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The influence of Basel 3 regulations on the health of banks: A comparison of the US and the EU

Gkousgkounis, Martin

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The influence of Basel 3 regulations on the health of banks:

A comparison of the US and the EU

Bachelor thesis

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Martin Gkousgkounis, s2337169

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Introduction

The Great Financial Crisis (GFC) of 2008 is often considered as being the biggest financial crisis since the Great Depression of the 1930s. The roots of the GFC can be found at a variety of places. A prominent example is lacking government oversight over the financial sector. Outdated regulation over the financial sector made early warning mechanisms of excessive risk taking practically useless. This enabled excessive amount of risk taking by investors and speculators which remained undetected. Financial innovation by financial firms led to the creation of financial products the firms themselves often did not know exactly what they were worth, a notable example was the creation of the collateralized debt obligation (CDO). The market was taking on more leverage as prices of most assets seemed only to be going up and up which made the underlying collateral worth even more, a self-perpetuating prophecy. The housing market being a prime example of higher and higher prices (Bernanke et al., 2019; Mishkin, 2018). All these examples can be thought of as being connected to each other in the form of a spider web with the most important actor in the middle. This actor was certainly not fully responsible for every reason but played a big role in making the web bigger, namely the banks.

Banks were at the center of the GFC being the ones who provided the tools for the bubble that occurred. The banks themselves underestimated their own ability to manage risk as it turned out that many banks worldwide were undercapitalized, were highly dependent on short term wholesale funding and overnight repo to finance themselves and lastly held too many illiquid assets on their books (Bernanke et al., 2019). These practices were doomed to fail and eventually the bubble burst which started with some turmoil in the sub-prime mortgage department of the market. A prime example of this is investment bank Lehman Brothers. This firm had about 680 billion US dollars worth of assets on their books which were underpinned with 22,5 billion US dollar of firm capital. The assets held were oftentimes positions in the sub-prime mortgage department (McDonald & Robinson, 2010). The bubble burst and Lehman Brothers went under. Major banks all across the world one of a sudden were in big trouble and the fragility of the financial system got exposed. Large banks in the US and Europe which were considered to be indestructible one of sudden had to be bailed out with taxpayer money in order to bring down the global financial system.

As a consequence of this crisis it became evident that banks were not in good shape, i.e. they were financed with short term funding, held little capital and had illiquid assets. The mechanisms and

requirements which were put in place by the Banking Committee on Banking Supervision (BCBS) in the Basel 2 accord proved to be deficient and had to be enhanced in new agreement. The BCBS is part of the Bank for International Settlements (BIS) and is located in Basel, Switzerland. The members of the BCBS which include the G20 came together in the aftermath of the GFC and create the Basel 3 accord of banking regulations. The BCBS agreed to strengthen global rules with respect to minimum capital requirements, healthier funding and reducing leverage within the banking system (BCBS, 2011; Mishkin, 2018; Weigand, 2015; Frattiani & Pattison, 2015). Each member is required to implement the agreed legislation but can implement in their own way as long the requirements will be met. This had to do with regional preferences of certain measures for example in the Eurozone where the German economy is different than the Greek one so the European Central Bank has to find a way to implement Basel 3 which is suitable for all Eurozone members (Frattiani & Pattison, 2015).

Moreover, after the G20 summit of 2009 was held in London the members agreed to create the Financial Stability Board (FSB) which is affiliated with the BIS and is located in Basel as well. The FSB monitors the financial stability of the global financial system. The FSB is the one who assessed a list of Globally Systemically Important Banks (G-SIB). This is a list of the world biggest banks which when in trouble could endanger the global financial system. It is generally agreed in the literature that banks worldwide are in much healthier shape post-crisis than pre-crisis given all the enhanced requirements which were put in place in Basel 3 (Bernanke et al, 2019; Mishkin, 2018; Naess-Schidt et al, 2019). There is a discrepancy though which is that post-crisis European G-SIBs have been suffering from weaker profitability and are considered to be in worse shape than US G-SIBs. The European G-SIBs suffer from lower profitability, higher levels of non-performing loans and are reliant more on short-term wholesale funding than US G-SIBs (ECB, 2015; Schildbach, 2013; Weigand, 2015). The combination of these things makes European banks more fragile in general and certainly in comparison to US banks. The existing literature addresses the weaknesses in European banks in comparison to US banks by looking at the aforementioned reasons. It fails to take sufficient notice of the difference of the Basel 3 implementation in Europe and the US and how that might affect the difference in the relative health of the banks. That is how the research question of this thesis emerged: *Why are European Globally Systemically Important Banks in worse shape than American Globally Systemically Important Banks? A comparison of the Basel 3 accord implementation.*

Theoretical framework

In the first section of the theoretical framework the current stance of the literature will be discussed on the implementation of the Basel 3 regulatory framework in the US and the EU, the ongoing debate about the divergences in profitability of US banks and European banks and how those factors contribute to banks health, and lastly the first part will address which gap has been found in the literature and the importance of filling that gap. In the second part of the theoretical framework the relevant concepts will be defined and discussed.

Literature review

Basel 3 implementation

The BCBS makes sets a high priority on a timely and orderly manner of the implementation of the Basel 3 regulations and therefore urges members to implement the minimum requirements according to deadlines. This is critical because as the BCBS puts it the adoption is critical to in order to ensure a resilient global banking system and the timely manner refers not only to follow the deadline but also to make clear the regulatory environment in which banks operate (BCBS, 2011). According to the BCBS (2010) the most important factors that needed to be addressed in order to improve banks health were better and higher capital requirements, better and more liquidity to cover funding and lastly less leverage. The importance of these three points have been repeated and acknowledged repeatedly in the literature (Bernanke et al, 2019; Mishkin, 2018; Glasserman & Ludis, 2015; ECB, 2010; Berger et al, 1995; Baldwin et al, 2015). The technicalities and specifics of the requirements will be discussed in a later part. The important factor at this point is how the trajectory of the implementation is going. The BCBS offers a semi-annual Regulatory Consistency Assessment Programme (RCAP) in which it asses the progress of the requirements. The latest report dates from July 2020 and it states that both the US and the European Union have legislation in place for the relevant factors mentioned earlier with the standards of Basel 3 being the minimum requirements (BCBS, 2020). Even though the trajectory for i.e. the capital ratio requirements were started in 2013 and were supposed to be fully implemented by 2019 the majority of G-SIBs have front-loaded this and were fully compliant already in 2014 (Nimwegen & Bruinshoofd, 2016). This has to do with a race to the top, in which when one bank complies with future regulation competitors will adjust accordingly to also match those standards.

Divergence in profitability, why?

Banks all over the world suffered big losses during the GFC for reasons that were mentioned earlier, like excessive risk taking, weak and little funding and very little capital. According to Schildbach (2013) and Bernanke et al (2019) US banks were hit harder than their European peers as they were the originators of the GFC. Losses amounted to 1,1 trillion dollars for the US banks whereas European bank 'only' suffered a loss of 500 billion dollars. Despite this a great divergence has taken place through since the aftermath of the GFC. Namely US banks with US GSIBs included have been performing better than their competitors in the Europe in terms of profitability and bank health overall since the aftermath of the GFC. The literature has been very clear about this divergence and attributes several reasons to this. Schildbach (2013) even goes as far as to say that the bank performance has been 'an ocean apart'. Macro economic developments have more favorable in the US which have attributed to a faster recovery of US banks. This has spurred higher loan growth which contributes to the revenue. The aggressive way in which US banks dealt with the bad assets that they resulