Mdngoing-concern = 48.18), (Mdngood-quality = 49.70), ($\chi 2 = 8.050$ $p < .018$).

Table 33

Impairment: Ranks for the non large sample in 2010

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	29	31.17
	Going Concern	49	49.95
	Good Quality	7	43.36
	Total	85	

a. AssetSize = Non Large Asset, Year = 2010

Table 34

Impairment: Test statistics for the non large sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	10.546
df	2
Asymp. Sig.	.005

a. AssetSize = Non Large Asset, Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2010 are shown in Tables thirty three and thirty four. The results of the Kruskal-Wallis H test indicate that a significant difference exists between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 31.17), (Mdngoing-concern = 49.95), (Mdngood-quality = 43.36), ($\chi 2 = 10.546$, $p < .005$).

Table 35

Impairment: Ranks for the non large sample in 2011

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	12	44.46
	Going Concern	70	43.21
	Good Quality	3	32.33
	Total	85	

a. AssetSize = Non Large Asset, Year = 2011

Table 36

Impairment: Test statistics for the non large sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	.607
df	2
Asymp. Sig.	.738

a. AssetSize = Non Large Asset, Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2011 are shown in Tables thirty five and thirty six. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 44.46), (Mdngoing-concern = 43.21), (Mdngood-quality = 32.33), ($\chi 2 = .607$, $p < .738$).

Table 37

Impairment: Ranks for the non large sample in 2012

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	11	35.23
	Going Concern	71	43.94
	Good Quality	3	49.33
	Total	85	

a. AssetSize = Non Large Asset, Year = 2012

Table 38

Impairment: Test statistics for the non large sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	1.391
df	2
Asymp. Sig.	.499

a. AssetSize = Non Large Asset, Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2012 are shown in Tables thirty seven and thirty eight. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 35.23), (Mdngoing-concern = 43.94), (Mdngood-quality = 49.33), ($\chi 2 = 1.391$, $p < .499$).

Table 39

Impairment: Ranks for the non large sample in 2013

Ranks[a]

	CentralBankImpairementIndicator	N	Mean Rank
Performance	Poor Quality	16	38.44
	Going Concern	64	43.98
	Good Quality	5	45.00
	Total	85	

a. AssetSize = Non Large Asset, Year = 2013

Table 40

Impairment: Test Statistics for the non large sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	.681
df	2
Asymp. Sig.	.711

a. AssetSize = Non Large Asset, Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankImpairementIndicator

The results of the test for 2013 are shown in Tables thirty nine and forty. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on impairment classification (Mdnpoor-quality = 38.44), (Mdngoing-concern = 43.98), (Mdngood-quality = 45.00), ($\chi 2 = .681$, $p < .711$).

IV.vi Impairment as an indicator of performance

Discussion of results:

The full and large class asset samples:

The initial analysis regarding key performance indicators and trends illustrated that the full and large class sample of banks had a more favorable average impairment result than the non large asset class; however impairment percentages observed were still high. As has been discussed, anything in excess of 5% in the banking industry is considered sub-par (Pollock, 2015). The best impairment result noted in the trend analysis was 5.88%. This result was contained in the large asset class in 2009.

The results of Kruskal-Wallis H test indicate that a significant difference exists between performance based on the impairment classification of the full and large asset classes for the years of 2009 to 2013 inclusive. These results are in line with the writer's expectations and the key trends presented for these classes.

Figure 22

The fluctuation of impairment classification in the full asset sample

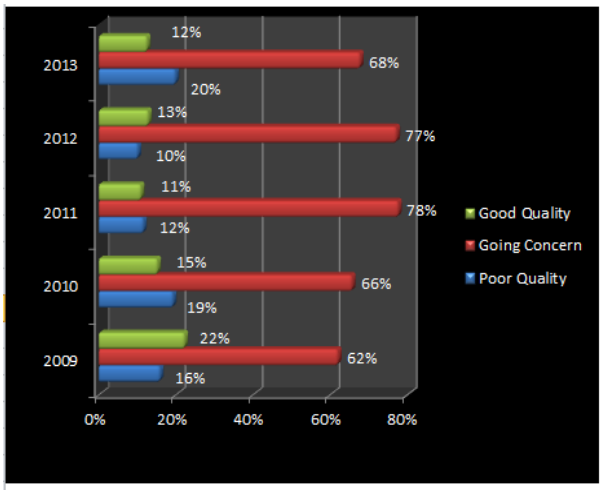


Figure 23

The fluctuation of impairment classification in the large asset sample

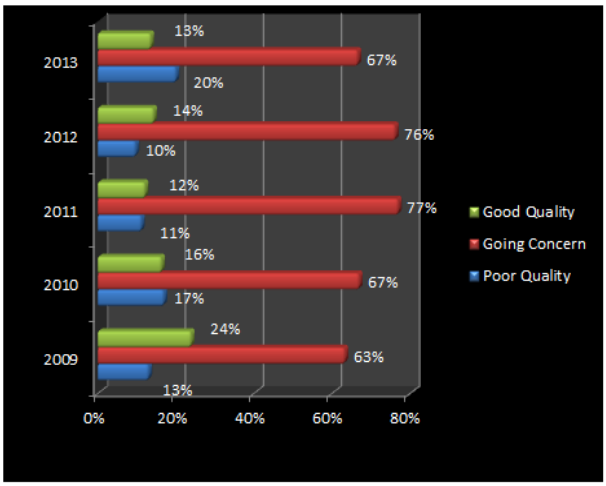


Figure twenty two and twenty three illustrate the percentage that each category of impairment accounts for between the years of 2009 and 2013. For each of these years, it can be clearly

noted that the majority of banks in both the full and large sample fall into the “going concern” category. Therefore these banks are neither considered to be poor or good quality but “going concern” i.e “adequate”. One potential reason that these impairment results although considered adequate may be impacting performance could be the cost of the bad debt provisions. For example, if a bank is showing an impairment level of 9.00% and a loanbook weighted in excess of 80% of the total asset size, then the cost of bad debt in the profit and loss account would be substantial. This would particularly be the case if the bank size was considered as “significant” by the SSM. While a larger asset size should correspond to a larger operating income, which could help to mitigate these losses, in the current low interest environment, revenue in the banking system has remained relatively stagnant (Pollack, 2015).

The non large class asset sample:

The results of Kruskal-Wallis H test for the non large asset class diverge from the full and large size. While the years of 2009 and 2011 to 2013 inclusive did not indicate that a significant existed difference between performances based on impairment classification, the 2010 results did note a significant difference.

Figure 24

The fluctuation of impairment classification in the non large asset sample

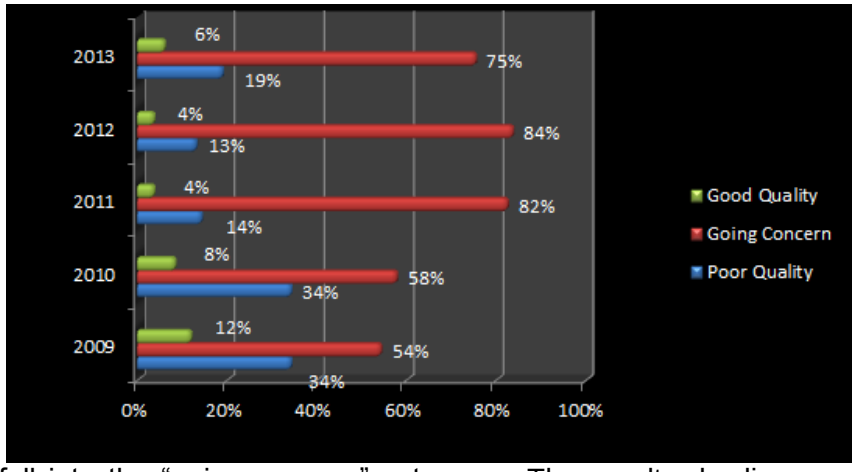


Figure twenty four illustrates the percentage that each category of impairment accounts for between the years of 2009 to 2013. Folllowing the pattern of the full and large sample, it can be noted that the majority of banks fall into the “going concern” category. The results do diverge more pointedly however and range from 54% in the year of 2009 to 75% in the most current year of 2013.

Analysing the year of 2010, it can be observed that the “poor quality” classification accounts for 34% of the non large sample. 34% is the highest result of “poor quality” impairment noted

in all three sample sizes over the five year period. Although the same value was noted for 2009, the “good quality” category also deteriorated from 12% in 2009 to 8% in 2010. The fluctuation between impairment categories may have caused the results to differ in 2010. The non large asset class also contain the lowest value of “good quality” impairment classification. Although the decline in “good quality” continues to deteriorate in 2011 and 2012 there is a smaller percentage of “poor quality” impairment noted.

Among potential reasons as to why there is no significant difference found between performance based on impairment classification for the years of 2009 and 2011 to 2013 inclusive may be the asset and corresponding loan book size and/or asset size and agility. As key informants have noted, there is a possibility that the volume of lending in the non large asset size may only equate to 50% of the total assets, this in turn would mean a lower bad debt cost to the profit and loss account (Pollock, 2015). This would apply even if the impairment percentage as discussed in the key trends was particularly high (Pollock, 2015). Also as can be observed in many industries, a smaller asset size can allow for more agility in the market place. These non large banks may be quicker to the market with new products and/or present a more diversified revenue stream, thus stimulating revenue. The higher the revenue, the higher the cushion available to absorb bad debt (Bailie, 2015). Strengthening this argument, the key performance indicators and trends did observe that on average the non large asset class performed consistenly better, showing a higher RoE and than the full and large asset class sample.

IV.vii Liquidity

Central Bank liquidity and performance (full sample split by years)

Table 41

Liquidity: Tests of Normality Central Bank liquidity and performance for the full sample in 2009

Tests of Normality[a]

	CentralBankLiquidityIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.291	386	.000	.544	386	.000
	Going Concern	.390	91	.000	.346	91	.000
	Good Quality	.151	149	.000	.855	149	.000

a. Year = 2009

b. Lilliefors Significance Correction

This study considered a total of 626 European banks, of which 386 were classified as having poor quality liquidity, 91 with going concern liquidity and 149 being classified as having good quality liquidity. Table forty one illustrates that in all three cases the results indicate significant deviations from normality (Wpoor-quality = .544, df = 386, p < .000), (Wgoing-concern = .346, df = 91, p < .000) and (Wgood-quality = .855, df = 149, p < .000).

Table 42

Liquidity: Ranks for the full sample in 2009

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	386	304.61
	Going Concern	91	312.79
	Good Quality	149	336.95
	Total	626	

a. Year = 2009

Table 43

Liquidity: Test statistics for the full sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	3.439
df	2
Asymp. Sig.	.179

a. Year = 2009

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2009 are shown in Tables forty two and forty three. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the

performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 304.61), (Mdngoing-concern = 312.79), (Mdngood-quality = 336.95), ($\chi 2 = 3.439$, $p < .179$).

Table 44

Liquidity: Ranks for the full sample in 2010

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	337	302.00
	Going Concern	130	315.36
	Good Quality	159	336.36
	Total	626	

a. Year = 2010

Table 45

Liquidity: Test statistics for the full sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	3.919
df	2
Asymp. Sig.	.141

a. Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2010 are shown in Tables forty four and forty five. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 302.00), (Mdngoing-concern = 315.36), (Mdngood-quality = 336.36), ($\chi 2 = 3.919$, $p < .141$).

Table 46

Liquidity: Ranks for the full sample in 2011

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	316	303.77
	Going Concern	160	331.53
	Good Quality	150	314.77
	Total	626	

a. Year = 2011

Table 47

Liquidity: Test statistics for the full sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	2.513
df	2
Asymp. Sig.	.285

a. Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2011 are shown in Tables forty six and forty seven. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 303.77), (Mdngoing-concern = 331.53), (Mdngood-quality = 314.77), ($\chi 2 = 2.513$, $p < .285$).

Table 48

Liquidity: Ranks for the full sample in 2012

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	358	289.47
	Going Concern	132	341.69
	Good Quality	136	349.41
	Total	626	

a. Year = 2012

Table 49

Liquidity: Test statistics for the full sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	14.891
df	2
Asymp. Sig.	.001

a. Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2012 are shown in Tables forty eight and forty nine. The results of the Kruskal-Wallis H test indicate a significant difference exists between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 289.47), (Mdngoing-concern = 341.69), (Mdngood-quality = 349.41), ($\chi 2 = 14.891$, $p < .001$).

Table 50

Liquidity: Ranks for the full sample in 2013

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	358	277.46
	Going Concern	146	341.37
	Good Quality	122	385.90
	Total	626	

a. Year = 2013

Table 51

Liquidity: Test statistics for the full sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	37.233
df	2
Asymp. Sig.	.000

a. Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2013 are shown in Tables fifty and fifty one. The results of the Kruskal-Wallis H test indicate a significant difference exists between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 277.46), (Mdngoing-concern = 341.37), (Mdngood-quality = 385.90), ($\chi 2 = 37.233$, $p < .000$).

Central Bank liquidity and performance (large class asset sample split by years)

Table 52

Liquidity: Tests of Normality Central Bank liquidity and performance for the large class asset sample in 2009

Tests of Normality[a]

	CentralBankLiquidityIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		Shapiro-Wilk[b]
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.292	352	.000	.553	352	.000
	Going Concern	.380	74	.000	.369	74	.000
	Good Quality	.110	115	.000	.925	115	.000

a. AssetSize = Large Asset, Year = 2009

b. Lilliefors Significance Correction

This study considered a total of 541 European banks, of which 352 were classified as having poor quality liquidity, 74 with going concern liquidity and 115 being classified as having good quality liquidity. Table fifty two illustrates that in all three cases our results indicate significant deviations from normality (Wpoor-quality = .553, df = 352, p < .000), (Wgoing-concern = .369, df = 74, p < .000) and (Wgood-quality = .925, df = 115, p < .000).

Table 53

Liquidity: Ranks for the large sample in 2009

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	352	259.70
	Going Concern	74	272.59
	Good Quality	115	304.56
	Total	541	

a. AssetSize = Large Asset, Year = 2009

Table 54

Liquidity: Test statistics for the large sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	7.148
df	2
Asymp. Sig.	.028

a. AssetSize = Large Asset, Year = 2009

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of this test for 2009 are shown in Tables forty two and forty three. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the

performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 259.70), (Mdngoing-concern = 272.59), (Mdngood-quality = 304.56), ($\chi 2 = 7.148$, $p < .028$).

Table 55

Liquidity: Ranks for the large sample in 2010

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	311	264.62
	Going Concern	110	270.43
	Good Quality	120	288.07
	Total	541	

a. AssetSize = Large Asset, Year = 2010

Table 56

Liquidity: Test statistics for the large sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	1.950
df	2
Asymp. Sig.	.377

a. AssetSize = Large Asset, Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2010 are shown in Tables fifty five and fifty six. The results of the Kruskal-Wallis H test indicate there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 264.62), (Mdngoing-concern = 270.43), (Mdngood-quality = 288.07), ($\chi 2 = 1.950$, $p < .377$).

Table 57

Liquidity: Ranks for the large sample in 2011

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	289	258.69
	Going Concern	141	287.34
	Good Quality	111	282.31
	Total	541	

a. AssetSize = Large Asset, Year = 2011

Table 58

Liquidity: Test statistics for the large sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	3.914
df	2
Asymp. Sig.	.141

a. AssetSize = Large Asset, Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2011 are shown in Tables fifty seven and fifty eight. The results of the Kruskal-Wallis H test indicate there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 258.69), (Mdngoing-concern = 287.34), (Mdngood-quality= (282.31), ($\chi 2 = 3.914$, $p < .141$).

Table 59

Liquidity: Ranks for the large sample in 2012

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	326	250.49
	Going Concern	109	299.92
	Good Quality	106	304.35
	Total	541	

a. AssetSize = Large Asset, Year = 2012

Table 60

Liquidity: Test statistics for the large sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	14.168
df	2
Asymp. Sig.	.001

a. AssetSize = Large Asset, Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2012 are shown in Tables fifty nine and sixty. The results of the Kruskal-Wallis H test indicate a significant difference exists between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 250.49), (Mdngoing-concern = 299.92), (Mdngood-quality = 304.35), ($\chi 2 = 14.168$, $p < .001$).

Table 61

Liquidity: Ranks for the large sample in 2013

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	327	247.11
	Going Concern	119	289.55
	Good Quality	95	329.99
	Total	541	

a. AssetSize = Large Asset, Year = 2013

Table 62

Liquidity: Test statistics for the large sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	22.843
df	2
Asymp. Sig.	.000

a. AssetSize = Large Asset, Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2013 are shown in Tables sixty one and sixty two. The results of the Kruskal-Wallis H test indicate a significant difference exists between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 247.11), (Mdngoing-concern = 289.55), (Mdngood-quality = 329.99), ($\chi 2 = 22.843$, $p < .000$).

Central Bank liquidity and performance (non large class asset sample split by years)

Table 63

Liquidity: Tests of Normality Central Bank impairment and performance for the non large class asset sample in 2009

Tests of Normality[a]

	CentralBankLiquidityIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.196	34	.002	.817	34	.000
	Going Concern	.234	17	.014	.808	17	.003
	Good Quality	.265	34	.000	.591	34	.000

a. AssetSize = Non Large Asset, Year = 2009

b. Lilliefors Significance Correction

This study considered a total of 85 European banks, of which 34 were classified as having poor quality liquidity, 17 with going concern liquidity and 34 being classified as having good quality liquidity. Table sixty three illustrates that in all three cases the results indicate significant deviations from normality (Wpoor-quality = .817, df = 34, p < .000), (Wgoing-concern = .808, df = 17, p < .003) and (Wgood-quality = .591, df = 34, p < .000).

Table 64

Liquidity: Ranks for the non large sample in 2009

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	34	42.46
	Going Concern	17	43.24
	Good Quality	34	43.43
	Total	85	

a. AssetSize = Non Large Asset, Year = 2009

Table 65

Liquidity: Test statistics for the non large sample in 2009

Test Statistics[a,b,c]

	Performance
Chi-Square	.028
df	2
Asymp. Sig.	.986

a. AssetSize = Non Large Asset, Year = 2009

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2009 are shown in Tables sixty four and sixty five. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 42.46), (Mdngoing-concern = 43.24), (Mdngood-quality = 43.43), ($\chi 2$ = .028, p < .986).

Table 66

Liquidity: Ranks for the non large sample in 2010

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	26	36.42
	Going Concern	20	45.48
	Good Quality	39	46.12
	Total	85	

a. AssetSize = Non Large Asset, Year = 2010

Table 67

Liquidity: Test statistics for the non large sample in 2010

Test Statistics[a,b,c]

	Performance
Chi-Square	2.669
df	2
Asymp. Sig.	.263

a. AssetSize = Non Large Asset, Year = 2010

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2010 are shown in Tables sixty six and sixty seven. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 36.42), (Mdngoing-concern = 45.48), (Mdngood-quality = 46.12), ($\chi 2 = 2.669$, $p < .263$).

Table 68

Liquidity: Ranks for the non large sample in 2011

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	27	43.43
	Going Concern	19	44.05
	Good Quality	39	42.19
	Total	85	

a. AssetSize = Non Large Asset, Year = 2011

Table 69

Liquidity: Test statistics for the non large sample in 2011

Test Statistics[a,b,c]

	Performance
Chi-Square	.084
df	2
Asymp. Sig.	.959

a. AssetSize = Non Large Asset, Year = 2011

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2011 are shown in Tables sixty eight and sixty nine. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 43.43), (Mdngoing-concern = 44.05), (Mdngood-quality = 42.19), ($\chi 2 = .084$, $p < .959$).

Table 70

Liquidity: Ranks for the non large sample in 2012

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	32	37.83
	Going Concern	23	42.74
	Good Quality	30	48.72
	Total	85	

a. AssetSize = Non Large Asset, Year = 2012

Table 71

Liquidity: Test statistics for the non large sample in 2012

Test Statistics[a,b,c]

	Performance
Chi-Square	3.017
df	2
Asymp. Sig.	.221

a. AssetSize = Non Large Asset, Year = 2012

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2012 are shown in Tables seventy and seventy one. The results of the Kruskal-Wallis H test indicate that there is no significant difference between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 37.83), (Mdngoing-concern = 42.74), (Mdngood-quality = 48.72), ($\chi 2 = 3.017$, $p < .221$).

Table 72

Liquidity: Ranks for the non large sample in 2013

Ranks[a]

	CentralBankLiquidityIndicator	N	Mean Rank
Performance	Poor Quality	31	30.27
	Going Concern	27	47.85
	Good Quality	27	52.76
	Total	85	

a. AssetSize = Non Large Asset, Year = 2013

Table 73

Liquidity: Test statistics for the non large sample in 2013

Test Statistics[a,b,c]

	Performance
Chi-Square	13.507
df	2
Asymp. Sig.	.001

a. AssetSize = Non Large Asset, Year = 2013

b. Kruskal Wallis Test

c. Grouping Variable: CentralBankLiquidityIndicator

The results of the test for 2013 are shown in Tables seventy two and seventy three. The results of the Kruskal-Wallis H test indicate a significant difference exists between the performance of each of the three groups based on liquidity classification (Mdnpoor-quality = 30.27), (Mdngoing-concern = 47.85), (Mdngood-quality = 52.76), ($\chi 2 = 13.507$, $p < .001$).

IV.viii Liquidity as an indicator of performance

Discussion of results:

The full and large class asset samples:

For the years of 2009 to 2011 inclusive, the results of Kruskal-Wallis H test indicate that no significant difference exists between the performance based on the liquidity classification of the full and large asset classes. In the years of 2012 and 2013 however, there was a change to these results and the findings show a significant difference between performances based on the liquidity classification. The liquidity trends discussed in the initial trend analysis and discussion do show an improvement in this ratio for both those classes concerned between the years of 2011 to 2013. It is imperative to note however that this "improvement" is marginal and the results still remain poor (Pollock, 2015).

Figure 25

The fluctuation of liquidity classification in the full asset sample

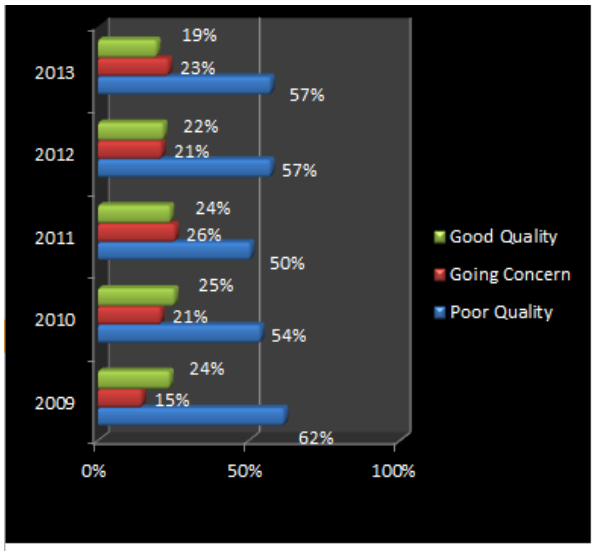


Figure 26

The fluctuation of liquidity classification in the large asset sample

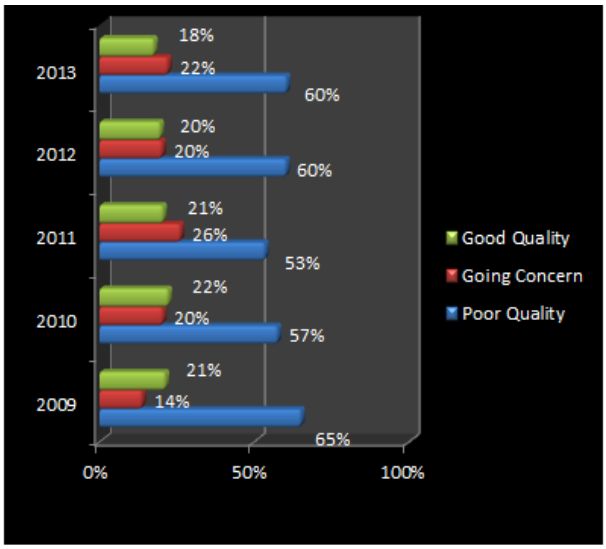


Figure twenty five and twenty six illustrate the percentage that each category of liquidity accounts for between the years of 2009 to 2013. The most immediate observation is that the majority of banks fall into the "poor quality" bracket. This is consistent throughout the years of 2009 to 2013. As discussed, key informants regard a ratio of 110% as an acceptable industry average (Bailie, 2015). Therefore when considering that the best performing loan to deposit

ratio over the five years was 144.07% for the full sample and 148.08% for the large sample, the volume of banks falling into the “poor quality” category is not surprising and in line with the key trends and industry benchmarks across the European banking sector.

What is interesting however is that there is no significant difference between performance and liquidity classification found in either sample during the years of 2009 to 2011. 2009 however presents the highest volume of “poor quality” liquidity classification with the full sample showing 62% and the large sample as high as 65%. Yet there is a significant difference noted between performance and liquidity classification for the years of 2012 and 2013. In 2012 and 2013 the “poor quality” category accounts for 57% in the full sample and 60% in the large sample. However although the “poor quality” category has decreased between the year of 2009 versus 2012 and 2013, so too has the percentage of “good quality” liquidity. This is particularly notable in the full class sample, where the “good quality” category of liquidity accounted for 24% in 2009 but deteriorated to 19% in 2013.

As mentioned, although the key trends show an improved ratio between the years of 2011 to 2013, this improvement was actually marginal and the ratio still remains at quite a poor level (Bailie, 2015). Therefore all of the years actually present a poor average ratio result. When considering this important fact, then other more current issues come into question. Was there any change observed in the banking system in current years?

One potential reason that a poor liquidity classification could have impacted performance during the years of 2012 and 2013 could be low interest environment (Pollock, 2015). Interest income to a bank is its core revenue stream. When a bank presents a poor loan to deposit ratio, it is a predetermined choice, a method to stimulate interest revenue. For many years this approach had a favorable impact on performance (Pollock, 2015).

However, in order to stimulate lending, the ECB cut interest rates thus affecting the banks main income stream. The impact of change was rapid with ECB benchmark rates falling from 4.20% to 0.50% between 2009 and 2013 (ECB, 2015). The impact of this would have been felt particularly during 2012 and 2013 as these changes can take time to eventually impact the performance of a bank. If the bank has a poor loan to deposit ratio then they have difficulty in self-funding and have made a choice to borrow instead in order to fund this lending. Although the key trends show a slightly improved loan to deposit ratio between 2011 and 2013, it is still unacceptably high and can be considered as “poor” (Bailie, 2015). Therefore in essence, the majority of these banks are overextended.

Prior to the crisis, the revenue opportunity could have outweighed the cost of borrowing (Pollock, 2015). However bank borrowing is currently not as accessible as it once was. Therefore when balancing additional borrowing needed to fund an extended loan book against the loss of interest revenue due to the current poor interest environment, the cost may currently be outweighing the benefit. Therefore the banks are not only dealing with a lower net interest revenue which will have a direct impact on performance but also with a lower revenue to absorb the cost of bad debt that can come with an extended loan book.

The non large class asset sample:

The results of Kruskal-Wallis H test in the non large asset class indicated that no significant difference existed between the performance based on the liquidity classification for the years of 2009 to 2012 inclusive. However, 2013 does indicate the existence of a significant difference between performances based on liquidity classification.

Figure 27

The fluctuation of liquidity classification in the non large asset sample

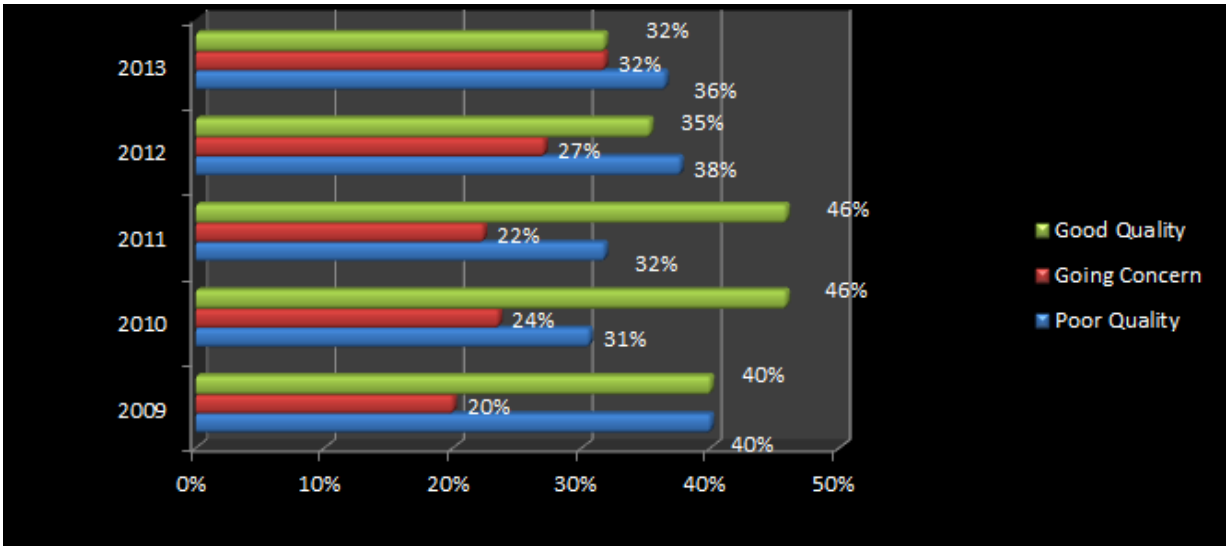


Figure twenty seven illustrates the percentage that each category of liquidity accounts for on a yearly basis. The pattern of results in regard to categorization are more evenly spread in the non large asset sample with 2009 to 2012 actually showing the majority of the liquidity falling into the “good quality” category particularly during 2010 and 2011 with a percentage of 46% in both years. This result is in line with the key trends and analysis. In the years of 2009 and

2010 the average loan to deposit ratio came very close to industry expectations falling between 117-118% (Pollock, 2015).

One of the most pivotal findings is that the non large sample does show the existence of a significant difference between performances based on liquidity classification in 2013. The key trends show that the ratio of loan to deposits during 2013 for this sample was 122.47%. However this ratio of 122.47% is far lower than highs of 163.35% presented in the large sample during 2009 which did not observe any differences between the performance and liquidity categorization. This further follows on from the analysis of the full and large samples indicating that the ratio itself may not be impacting performance however associated factors may.

Although the average loan to deposit ratio for 2013 observed in the non large class of banks was much better when compared with the large and full samples, like cannot be compared with like. Bank size again needs to be called into question. As lending is extended past a loan to deposit ratio of 100% then need for further funding is required. For a non large bank, particularly one that is stand alone and not part of a larger group, access to funding may be even more difficult and hence more costly (Bailie, 2015). This cost may be potentially impacting performance in the non large asset class (Bailie, 2015).

As also noted in the initial analysis, many banks presented in this category could be perceived as “medium size” and in the grey zone. If this is the case then asset base and volume of lending may be growing more rapidly. If the volume of lending is rising rapidly then so too is the cost of borrowing. This could also be a reason why the non large asset class only began to observe significant difference in performance a year later than the larger sample, the cost of borrowing could have grown quite rapidly. The question is whether the revenue is increasing quickly enough to absorb this larger borrowing cost. If not then this could be a further cause of the significant difference between performance based on liquidity category observed in 2013.

IV.ix The combination of asset quality and liquidity

Concluding results

Both the impairment and liquidity results are poor when equated with industry benchmarks. This is true for every year observed. This result is not surprising given the current climate.

The results of Kruskal-Wallis H test consistently show that poor impairment is affecting the performance in the larger banks. The key trend analysis showed an average impairment result of 5.88% in 2009 to an increase to 11.18% in 2013. However both years show that the impairment levels are impacting performance. Therefore, it appears that this could be volume rather than percentage based. Liquidity levels however, are mixed and appear to affect the larger asset banks only when subject to associated factors such as external market shocks i.e. a low interest environment. When combining poor results in regard both asset and liquidity quality, the findings suggest the larger banks are more affected by impairment and can absorb a poor liquidity result providing that normal market conditions prevail.

The effects of impairment appear less severe in the non large asset class. These banks seem to have the capacity to absorb bad debt losses, even with a growing percentage of impairment. The results of Kruskal-Wallis H test show that there is no significant difference to performance in four of the five years observed. The liquidity results on the other hand are mixed and appear to impact the non large banks in a similar manner to the large banks. This would suggest that the non large asset class an also absorb a combination of both poor impairment and liquidity results given normal market conditions. Although the current liquidity trends are poor in both classes, the non large asset class present a better ratio result. This could mean that even with a better liquidity ratio borrowing costs can be more problematic for the non large asset class. This would absolutely be in line with the writers expectations. A non large bank is less likely to be part of a consolidated group and therefore access to funding is likely to be even more difficult (Bailie, 2015).

Chapter V

V.i Conclusion

'….we cannot define a caterpillar and then use the same definition for a butterfly'.

(Penrose, 1995 p.19).

The overall aim of this study was to provide key stakeholders within the European banking industry with an empirical basis to make a more informed decision when evaluating banks performance. Specifically, the main objectives of the study were to investigate the relationship between asset quality, liquidity and their impact on bank performance.

The relationship between asset quality and performance

This study has found statistically significant evidence to suggest impairment levels are a valid indicator of bank performance for the large asset class of banks. The results were consistent in all years observed. However, this was not the case for the non large asset class. An unexpected finding here was that the analysis identified no significant variance between performance and impairment categories in four of the five years observed.

The analysis also revealed a trend of deterioration in impairment levels within the European banking sector across all asset classes. This was found to be consistent in all years observed. However, the non large asset class presented a poorer impairment result. This was another unexpected finding and indicates the relationship between performance and impairment differs, dependent on asset size. This finding also suggests impairment as an indicator of performance is subject to certain *caveats*. The volume of lending extended in relation to the volume of total assets is an important component when evaluating the impairment ratio. Further investigation through key informants disclosed that the loan book generally accounts for a smaller percentage of the total assets in the non large asset class. This would explain how impairment level is not impacting significantly on the performance of the smaller size banks (Bailie, 2015; Pollock, 2015). These findings (obtained from both primary and secondary analysis) echo the sentiments expressed in the quote from Penrose

(1995) above: when studying any phenomenon consideration needs to be given to its stage of development.

The relationship between liquidity quality and performance

The findings with regard to liquidity quality as an indicator of bank performance were mixed. The study found that the category of liquidity impacted the performance of the large asset class in two of five years and the performance of the non large asset class in one of the five years.

Although the analysis indicates that the trend of liquidity remains poor within the European banking system, it is showing a recent improvement in both the large and non large asset class. However, in spite of these improvements, it is the recent years that show liquidity quality significantly impacting on bank performance. This suggests that the current competitive net interest environment is impacting the banks. If the liquidity ratio is improving it could be caused by a decline in lending. This would result in lower profitability thus impacting net interest income. As the current liquidity level is still poor when compared with industry standards, it is clear that there are still a significant amount of banks in need of external market funding to support their loan book. However current access to funding is difficult and potentially more expensive.

As lending appears to be decreasing, so too does the net interest income and the cushion to absorb the borrowing costs. Therefore banks with a better category of liquidity should be in a stronger position.

This could possibly explain why bank performance has only begun to be affected by liquidity of late. This suggests that liquidity quality alone may not be a valid indicator of performance regardless of bank size, but, may in fact be indirectly influenced by external market shocks.

The combination of asset and liquidity quality and performance

Regardless of asset size, the impairment and liquidity results are poor when equated with industry benchmarks. This is true for every year observed and the results are not surprising given the current climate and legacy of the financial crisis.

In summary, the findings consistently show that impairment level is affecting the performance in the larger banks. However, the liquidity appears to affect the larger asset banks only when subject to external market factors such as a low interest environment. When combining poor

results with regards to asset and liquidity quality, the findings suggest that larger banks are more affected by impairment and can absorb a poorer liquidity result provided normal market conditions prevail.

The effect of a combination of poor asset and liquidity quality appears to differ when assessing the non large banks. These banks appear to have the ability to absorb bad debt losses, even with a growing percentage of impairment. Liquidity on the other hand appears to impact the non large banks in a similar manner to the large banks. This would suggest that the non large asset class can also absorb both poor impairment and liquidity results under normal market conditions.

V.ii Limitations of this study

'Still today, most banks around the world use return on equity – RoE - as their main metric of profitability'.

(Jenkins, 2011, para.3).

Ratios

Financial ratios, on their own, cannot evaluate all aspects of organizational performance (Fridson and Alvarez, 2011). Furthermore no single ratio can be used to measure all aspects of profitability (Nissim and Penman, 2001). However as noted by Jenkins (2011) RoE is a generally well regarded measure of bank performance.

Unbalanced Sample Size

The database used in this study focused on the largest banks in the European banking sector. Therefore this meant that most of the banks analyzed in the study are large class asset banks. The database consists of six hundred and twenty six banks in total. Five hundred and forty one are contained in the large class and eighty five are contained in the non large asset class. Although this sample size is considerably larger than previous studies (eg ECB, 2013), the number of banks contained in the large and non large asset class is unbalanced. However, it should be noted that this analysis produced statistically significant results for both size categories.

V.ii Recommendation for further research

'I had during many years followed a golden rule, namely, that whenever a published fact, a new observation or thought came across me, which was opposed to my general results, to make a memorandum of it without fail and at once; for I had found by experience that such facts and thoughts were far more apt to escape from the memory than favorable ones..'.

(Darwin, 1958, p.123).

Several associated issues emerged when investigating the objectives for this study. In particular there appears to be a significant divergence in trends based on bank size across the banking sector. Building upon this research, the following areas are recommended for further investigation.

i) Bank size and resilience to impairment: The non large banks show an increased capability to absorb bad debt. Could this be due to agility, to a lower volume of lending, or to a more diversified revenue channel?

ii) Is the impaired loan ratio a crude measure for assessing the impact of performance when analyzing a non large bank? Should a modified metric be developed, in which the impairment ratio is combined with a calculation of the loans to total assets?

iii) Is the higher impairment level experienced by the non large banks related to poor management skills and/or training?

iv) The analysis suggests that the Basel II accord could be improving the liquidity profile in the larger banks. Is this because there are a number of banks more strictly regulated, i.e. directly by the European Central Bank?

v) The findings indicate that a reduction in interest income can affect a bank's ability to perform with a poor liquidity profile. Is there a measurable point at which the cost of borrowing exceeds the benefit of an overextended loan book?

vi) This study has revealed that there is a significant difference observed between European and U.S. industry benchmarks. Why is there such a fundamental difference in acceptable policies and are they being adhered to?

Almost a decade after the initial impact of the 2008 financial crisis, questions remain regarding the fundamentals of the European banking sector. This study has examined the relationship between bank asset quality and liquidity and their impact on performance, and has also provided insights into the fundamentals and associated risks in the European banking sector. In addition, the empirical evidence presented here can be used by industry analysts and researchers for benchmarking purposes and as a basis for further investigation into the factors that impact on European bank performance.

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Appendix 1

Central Bank Impairment and performance (full sample split by years)

Table 1

Impairment: Case processing summary for Central Bank impairment and performance for the full sample in 2009

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	CentralBankImpairementIndicator	N	Percent	N	Percent	N	Percent
Performance	Poor Quality	99	100.0%	0	0.0%	99	100.0%
	Going Concern	388	100.0%	0	0.0%	388	100.0%
	Good Quality	139	100.0%	0	0.0%	139	100.0%

a. Year = 2009

Table 2

Impairment: Descriptive statistics for Central Bank impairment and performance for the full sample in 2009

Descriptives[a]

	CentralBankImpairementIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		1.1968	1.07140
		95% Confidence Interval for Mean	Lower Bound	-.9294	
			Upper Bound	3.3229	
		5% Trimmed Mean		2.2593	
		Median		2.7600	
		Variance		113.641	
		Std. Deviation		10.66026	
		Minimum		-67.80	
		Maximum		27.25	
		Range		95.05	
		Interquartile Range		4.97	
		Skewness		-3.434	.243
		Kurtosis		19.182	.481
	Going Concern	Mean		3.6955	.65918
		95% Confidence Interval for Mean	Lower Bound	2.3995	
			Upper Bound	4.9915	
		5% Trimmed Mean		4.5532	
		Median		3.9700	
		Variance		168.595	
		Std. Deviation		12.98440	
		Minimum		-130.72	
		Maximum		70.41	
		Range		201.13	
		Interquartile Range		4.91	
		Skewness		-6.177	.124
		Kurtosis		63.885	.247
	Good Quality	Mean		4.5996	1.10752
		95% Confidence Interval for Mean	Lower Bound	2.4097	
			Upper Bound	6.7895	
		5% Trimmed Mean		5.7714	
		Median		5.3800	
		Variance		170.496	
		Std. Deviation		13.05742	
		Minimum		-93.39	
		Maximum		33.50	
		Range		126.89	
		Interquartile Range		5.36	
		Skewness		-5.568	.206
		Kurtosis		40.149	.408

a. Year = 2009

Table 3

Impairment: Case processing summary for Central Bank impairment and performance for the full sample in 2013

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	CentralBankImpairementIndicator	N	Percent	N	Percent	N	Percent
Performance	Poor Quality	124	100.0%	0	0.0%	124	100.0%
	Going Concern	424	100.0%	0	0.0%	424	100.0%
	Good Quality	78	100.0%	0	0.0%	78	100.0%

a. Year = 2013

Table 4

Impairment: Test of Normality for Central Bank impairment and performance for the full sample in 2013

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	CentralBankImpairementIndicator	Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.261	124	.000	.694	124	.000
	Going Concern	.275	424	.000	.567	424	.000
	Good Quality	.199	78	.000	.808	78	.000

a. Year = 2013

b. Lilliefors Significance Correction

Table 5

Impairment: Descriptive statistics for Central Bank impairment and performance for the full sample in 2013

Descriptives[a]

CentralBankImpairementIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		-12.6769	3.26110
		95% Confidence Interval for Mean	Lower Bound	-19.1321	
			Upper Bound	-6.2218	
		5% Trimmed Mean		-8.4926	
		Median		-.7450	
		Variance		1318.708	
		Std. Deviation		36.31403	
		Minimum		-168.45	
		Maximum		81.89	
		Range		250.34	
		Interquartile Range		15.48	
		Skewness		-2.236	.217
		Kurtosis		6.747	.431
	Going Concern	Mean		3.2771	.52852
		95% Confidence Interval for Mean	Lower Bound	2.2383	
			Upper Bound	4.3160	
		5% Trimmed Mean		3.7889	
		Median		3.4950	
		Variance		118.438	
		Std. Deviation		10.88292	
		Minimum		-126.69	
		Maximum		58.69	
		Range		185.38	
		Interquartile Range		4.16	
		Skewness		-4.438	.119
		Kurtosis		56.550	.237
	Good Quality	Mean		6.2431	1.22961
		95% Confidence Interval for Mean	Lower Bound	3.7946	
			Upper Bound	8.6915	
		5% Trimmed Mean		6.2591	
		Median		5.1150	
		Variance		117.931	
		Std. Deviation		10.85959	
		Minimum		-41.00	
		Maximum		43.92	
		Range		84.92	
		Interquartile Range		7.10	
		Skewness		-.463	.272
		Kurtosis		7.412	.538

a. Year = 2013

Appendix 2

Central Bank Impairment and performance (large class asset sample split by years)

Table 6

Impairment: Case processing summary for Central Bank impairment and performance for the large class asset sample in 2009

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	CentralBankImpairementIndicator	N	Percent	N	Percent	N	Percent
Performance	Poor Quality	70	100.0%	0	0.0%	70	100.0%
	Going Concern	342	100.0%	0	0.0%	342	100.0%
	Good Quality	129	100.0%	0	0.0%	129	100.0%

a. AssetSize = Large Asset, Year = 2009

Table 7

Impairment: Descriptive statistics for Central Bank impairment and performance for the large class asset sample in 2009

Descriptives[a]

CentralBankImpairementIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		1.6479	1.37652
		95% Confidence Interval for Mean	Lower Bound	-1.0982	
			Upper Bound	4.3939	
		5% Trimmed Mean		2.6599	
		Median		3.4450	
		Variance		132.636	
		Std. Deviation		11.51679	
		Minimum		-67.80	
		Maximum		27.25	
		Range		95.05	
		Interquartile Range		4.89	
		Skewness		-3.457	.287
		Kurtosis		19.316	.566
	Going Concern	Mean		3.6783	.74619
		95% Confidence Interval for Mean	Lower Bound	2.2106	
			Upper Bound	5.1460	
		5% Trimmed Mean		4.6762	
		Median		4.0050	
		Variance		190.424	
		Std. Deviation		13.79941	
		Minimum		-130.72	
		Maximum		70.41	
		Range		201.13	
		Interquartile Range		5.13	
		Skewness		-5.841	.132
		Kurtosis		56.591	.263
	Good Quality	Mean		4.6578	1.19232
		95% Confidence Interval for Mean	Lower Bound	2.2986	
			Upper Bound	7.0170	
		5% Trimmed Mean		5.9207	
		Median		5.7000	
		Variance		183.389	
		Std. Deviation		13.54213	
		Minimum		-93.39	
		Maximum		33.50	
		Range		126.89	
		Interquartile Range		5.42	
		Skewness		-5.400	.213
		Kurtosis		37.432	.423

a. AssetSize = Large Asset, Year = 2009

Table 8

Impairment: Case processing summary for Central Bank impairment and performance for the large class asset sample in 2013

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	CentralBankImpairementIndicator	N	Percent	N	Percent	N	Percent
Performance	Poor Quality	108	100.0%	0	0.0%	108	100.0%
	Going Concern	360	100.0%	0	0.0%	360	100.0%
	Good Quality	73	100.0%	0	0.0%	73	100.0%

a. AssetSize = Large Asset, Year = 2013

Table 9

Impairment: Test of Normality for Central Bank impairment and performance for the large class asset sample in 2013

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	CentralBankImpairementIndicator	Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.256	108	.000	.714	108	.000
	Going Concern	.279	360	.000	.578	360	.000
	Good Quality	.198	73	.000	.807	73	.000

a. AssetSize = Large Asset, Year = 2013

b. Lilliefors Significance Correction

Table 10

Impairment: Descriptive statistics for Central Bank impairment and performance for the large class asset sample in 2013

Descriptives[a]

	CentralBankImpairementIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		-14.3381	3.65401
		95% Confidence Interval for Mean	Lower Bound	-21.5818	
			Upper Bound	-7.0945	
		5% Trimmed Mean		-10.3541	
		Median		-4.0100	
		Variance		1441.997	
		Std. Deviation		37.97363	
		Minimum		-168.45	
		Maximum		81.89	
		Range		250.34	
		Interquartile Range		16.80	
		Skewness		-2.094	.233
		Kurtosis		5.967	.461
	Going Concern	Mean		3.0426	.61637
		95% Confidence Interval for Mean	Lower Bound	1.8305	
			Upper Bound	4.2548	
		5% Trimmed Mean		3.6017	
		Median		3.3400	
		Variance		136.768	
		Std. Deviation		11.69478	
		Minimum		-126.69	
		Maximum		58.69	
		Range		185.38	
		Interquartile Range		4.28	
		Skewness		-4.163	.129
		Kurtosis		49.394	.256
	Good Quality	Mean		6.1234	1.28621
		95% Confidence Interval for Mean	Lower Bound	3.5594	
			Upper Bound	8.6874	
		5% Trimmed Mean		6.1842	
		Median		5.2100	
		Variance		120.767	
		Std. Deviation		10.98940	
		Minimum		-41.00	
		Maximum		43.92	
		Range		84.92	
		Interquartile Range		7.18	
		Skewness		-.517	.281
		Kurtosis		7.515	.555

a. AssetSize = Large Asset, Year = 2013

Appendix 3

Central Bank Impairment and performance (non large class asset sample split by years)

Table 11

Impairment: Case processing summary for Central Bank impairment and performance for the non large class asset sample in 2009

Case Processing Summary[a]

		Cases				
		Valid		Missing		Total
	CentralBankImpairementIndicator	N	Percent	N	Percent	N
Performance	Poor Quality	29	100.0%	0	0.0%	29
	Going Concern	46	100.0%	0	0.0%	46
	Good Quality	10	100.0%	0	0.0%	10

a. AssetSize = Non Large Asset, Year = 2009

Table 12

Impairment: Descriptive statistics for Central Bank Impairment and performance for the non large class asset sample in 2009

Descriptives[a]

	CentralBankImpairementIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		.1079	1.54422
		95% Confidence Interval for Mean	Lower Bound	-3.0553	
			Upper Bound	3.2711	
		5% Trimmed Mean		1.2328	
		Median		2.1200	
		Variance		69.153	
		Std. Deviation		8.31585	
		Minimum		-36.94	
		Maximum		9.01	
		Range		45.95	
		Interquartile Range		3.36	
		Skewness		-3.435	.434
		Kurtosis		14.461	.845
	Going Concern	Mean		3.8237	.38750
		95% Confidence Interval for Mean	Lower Bound	3.0432	
			Upper Bound	4.6042	
		5% Trimmed Mean		3.7401	
		Median		3.5450	
		Variance		6.907	
		Std. Deviation		2.62813	
		Minimum		-1.56	
		Maximum		10.53	
		Range		12.09	
		Interquartile Range		3.22	
		Skewness		.627	.350
		Kurtosis		.259	.688
	Good Quality	Mean		3.8490	.73468
		95% Confidence Interval for Mean	Lower Bound	2.1870	
			Upper Bound	5.5110	
		5% Trimmed Mean		3.8439	
		Median		4.0700	
		Variance		5.398	
		Std. Deviation		2.32327	
		Minimum		.54	
		Maximum		7.25	
		Range		6.71	
		Interquartile Range		4.07	
		Skewness		.106	.687
		Kurtosis		-1.358	1.334

a. AssetSize = Non Large Asset, Year = 2009

Table 13

Impairment: Case processing summary for Central Bank impairment and performance for the non large class asset sample in 2013

Case Processing Summary[a]

		Cases				
		Valid		Missing		Total
	CentralBankImpairementIndicator	N	Percent	N	Percent	N
Performance	Poor Quality	16	100.0%	0	0.0%	16
	Going Concern	64	100.0%	0	0.0%	64
	Good Quality	5	100.0%	0	0.0%	5

a. AssetSize = Non Large Asset, Year = 2013

Table 14

Test of Normality for Central Bank Impairment and performance for the non large class asset sample in 2013

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		Shapiro-Wilk[b]
	CentralBankImpairementIndicator	Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.369	16	.000	.437	16	.000
	Going Concern	.125	64	.015	.920	64	.001
	Good Quality	.417	5	.005	.620	5	.001

a. AssetSize = Non Large Asset, Year = 2013

b. Lilliefors Significance Correction

Table 15

Impairment: Descriptive statistics for Central Bank impairment and performance for the non large class asset sample in 2013

Descriptives[a]

	CentralBankImpairementIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		-1.4637	4.82947
		95% Confidence Interval for Mean	Lower Bound	-11.7575	
			Upper Bound	8.8300	
		5% Trimmed Mean		1.9519	
		Median		4.1800	
		Variance		373.181	
		Std. Deviation		19.31788	
		Minimum		-72.44	
		Maximum		8.03	
		Range		80.47	
		Interquartile Range		4.52	
		Skewness		-3.741	.564
		Kurtosis		14.468	1.091
	Going Concern	Mean		4.5961	.46408
		95% Confidence Interval for Mean	Lower Bound	3.6687	
			Upper Bound	5.5235	
		5% Trimmed Mean		4.6083	
		Median		4.2250	
		Variance		13.784	
		Std. Deviation		3.71268	
		Minimum		-8.61	
		Maximum		15.39	
		Range		24.00	
		Interquartile Range		3.13	
		Skewness		-.112	.299
		Kurtosis		3.215	.590
	Good Quality	Mean		7.9900	4.29615
		95% Confidence Interval for Mean	Lower Bound	-3.9380	
			Upper Bound	19.9180	
		5% Trimmed Mean		7.3150	
		Median		3.4200	
		Variance		92.285	
		Std. Deviation		9.60648	
		Minimum		3.02	
		Maximum		25.11	
		Range		22.09	
		Interquartile Range		11.98	
		Skewness		2.195	.913
		Kurtosis		4.845	2.000

a. AssetSize = Non Large Asset, Year = 2013

Appendix 4

Central Bank liquidity and performance (full sample split by years)

Table 16

Liquidity: Case processing summary for Central Bank liquidity and performance for the full sample in 2009

Case Processing Summary[a]

	CentralBankLiquidityIndicator	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Performance	Poor Quality	386	100.0%	0	0.0%	386	100.0%
	Going Concern	91	100.0%	0	0.0%	91	100.0%
	Good Quality	149	100.0%	0	0.0%	149	100.0%

a. Year = 2009

Table 17

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the full sample in 2009

Descriptives[a]

CentralBankLiquidityIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		3.5157	.60544
		95% Confidence Interval for Mean	Lower Bound	2.3253	
			Upper Bound	4.7061	
		5% Trimmed Mean		4.2751	
		Median		3.8850	
		Variance		141.493	
		Std. Deviation		11.89509	
		Minimum		-93.39	
		Maximum		70.41	
		Range		163.80	
		Interquartile Range		4.68	
		Skewness		-3.735	.124
		Kurtosis		32.224	.248
	Going Concern	Mean		1.5504	2.16710
		95% Confidence Interval for Mean	Lower Bound	-2.7549	
			Upper Bound	5.8558	
		5% Trimmed Mean		4.4422	
		Median		3.8700	
		Variance		427.365	
		Std. Deviation		20.67280	
		Minimum		-130.72	
		Maximum		19.15	
		Range		149.87	
		Interquartile Range		5.29	
		Skewness		-5.856	.253
		Kurtosis		36.072	.500
	Good Quality	Mean		4.6546	.56891
		95% Confidence Interval for Mean	Lower Bound	3.5303	
			Upper Bound	5.7788	
		5% Trimmed Mean		5.1384	
		Median		4.8700	
		Variance		48.224	
		Std. Deviation		6.94438	
		Minimum		-36.94	
		Maximum		22.89	
		Range		59.83	
		Interquartile Range		6.20	
		Skewness		-1.922	.199
		Kurtosis		9.533	.395

a. Year = 2009

Table 18

Liquidity: Case processing summary for Central Bank liquidity and performance for the full sample in 2013

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	CentralBankLiquidityIndicator	N	Percent	N	Percent	N	Percent
Performance	Poor Quality	358	100.0%	0	0.0%	358	100.0%
	Going Concern	146	100.0%	0	0.0%	146	100.0%
	Good Quality	122	100.0%	0	0.0%	122	100.0%

a. Year = 2013

Table 19

Liquidity: Test of Normality for Central Bank liquidity and performance for the full sample in 2013

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	CentralBankLiquidityIndicator	Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.280	358	.000	.562	358	.000
	Going Concern	.331	146	.000	.498	146	.000
	Good Quality	.354	122	.000	.461	122	.000

a. Year = 2013

b. Lilliefors Significance Correction

Table 20

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the full sample in 2013

Descriptives*

	CentralBankLiquidityIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		.1718	.94924
		95% Confidence Interval for Mean	Lower Bound	-1.6950	
			Upper Bound	2.0386	
		5% Trimmed Mean		1.5185	
		Median		2.6000	
		Variance		322.578	
		Std. Deviation		17.96046	
		Minimum		-162.30	
		Maximum		81.89	
		Range		244.19	
		Interquartile Range		3.97	
		Skewness		-3.568	.129
		Kurtosis		31.188	.257
	Going Concern	Mean		1.1405	1.52339
		95% Confidence Interval for Mean	Lower Bound	-1.8704	
			Upper Bound	4.1515	
		5% Trimmed Mean		3.5220	
		Median		3.9900	
		Variance		338.823	
		Std. Deviation		18.40714	
		Minimum		-126.21	
		Maximum		27.68	
		Range		153.89	
		Interquartile Range		5.51	
		Skewness		-4.868	.201
		Kurtosis		29.019	.399
	Good Quality	Mean		.6269	2.39059
		95% Confidence Interval for Mean	Lower Bound	-4.1059	
			Upper Bound	5.3597	
		5% Trimmed Mean		4.6925	
		Median		5.1850	
		Variance		697.222	
		Std. Deviation		26.40497	
		Minimum		-168.45	
		Maximum		38.96	
		Range		207.41	
		Interquartile Range		6.05	
		Skewness		-4.491	.219
		Kurtosis		22.578	.435

Appendix 5

Central Bank liquidity and performance (large class asset sample split by years)

Table 21

Liquidity: Case processing summary for Central Bank liquidity and performance for the large class asset sample in 2009

Case Processing Summary[a]

		Cases				
		Valid		Missing		Total
	CentralBankLiquidityIndicator	N	Percent	N	Percent	N
Performance	Poor Quality	352	100.0%	0	0.0%	352
	Going Concern	74	100.0%	0	0.0%	74
	Good Quality	115	100.0%	0	0.0%	115

a. AssetSize = Large Asset, Year = 2009

Table 22

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the large class asset sample in 2009

Descriptives[a]

CentralBankLiquidityIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		3.5842	.66164
		95% Confidence Interval for Mean	Lower Bound	2.2829	
			Upper Bound	4.8855	
		5% Trimmed Mean		4.4181	
		Median		4.0900	
		Variance		154.093	
		Std. Deviation		12.41341	
		Minimum		-93.39	
		Maximum		70.41	
		Range		163.80	
		Interquartile Range		4.98	
		Skewness		-3.618	.130
		Kurtosis		29.696	.259
	Going Concern	Mean		1.0704	2.66042
		95% Confidence Interval for Mean	Lower Bound	-4.2318	
			Upper Bound	6.3726	
		5% Trimmed Mean		4.5515	
		Median		4.2550	
		Variance		523.760	
		Std. Deviation		22.88580	
		Minimum		-130.72	
		Maximum		19.15	
		Range		149.87	
		Interquartile Range		5.08	
		Skewness		-5.286	.279
		Kurtosis		29.060	.552
	Good Quality	Mean		5.5072	.60259
		95% Confidence Interval for Mean	Lower Bound	4.3135	
			Upper Bound	6.7009	
		5% Trimmed Mean		5.8828	
		Median		5.5300	
		Variance		41.758	
		Std. Deviation		6.46208	
		Minimum		-19.38	
		Maximum		22.89	
		Range		42.27	
		Interquartile Range		7.06	
		Skewness		-.986	.226
		Kurtosis		3.245	.447

a. AssetSize = Large Asset, Year = 2009

Table 23

Liquidity: Case processing summary for Central Bank liquidity and performance for the large class asset sample in 2013

Case Processing Summary[a]

	CentralBankLiquidityIndicator	Cases				
		Valid		Missing		Total
		N	Percent	N	Percent	N
Performance	Poor Quality	327	100.0%	0	0.0%	327
	Going Concern	119	100.0%	0	0.0%	119
	Good Quality	95	100.0%	0	0.0%	95

a. AssetSize = Large Asset, Year = 2013

Table 24

Liquidity: Test of Normality for Central Bank liquidity and performance for the large sample in 2013

Tests of Normality[a]

	CentralBankLiquidityIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk	
		Statistic	df	Sig.	Statistic	df
Performance	Poor Quality	.272	327	.000	.573	327
	Going Concern	.318	119	.000	.520	119
	Good Quality	.354	95	.000	.506	95

a. AssetSize = Large Asset, Year = 2013

b. Lilliefors Significance Correction

Table 25

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the large class asset sample in 2013

Descriptives[a]

	CentralBankLiquidityIndicator			Statistic	Std. Error
Performance	Poor Quality	Mean		.1588	1.01254
		95% Confidence Interval for Mean	Lower Bound	-1.8331	
			Upper Bound	2.1508	
		5% Trimmed Mean		1.4042	
		Median		2.5800	
		Variance		335.253	
		Std. Deviation		18.30992	
		Minimum		-162.30	
		Maximum		81.89	
		Range		244.19	
		Interquartile Range		4.15	
		Skewness		-3.496	.135
		Kurtosis		30.931	.269
	Going Concern	Mean		.0511	1.84321
		95% Confidence Interval for Mean	Lower Bound	-3.5990	
			Upper Bound	3.7011	
		5% Trimmed Mean		2.8758	
		Median		3.6500	
		Variance		404.293	
		Std. Deviation		20.10704	
		Minimum		-126.21	
		Maximum		27.68	
		Range		153.89	
		Interquartile Range		6.05	
		Skewness		-4.460	.222
		Kurtosis		23.834	.440
	Good Quality	Mean		-.6756	3.05439
		95% Confidence Interval for Mean	Lower Bound	-6.7401	
			Upper Bound	5.3890	
		5% Trimmed Mean		4.1259	
		Median		5.0600	
		Variance		886.281	
		Std. Deviation		29.77048	
		Minimum		-168.45	
		Maximum		38.96	
		Range		207.41	
		Interquartile Range		7.68	
		Skewness		-3.921	.247
		Kurtosis		16.903	.490

a. AssetSize = Large Asset, Year = 2013

Appendix 6

Central Bank liquidity and performance (Non large class asset sample split by years)

Table 26

Liquidity: Case processing summary for Central Bank liquidity and performance for the non large sample in 2009

Case Processing Summary[a]

	CentralBankLiquidityIndicator	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Performance	Poor Quality	34	100.0%	0	0.0%	34	100.0%
	Going Concern	17	100.0%	0	0.0%	17	100.0%
	Good Quality	34	100.0%	0	0.0%	34	100.0%

a. AssetSize = Non Large Asset, Year = 2009

Table 27

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the non large class asset sample in 2009

Descriptives[a]

CentralBankLiquidityIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		2.8068	.57394
		95% Confidence Interval for Mean	Lower Bound	1.6391	
			Upper Bound	3.9745	
		5% Trimmed Mean		3.0334	
		Median		3.1800	
		Variance		11.200	
		Std. Deviation		3.34661	
		Minimum		-11.21	
		Maximum		9.36	
		Range		20.57	
		Interquartile Range		2.92	
		Skewness		-2.007	.403
		Kurtosis		8.979	.788
	Going Concern	Mean		3.6400	.70994
		95% Confidence Interval for Mean	Lower Bound	2.1350	
			Upper Bound	5.1450	
		5% Trimmed Mean		3.4833	
		Median		2.3100	
		Variance		8.568	
		Std. Deviation		2.92717	
		Minimum		.72	
		Maximum		9.38	
		Range		8.66	
		Interquartile Range		3.90	
		Skewness		1.143	.550
		Kurtosis		-.112	1.063
	Good Quality	Mean		1.7706	1.33857
		95% Confidence Interval for Mean	Lower Bound	-.9527	
			Upper Bound	4.4939	
		5% Trimmed Mean		2.8755	
		Median		3.0650	
		Variance		60.920	
		Std. Deviation		7.80512	
		Minimum		-36.94	
		Maximum		10.53	
		Range		47.47	
		Interquartile Range		3.76	
		Skewness		-3.942	.403
		Kurtosis		19.004	.788

a. AssetSize = Non Large Asset, Year = 2009

Table 28

Liquidity: Case processing summary for Central Bank liquidity and performance for the non large sample in 2013

Case Processing Summary[a]

	CentralBankLiquidityIndicator	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Performance	Poor Quality	31	100.0%	0	0.0%	31	100.0%
	Going Concern	27	100.0%	0	0.0%	27	100.0%
	Good Quality	27	100.0%	0	0.0%	27	100.0%

a. AssetSize = Non Large Asset, Year = 2013

Table 29

Liquidity: Test of Normality for Central Bank liquidity and performance for the non large sample in 2013

Tests of Normality[a]

	CentralBankLiquidityIndicator	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance	Poor Quality	.388	31	.000	.381	31	.000
	Going Concern	.229	27	.001	.718	27	.000
	Good Quality	.157	27	.087	.898	27	.012

a. AssetSize = Non Large Asset, Year = 2013

b. Lilliefors Significance Correction

Table 30

Liquidity: Descriptive statistics for Central Bank liquidity and performance for the non large class asset sample in 2013

Descriptives[a]

CentralBankLiquidityIndicator				Statistic	Std. Error
Performance	Poor Quality	Mean		.3090	2.51176
		95% Confidence Interval for Mean	Lower Bound	-4.8207	
			Upper Bound	5.4387	
		5% Trimmed Mean		2.5604	
		Median		3.0300	
		Variance		195.577	
		Std. Deviation		13.98490	
		Minimum		-72.44	
		Maximum		11.97	
		Range		84.41	
		Interquartile Range		2.99	
		Skewness		-4.991	.421
		Kurtosis		26.529	.821
	Going Concern	Mean		5.9422	.96887
		95% Confidence Interval for Mean	Lower Bound	3.9507	
			Upper Bound	7.9338	
		5% Trimmed Mean		5.2723	
		Median		4.3100	
		Variance		25.345	
		Std. Deviation		5.03439	
		Minimum		1.29	
		Maximum		25.11	
		Range		23.82	
		Interquartile Range		3.17	
		Skewness		2.565	.448
		Kurtosis		7.764	.872
	Good Quality	Mean		5.2096	.68067
		95% Confidence Interval for Mean	Lower Bound	3.8105	
			Upper Bound	6.6088	
		5% Trimmed Mean		5.4035	
		Median		5.5100	
		Variance		12.509	
		Std. Deviation		3.53687	
		Minimum		-6.06	
		Maximum		12.73	
		Range		18.79	
		Interquartile Range		3.73	
		Skewness		-1.145	.448
		Kurtosis		3.706	.872

a. AssetSize = Non Large Asset, Year = 2013

Appendix 7

Full bank database used in this study

The information used in this study was compiled by Bankscope from the 2009-2013 audited financial statements of the following banks:

Aareal Bank AG
AB DNB Bankas
AB SEB Bankas
Abanka Vipa dd
ABH Financial Limited
Advanzia Bank SA
AEGON Bank NV
Agence Française de Développement
Al khaliji France SA
Allianz Bank Financial Advisors S.p.A.
Allianz Banque SA
Allied Irish Banks plc
Alpha Bank AE
American Express Carte France SA
APS Bank Limited
Aresbank SA
ARKEA Banque Entreprises et Institutionnels
AS DNB Banka
Attica Bank SA-Bank of Attica SA
Augsburger Aktienbank AG
AXA Bank Europe SA/NV
B.C.C. del Garda di Credito Cooperativo Colli Morenici del Garda
Banca Akros
Banca Alpi Marittime Credito Cooperativo Carru
Banca Alto Vicentino - Credito Cooperativo Di Schio E Pedemonte Societa Cooperativa

Banca Annia - Credito Cooperativo di Cartura e del Polesine s.c
Banca Area Pratese Credito Cooperativo Società. Cooperativa
Banca Atestina di Credito Cooperativo
Banca Carige SpA
Banca Carime Spa
Banca Cassa di risparmio di Savigliano SpA - Banca CRS
Banca Centropadana - Credito Cooperativo Scrl
Banca CRAS Credito Cooperativo - Chianciano Terme - Costa Etrusca - Sovicille
Banca Cremasca - Credito Cooperativo
Banca Cremonese Credito Cooperativo
Banca dei Colli Euganei - Credito Cooperativo - Lozzo Atestino
Banca dei Sibillini Credito Cooperativo di Casavecchia
Banca del Centroveneto - Credito Cooperativo SCRL - Longare (VI)
Banca del Cilento E Lucania Sud-Credito Cooperativo-Societa Cooperativa per azioni
Banca del Fucino SpA
Banca del Lavoro e del Piccolo Risparmio SpA
Banca del Mugello Credito Cooperativo SCRL
Banca del Nisseno Credito Cooperativo di Sommatino e Serradifalco Società Cooperativa.
Banca del Piemonte
Banca del Valdarno Credito Cooperativo Scrl
Banca della Bergamasca - Credito Cooperativo Scarl
Banca della Maremma - Credito Cooperativo di Grosseto
Banca della Nuova Terra SpA-BNT SpA
Banca della Valsassina Credito Cooperativo Societa Cooperativa
Banca dell'Elba Credito Cooperativo - Societa Cooperativa
Banca di Anghiari e Stia - Credito Cooperativo
Banca di Bedizzole Turano Valvestino Credito cooperativo Societa Cooperativa
Banca di Bologna - Credito Cooperativo
Banca di Caraglio, del Cuneese e della Riviera dei Fiori - Credito Cooperativo
Banca di Cascina - Credito Cooperativo
Banca di Cesena - Credito Cooperativo di Cesena e Ronta Scrl
Banca di Credito Cooperativo - S. Stefano - Martellago
Banca di Credito Cooperativo "Mutuo Soccorso" di Gangi

Banca di Credito Cooperativo "San Vincenzo de' Paoli" di Casagiove
Banca di Credito Cooperativo Abruzzese - Cappelle sul Tavo
Banca di Credito Cooperativo degli Ulivi - Terra di Bari
Banca di Credito Cooperativo dei Castelli e degli Iblei
Banca di Credito Cooperativo dei Castelli Romani
Banca di Credito Cooperativo dei Comuni Cilentani
Banca di Credito Cooperativo del Basso Sebino
Banca di Credito Cooperativo del Circeo Scrl
Banca di Credito Cooperativo del Friuli Centrale
Banca di Credito Cooperativo del Metauro
Banca di Credito Cooperativo del Tuscolo - Rocca Priora
Banca di Credito Cooperativo del Velino (Comune di Posta Provincia di Rieti)
Banca di Credito Cooperativo della Bassa Friulana
Banca di Credito Cooperativo della Marca Scrl-Banca della Marca
Banca di Credito Cooperativo della Romagna Occidentale
Banca di Credito Cooperativo della Valle del Fitalia
Banca di Credito Cooperativo della Valle del Trigno
Banca di Credito Cooperativo dell'Adriatico Teramano Scrl
Banca di Credito Cooperativo dell'Alta Brianza - Alzate Brianza (Como)
Banca di Credito Cooperativo dell'Alta Murgia
Banca di Credito Cooperativo dell'Alto Reno
Banca di Credito Cooperativo dell'Alto Tirreno Della Calabria Verbicaro
Banca di Credito Cooperativo delle Prealpi
Banca di Credito Cooperativo di Alba, Langhe, Roero e Canavese Scrl
Banca di Credito Cooperativo di Altofonte e Caccamo
Banca di Credito Cooperativo di Anagni Scrl
Banca di Credito Cooperativo di Aquara
Banca di Credito Cooperativo di Arborea (Oristano)
Banca di Credito Cooperativo di Avetrana (Taranto)
Banca di Credito Cooperativo di Barbarano Romano (Provincia di Viterbo)
Banca di Credito Cooperativo di Bari
Banca di Credito Cooperativo di Barlassina
Banca di Credito Cooperativo di Basciano
Banca di Credito Cooperativo di Basiliano

Banca di Credito Cooperativo di Bellegra
Banca di Credito Cooperativo di Borghetto Lodigiano
Banca di Credito Cooperativo di Brescia
Banca di Credito Cooperativo di Buccino Societa Cooperativa
Banca di Credito Cooperativo di Buonabitacolo Societa Cooperativa
Banca di Credito Cooperativo di Busto Garolfo e Buguggiate
Banca di Credito Cooperativo di Calcio e di Covo SCarl
Banca di Credito Cooperativo di Cambiano
Banca di Credito Cooperativo di Canosa-Loconia
Banca di Credito Cooperativo di Capaccio Paestum
Banca di Credito Cooperativo di Carate Brianza
Banca di Credito Cooperativo di Caravaggio
Banca di Credito Cooperativo di Carugate e Inzago - Societa Cooperativa
Banca di Credito Cooperativo di Casalgrasso e Sant Albano Stura
Banca di Credito Cooperativo di Cassano delle Murge e Tolve
Banca di Credito Cooperativo di Castagneto Carducci
Banca di Credito Cooperativo di Castel Goffredo
Banca di Credito Cooperativo di Castenaso (Bologna)
Banca di Credito Cooperativo di Castiglione Messer Raimondo e Pianella
Banca di Credito Cooperativo di Cernusco sul Naviglio Societa Cooperativa
Banca di Credito Cooperativo di Cherasco
Banca di Credito Cooperativo di Cittanova Scrl
Banca di Credito Cooperativo di Civitanova Marche e Montecosaro
Banca di Credito Cooperativo di Conversano
Banca di Credito Cooperativo di Doberdo e Savogna-Zadruzna Kreditna Banka Doberdob in Sovodnje
Banca di Credito Cooperativo di Dovera e Postino (Cremona)
Banca di Credito Cooperativo di Falconara Marittima (Ancona)
Banca di Credito Cooperativo di Fano
Banca di Credito Cooperativo di Fiuggi
Banca di Credito Cooperativo di Fiumicello ed Aiello del Friuli
Banca di Credito Cooperativo di Gambatesa (Campobasso)
Banca di Credito Cooperativo di Gatteo
Banca di Credito Cooperativo di Gaudiano di Lavello

Banca di Credito Cooperativo di Ghisalba
Banca di Credito Cooperativo di Gradara Società Cooperativa
Banca di Credito Cooperativo di Impruneta
Banca di Credito Cooperativo di Laurenzana E Nova Siri - Societa Cooperativa
Banca di Credito Cooperativo di Lesmo
Banca di Credito Cooperativo di Lezzeno (Como)
Banca di Credito Cooperativo di Locorotondo - Cassa Rurale ed Artigiana
Banca di Credito Cooperativo di Manzano (Udine)
Banca di Credito Cooperativo di Marcon - Venezia SCarl
Banca di Credito Cooperativo di Marina di Ginosa
Banca di Credito Cooperativo di Masiano (Pistoa)
Banca di Credito Cooperativo di Massafra Scarl
Banca di Credito Cooperativo di Monopoli
Banca di Credito Cooperativo di Montepaone
Banca di Credito Cooperativo di Montepulciano
Banca di Credito Cooperativo di Monterenzio (Provincia di Bologna)
Banca di Credito Cooperativo di Mozzanica Società Cooperativa (Bergamo)
Banca di Credito Cooperativo di Nettuno
Banca di Credito Cooperativo di Oppido Lucano e Ripacandida (Provincia di Potenza)
Banca di Credito Cooperativo di Ostra e Morro d'Alba
Banca di Credito Cooperativo di Ostra Vetere (Ancona)
Banca di Credito Cooperativo di Ostuni - Societa cooperativa
Banca di Credito Cooperativo di Pachino - Societa Cooperativa
Banca di Credito Cooperativo di Palestrina
Banca di Credito Cooperativo di Pianfei e Rocca de' Baldi
Banca di Credito Cooperativo di Piove di Sacco (Padova)
Banca di Credito Cooperativo di Pitigliano
Banca di Credito Cooperativo di Pompiano e della Franciacorta
Banca di Credito Cooperativo di Pontassieve (Firenze)
Banca di Credito Cooperativo di Pratola Peligna (L'Aquila)
Banca di Credito Cooperativo di Recanati e Colmurano (Comune di Recanati - Provincia di Macerata)
Banca di Credito Cooperativo di Riano
Banca di Credito Cooperativo di Ripatransone - Prov. di Ascoli Piceno

Banca di Credito Cooperativo di Roma
Banca di Credito Cooperativo di Ronciglione
Banca di Credito Cooperativo di Sala di Cesenatico Societa Cooperativa
Banca di Credito Cooperativo di Sambuca di Sicilia
Banca di Credito Cooperativo di San Biagio Platani
Banca di Credito Cooperativo di San Giovanni Rotondo - Societa Cooperativa
Banca di Credito Cooperativo di San Marco dei Cavoti E Del Sannio Calvi
Banca di Credito Cooperativo di San Marzano di San Giuseppe (Taranto)
Banca di Credito Cooperativo di Sant'Elena
Banca di Credito Cooperativo di Santeramo in Colle (Bari)
Banca di Credito Cooperativo di Sarsina - Societa Cooperativa
Banca di Credito Cooperativo di Sassano Societa Cooperativa
Banca di Credito Cooperativo di Sesto San Giovanni (Milano)
Banca di Credito Cooperativo di Signa
Banca di Credito Cooperativo di Sorisole e di Lepreno Scarl
Banca di Credito Cooperativo di Spello e di Bettona - Societa Cooperativa
Banca di Credito Cooperativo di Spinazzola (Bari)
Banca di Credito Cooperativo di Staranzano e Villesse SC
Banca di Credito Cooperativo di Terra d'Otranto (Provincia di Lecce)
Banca di Credito Cooperativo di Triuggio e della Valle del Lambro - Societa Cooperativa
Banca di Credito Cooperativo di Turriaco
Banca di Credito Cooperativo di Valledolmo
Banca di Credito Cooperativo di Vergato
Banca di Credito Cooperativo di Verolavecchia
Banca di Credito Cooperativo di Vignole e della Montagna Pistoiese
Banca di Credito Cooperativo Don Stella di Resuttano
Banca di Credito Cooperativo Giuseppe Toniolo
Banca di Credito Cooperativo La Riscossa di Regalbuto
Banca di Credito Cooperativo Laudense - Lodi
Banca di Credito Cooperativo Monte Pruno di Roscigno e di Laurino - Societa Cooperativa
Banca di Credito Cooperativo Orobica di Bariano e Cologno al Serio
Banca di Credito Cooperativo Picena SCarl
Banca di Credito Cooperativo Pordenonese

Banca di Credito Cooperativo S. Barnaba di Marino
Banca di Credito Cooperativo San Giuseppe di Mussomeli
Banca di Credito Cooperativo San Giuseppe di Petralia Sottana
Banca di Credito Cooperativo San Michele di Caltanissetta e Pietraperzia
Banca di Credito Cooperativo Sangro Teatina di Atessa
Banca di Credito Cooperativo Senatore Pietro Grammatico Paceco
Banca di Credito Cooperativo Valle del Torto
Banca di Credito Cooperativo Valle Seriana
Banca di Credito Cooperativo Vicentino Pojana Maggiore
Banca di credito popolare SCRL
Banca di Forli - Credito Cooperativo
Banca di Formello e Trevignano Romano di Credito Cooperativo
Banca di Imola SpA
Banca di Pesaro Credito Cooperativo
Banca di Pescia - Credito Cooperativo
Banca di Piacenza
Banca di Pisa e Fornacette Credito Cooperativo SCPA
Banca di Pistoia Credito Cooperativo
Banca di Romano e S. Caterina - Credito Cooperativo (VI)
Banca di Sassari SpA
Banca di Taranto - Banca di Credito Cooperativo
Banca di Teramo di Credito Cooperativo - Societa Cooperativa
Banca di Trento e Bolzano Societa per Azioni - Bank Fuer Trient und Bozen-BTB SpA
Banca di Treviso SpA
Banca di Udine Credito Cooperativo
Banca di Valle Camonica SpA
Banca di Verona Credito Cooperativo Cadidavid Societa cooperativa per azioni
Banca di Viterbo - Credito Cooperativo
Banca Don Rizzo - Credito Cooperativo della Sicilia Occidentale
Banca Federico del Vecchio SpA
Banca Ifis SpA
Banca Intermobiliare di Investimenti e Gestioni
Banca Leonardo Spa
Banca Malatestiana - Credito Cooperativo

Banca March SA
Banca Mediocredito del Friuli Venezia Giulia SpA
Banca Mediolanum SpA
Banca Monte dei Paschi di Siena SpA-Gruppo Monte dei Paschi di Siena
Banca Monte Parma SpA
Banca Nazionale del Lavoro SpA
Banca Nuova SpA
Banca Passadore & C. SpA
Banca per lo Sviluppo dell Cooperazione di Credito SpA-Banca Sviluppo SpA
Banca Piccolo Credito Valtellinese-Credito Valtellinese Soc Coop
Banca Picena Truentina - Credito Cooperativo
Banca Popolare Commercio e Industria SpA
Banca Popolare del Lazio
Banca popolare dell'Emilia Romagna
Banca popolare dell'Etruria e del Lazio Soc. coop.
Banca Popolare di Ancona SpA
Banca Popolare di Bari Scarl
Banca Popolare di Bergamo SpA
Banca Popolare di Cividale Societa Cooperativa per azioni
Banca Popolare di Cortona
Banca Popolare di Lajatico
Banca Popolare di Milano SCaRL
Banca Popolare di Puglia e Basilicata
Banca Popolare di Sondrio Societa Cooperativa per Azioni
Banca Popolare di Sviluppo Scarl
Banca Popolare di Vicenza Societa cooperativa per azioni
Banca Popolare FriulAdria SpA
Banca Popolare Pugliese-Gruppo Bancario Banca Popolare Pugliese
Banca Popolare Valconca SCarl
Banca Profilo SpA
Banca Regionale Europea SpA
Banca S. Biagio del Veneto Orientale di Cesarolo e Fossalta di Portogruaro - Banca di Credito Cooperativo
Banca Sella Holding SpA

Banca Sella SpA
Banca Suasa - Credito Cooperativo
Banca Valdichiana Credito Cooperativo Tosco-Umbro, Societa cooperativa
Banca Valsabbina Societa cooperativa per azioni-La Valsabbina
Banca Veronese Credito Cooperativo di Concamarise
Banca Versilia Lunigiana e Garfagnana Credito Cooperativo Societa' Cooperativa
BancApulia SpA
Bancasciano Credito Cooperativo
Banco Bic Portugues SA
Banco Bilbao Vizcaya Argentaria (Portugal) SA
Banco Bilbao Vizcaya Argentaria SA
Banco BPI SA
Banco Caminos SA
Banco Comercial Português, SA-Millennium bcp
Banco Cooperativo Espanol
Banco de Investimento Global SA - BIG
Banco de Sabadell SA
Banco di Brescia San Paolo Cab SpA-Banco di Brescia SpA
Banco di Desio e della Brianza SpA-Banco Desio
Banco di Napoli SpA
Banco Espirito Santo SA
Banco Finantia SA
Banco Invest SA
Banco Popolare - Società Cooperativa-Banco Popolare
Banco Popular Espanol SA
Banco Portugues de Gestao
Banco Santander SA
Banco Santander Totta SA
Bank für Arbeit und Wirtschaft und Österreichische Postsparkasse Aktiengesellschaft-BAWAG PSK Group
Bank of Cyprus Public Company Limited-Bank of Cyprus Group
Bank of Valletta Plc
Bank Winter & Co. AG
Banka Celje dd

Banka Koper d.d.
Bankinter SA
Bankoa SA
Banque BCP SAS
Banque Chaix SA
Banque CIC Est SA
Banque CIC Sud-Ouest SA
Banque Commerciale du Marche Nord Europe - BCMNE
Banque Courtois
Banque CPH
Banque de la Réunion SA
Banque de Neuflize OBC
Banque de Tahiti
Banque des Antilles françaises SA-BDAF
Banque du Bâtiment et des Travaux Publics - BTP Banque
Banque EDEL Snc
Banque Espirito Santo et de la Vénétie SA
Banque Fédérative du Crédit Mutuel
Banque Française Commerciale Antilles-Guyane SA-BFC
Banque Française Commerciale Océan Indien SA-BFC
Banque Internationale à Luxembourg SA
Banque Kolb SA
Banque Laydernier
Banque Michel Inchauspé SA-Bami
Banque Nuger
Banque Palatine SA
Banque Patrimoine et Immobilier SA
Banque Populaire Rives de Paris SC
Banque Privée 1818 SA
Banque Rhône-Alpes
Banque SBA SA
Banque Socredo
Banque Tarneaud
Banque Transatlantique SA

Barclays Bank S.A.
Bati Lease SA
Bayerische Landesbank
BCC Alto Casertano e Basso Frusinate
Belfius Banque SA/NV-Belfius Bank SA/NV
BHF-Bank AG
BNP Paribas Fortis SA/ NV
BNP Paribas Nouvelle Calédonie SA
BNP Paribas SA
BNP Paribas Wealth Management SA
BPCE International et Outre Mer SA
BRED Banque Populaire SC
Bremer Landesbank Kreditanstalt Oldenburg - Girozentrale
Caisse Centrale du Crédit Immobilier de France SA-3CIF
Caisse d'épargne et de prévoyance Aquitaine Poitou-Charentes
Caisse d'Epargne et de Prévoyance Bretagne-Pays de Loire
Caisse d'épargne et de prévoyance d'Alsace
Caisse d'épargne et de prévoyance d'Auvergne et du Limousin
Caisse d'Epargne et de Prévoyance de Loire-Drôme-Ardèche
Caisse d'épargne et de prévoyance de Lorraine Champagne-Ardenne
Caisse d'Epargne et de Prévoyance de Midi-Pyrénées
Caisse d'Epargne et de Prévoyance de Picardie
Caisse d'épargne et de prévoyance du Languedoc Roussillon
Caisse d'Epargne et de Prévoyance Loire-Centre
Caisse d'Epargne et de Prevoyance Normandie
Caisse d'épargne et de prévoyance Provence Alpes Corse SA
Caisse d'épargne et de prévoyance Rhône Alpes
Caisse des Dépôts et Consignations-Groupe Caisse des Dépôts
Caisse régionale de crédit agricole mutuel de Franche-Comte SC
Caixa - Banco de Investimento SA
Caixa de Credit dels Enginyers S. Coop de Credit-Caja de Crédito de Los Ingenieros Sociedad Coopérativa de Crédito
Caixa Economica Montepio Geral
Caixa Geral de Depositos

Caja de Ahorros y Monte de Piedad de Zaragoza, Aragon y Rioja-Ibercaja
Caja Rural de Almendralejo Sociedad Cooperativa de Credito
Caja Rural de Navarra Sociedad Cooperativa de Crédito
CARIFERMO - Cassa di Risparmio di Fermo SpA
Cassa dei Risparmi di Forli e della Romagna SpA-CARIROMAGNA SpA
Cassa Depositi e Prestiti
Cassa di Risparmio del Veneto SpA
Cassa di risparmio della provincia di Chieti SpA - CARICHIETI
Cassa di risparmio della provincia di Viterbo SpA
Cassa di risparmio della Spezia SpA - CARISPE
Cassa di Risparmio di Biella e Vercelli - BIVERBANCA
Cassa di Risparmio di Bolzano SpA-Suedtiroler Sparkasse
Cassa di risparmio di Bra SpA
Cassa di Risparmio di Cento SpA
Cassa di risparmio di Civitavecchia SpA
Cassa di risparmio di Fano SpA - CARIFANO
Cassa di Risparmio di Firenze SpA-Banca CR Firenze SpA
Cassa di risparmio di Fossano SpA
Cassa di Risparmio di Orvieto
Cassa di Risparmio di Parma e Piacenza SpA
Cassa di risparmio di Pistoia e della Lucchesia SpA
Cassa di Risparmio di Ravenna SpA
Cassa di risparmio di Saluzzo SpA
Cassa di risparmio di San Miniato SpA Oppure Carismi Spa
Cassa di risparmio di Volterra SpA
Cassa di risparmio in Bologna SpA - CARISBO
Cassa Lombarda SpA
Cassa Padana Banca di Credito Cooperativo Societa cooperativa
Cassa Raiffeisen Alta Venosta-Raiffeisenkasse Obervintschgau
Cassa Raiffeisen Bassa Atesina
Cassa Raiffeisen Bassa Vall'Isarco
Cassa Raiffeisen Castelrotto- Ortisei Societa Cooperativa
Cassa Raiffeisen della Valle Isarco-Raiffeisenkasse Eisacktal
Cassa Raiffeisen di Brunico-Raiffeisenkasse Bruneck

Cassa Raiffeisen di Ciardes-Raiffeisenkasse Tschars
Cassa Raiffeisen di Funes-Raiffeisenkasse Villnoss
Cassa Raiffeisen di Lagundo-Raiffeisenkasse Algund
Cassa Raiffeisen di Lana-Raiffeisenkasse Lana
Cassa Raiffeisen di Lasa-Raiffeisenkasse Laas
Cassa Raiffeisen di Merano Scrl-Raiffeisenkasse Meran
Cassa Raiffeisen di Nalles - Raiffeisenkasse Nals
Cassa Raiffeisen di Naturno-Raiffeisenkasse Naturns
Cassa Raiffeisen di Nova Ponente-Aldino-Raiffeisenkasse Deutschnofen-Aldein
Cassa Raiffeisen di Parcines-Raiffeisenkasse Partschins
Cassa Raiffeisen di San Martino in Passiria-Raiffeisenkasse St Martin in Passeier
Cassa Raiffeisen di Scena-Raiffeisenkasse Schenna
Cassa Raiffeisen di Senales-Raiffeisenkasse Schnals
Cassa Raiffeisen di Terlano-Raiffeisenkasse Terlan
Cassa Raiffeisen Nova Levante - Raiffeisenkasse Welschnofen
Cassa Raiffeisen Schlern Rosengarten Societa' Cooperativa
Cassa Raiffeisen Silandro-Raiffeisenkasse Schlanders
Cassa Raiffeisen Tirolo-Raiffeisenkasse Tirol
Cassa Raiffeisen Tures-Aurina-Raiffeisenkasse Tauferer-Ahrntal
Cassa Raiffeisen Ultimo-S. Pancrazio-Lauregno-Raiffeisenkasse Ulten-S. Pankraz-Laurein
Cassa Raiffeisen Val Sarentino-Raiffeisenkasse Sarntal
Cassa Raiffeisen Wipptal
Cassa Rurale - Banca di Credito Cooperativo di Treviglio Societa Cooperativa
Cassa Rurale Adamello - Brenta Banca di Credito Cooperativo - Societa Cooperativa
Cassa Rurale Alta Val di Sole e Pejo - Banca di Credito Cooperativo
Cassa Rurale Alta Vallagarina di Besenello, Calliano, Nomi, Volano - Banca di Credito Cooperativo-Cassa Rurale Alta Vallagarina
Cassa Rurale Alto Garda - Banca di Credito Cooperativo
Cassa Rurale Bassa Anaunia - Banca di Credito Cooperativo
Cassa Rurale Bassa Vallagarina Banca di Credito Cooperato
Cassa Rurale Centrofiemme - Cavalese - Banca di Credito Cooperativo
Cassa Rurale d'Anaunia-Banca di Credito Cooperativo-Taio Societa' Cooperativa
Cassa Rurale della Valle dei Laghi - Banca di Credito Cooperativo

Cassa Rurale della Valsugana e Tesino Scarl
Cassa Rurale di Bolzano-Raifeisenkasse Bozen
Cassa Rurale di Caldonazzo - Banca di Credito Cooperativo
Cassa rurale di Folgaria Societa cooperativa
Cassa Rurale di Giovo - Banca di Credito Cooperativo
Cassa Rurale di Isera - Banca di Credito Cooperativo
Cassa Rurale di Ledro
Cassa Rurale di Levico Terme - Banca di Credito Cooperativo
Cassa Rurale di Lizzana
Cassa Rurale di Mori - Brentonico- Val di Gresta Banca di Credito Cooperativo
Cassa Rurale di Pergine - Banca di Credito Cooperativo
Cassa rurale di Rabbi e Caldes
Cassa Rurale di Roncegno - Banca di Credito Cooperativo
Cassa Rurale di Rovere della Luna - Banca di Credito Cooperativo
Cassa Rurale di Rovereto Banca di Credito Cooperativo Scrl
Cassa Rurale di Saone - Banca di Credito Cooperativo
Cassa Rurale di Strembo, Bocenago e Caderzone - Banca di Credito Cooperativo
Cassa Rurale di Tassullo e Nanno - Banca di Credito Cooperativo
Cassa Rurale di Trento Banca di Credito Cooperativo
Cassa Rurale ed Artigana San Giuseppe Credito Cooperativo Camerano (Ancona)
Cassa Rurale ed artigiana dell'Agro Pontino - Banca di Credito Cooperativo
Cassa Rurale ed artigiana di Binasco - Credito Cooperativo
Cassa Rurale ed Artigiana di Borgo San Giacomo (Brescia) S.c.r.l. - Credito Cooperativo
Cassa Rurale ed Artigiana di Boves - Banca di Credito Cooperativo (Boves - Cuneo)
Cassa Rurale ed Artigiana di Brendola - Credito Cooperativo
Cassa Rurale ed Artigiana di Cantu - Banca di Credito Cooperativo
Cassa rurale ed artigiana di Castellana Grotte
Cassa rurale ed artigiana di Cortina d'Ampezzo e delle Dolomiti SCarl
Cassa Rurale ed Artigiana di Rivarolo Mantovano (Mantova) - Credito Cooperativo
Cassa Rurale ed Artigiana di Roana - Credito Cooperativo
Cassa Rurale ed Artigiana di Treviso - Credito Cooperativo
Cassa Rurale ed Artigiana di Vestenanova Credito Cooperativo
Cassa Rurale Giudicarie Valsabbia Paganella - Banca di Credito Cooperativo
Cassa Rurale Pinetana Formace e Seregnano - Banca di Credito Cooperativo

Cassa Rurale Val di Fassa e Agordino
Cassa Rurale Valli di Primiero e Vanoi - Banca di Credito Cooperativo
Casse di Risparmio dell'Umbria SpA
Centromarca Banca - Credito Cooperativo SCARL
Cereabanca 1897 - Credito Cooperativo
CMCIC Lease
CM-CIC Securities SA
Cofidis Participations SA
Commerzbank AG
Compagnie de Financement Foncier SA
Compagnie générale de crédits aux particuliers SA-CREDIPAR
Compagnie générale de location d'équipements SA-SGL
Cooperatieve Centrale Raiffeisen-Boerenleenbank B.A-Rabobank Nederland
Credit Agricole Corporate and Investment Bank SA-Credit Agricole CIB
Crédit Agricole-Crédit Agricole Group
Crédit Commercial du Sud-Ouest SA
Crédit du Nord SA
Credit Europe Bank N.V.
Crédit Foncier de France SA
Crédit Immobilier de France Développement SA-CIFD
Credit Immobilier De France Rhone Alpes Auvergne Sa
Crédit Industriel et Commercial SA - CIC
Crédit Moderne Antilles Guyane SA
Crédit Moderne Océan Indien SA
Credit Mutuel (Combined - IFRS)
Credit Mutuel Arkea SA
Crédit Mutuel de Maine-Anjou et Basse-Normandie SA
Crédit Mutuel Nord Europe SA
Credit Suisse (France)
Credito Agricola Financial Group-Caixa Central de Credito Agricola Mutuo - CCCAM
Credito Cooperativo - Cassa rurale ed artigiana de Lucinico Farra e Capriva
Credito Cooperativo - Cassa Rurale ed Artigiana di Paliano (Frosinone)
Credito Cooperativo Cassa Rurale ed Artigiana di Erchie
Credito Cooperativo Centro Calabria - Societa Cooperativa

Credito Cooperativo Friuli - Societa Cooperativa-Credifriuli
Credito Cooperativo Mediocrati
Credito Cooperativo Ravennate e Imolese
Credito Cooperativo Reggiano
Credito Cooperativo Valdarno Fiorentino Banca di Cascia SC
Credito Emiliano SpA-CREDEM
Credito Etneo - Banca di Credito Cooperativo
Credito Trevigiano - Banca di Credito Cooperativo
Credito Valdinievole Banca di Credito Cooperativo di montecatini Terme E Bientina Societa Cooperativa
Crediveneto Credito Cooperativo-Credito Cooperativo Interprovinciale Veneto
Cyprus Development Bank Public Company Ltd
DekaBank Deutsche Girozentrale AG
Deutsche Bank AG
Deutsche Bank SpA
Deutsche Postbank AG
Dexia CREDIOP SpA-Gruppo Bancario CREDIOP
Dexia Crédit Local SA
Dexia SA
Diac SA
Duesseldorfer Hypothekenbank AG
DZ Bank AG-Deutsche Zentral-Genossenschaftsbank
EBS Limited
Edmond de Rothschild (France)
Edmond de Rothschild SA
Erste Group Bank AG
Eurobank Ergasias SA
Factorit SpA
Farbanca SpA
Fédération du Crédit Mutuel
Fédération du crédit mutuel Antilles-Guyane SC
FIMBank Plc
FinecoBank Banca FinEco SpA-Banca FinEco SpA
Fortis Lease SA

Franfinance SA
Friulovest Banca Credito Cooperativo Societa Cooperativa
Ge Capital Interbanca SpA
GE Corporate Finance Bank SAS
Gorenjska Banka d.d. Kranj
Grupo Ahorro Corporacion-Ahorro Corporacion S.A.
Hellenic Bank Public Company Limited
Home Credit BV
HSBC Bank Malta Plc
HSBC France SA
HSH Nordbank AG
Hypo Alpe-Adria-Bank Spa
Hypo Real Estate Holding AG
ICCREA Banca SpA - Istituto Centrale del Credito Cooperativo
Iccrea BancaImpresa Spa
Iccrea Holding SpA
ING Bank NV
ING Groep NV
Instituto de Crédito Oficial
Intesa Sanpaolo
Investment Bank of Greece
IW Bank SpA
Jsc Latvian Development Financial Institution Altum
KBC Bank NV
KBC Groep NV/ KBC Groupe SA-KBC Group
KfW Bankengruppe-KfW Group
La Banque Postale
Landesbank Baden-Wuerttemberg
Landesbank Berlin AG
Landesbank Saar-SaarLB
Le Crédit Lyonnais (LCL) SA
Liberbank SA
Lico Corporacion SA
Mediocredito Italiano SpA

Mediocredito Trentino-Alto Adige SpA-Tedesca Investitionsbank Trentino - Suedtirol - A.G
Monte dei Paschi di Siena Capital Services Banca per le Imprese SpA-MPS Capital Services Banca per le Imprese SpA
Monte Paschi Banque S.A.
MPS Leasing & Factoring SpA-Monte dei Paschi di Siena Leasing & Factoring, Banca per i servizi finanziari alle imprese SpA
National Bank of Greece SA
Natixis SA
NIBC Bank NV
NLB dd-Nova Ljubljanska Banka d.d.
Norddeutsche Landesbank Girozentrale NORD/LB
Nordea Bank Finland Plc
Norvik Banka AS
Nova Kreditna Banka Maribor d.d.
Oberbank AG
OP-Pohjola Group-OP Osuuskunta
OTP Banka Slovensko, as
Permanent TSB Plc
Piraeus Bank SA
Pohjola Bank plc-Pohjola Pankki Oyj
Postna Banka Slovenije dd
ProCredit Holding AG & Co. KGaA
Rabo Real Estate Group-Rabo Vastgoedgroep
Raiffeisen Bank International AG
Raiffeisen Banka dd
Raiffeisen Zentralbank Oesterreich AG - RZB
RCI Banque SA
Regionala investiciju banka-Regional Investment Bank
Romagna Est Banca di Credito Cooperativo Società Cooperativa
Rovigobanca Credito Cooperativo
Santander Consumer Bank SpA
Santander Consumer Finance
Santander Totta SGPS

Sberbank Banka dd
Sberbank Slovensko, as
SEB banka AS
SEB Pank
Siauliu Bankas
SID - Slovene Export and Development Bank, Inc, Ljubljana - SID Bank, Inc-SID -
Slovenska izvozna in razvojna banka, dd, Ljubljana - SID Banka, dd
SKB Banka DD
Slovenska sporitel'na as-Slovak Savings Bank
SNS Bank N.V.
Société Générale SA
Société Marseillaise de Crédit
Société Martiniquaise de Financement SCA-SOMAFI
Société Réunionnaise de Financement SCA-SOREFI
Staalbankiers NV
Swedbank AB
Swedbank As
Swedbank AS
Tatra Banka a.s.
TCS Group Holding Plc
Trasta Komercbanka-Trust Commercial Bank
Turkish Bank Ltd.
UAB Medicinos Bankas
UBI Banca Private Investment SpA
Ulster Bank Ireland Limited
UniCredit Bank AG
UniCredit Bank Austria AG-Bank Austria
UniCredit Factoring SpA
UniCredit SpA
Unione di Banche Italiane Scpa-UBI Banca
USB Bank Plc
Valpolicella Benaco Banca Credito Cooperativo (Verona) SC
Van Lanschot NV
Veneto Banca scpa

VIBanca - Banca di Credito Cooperativo di S. Pietro in Vincio - Società Cooperativa
Volkswagen Bank GmbH
Vseobecna Uverova Banka a.s.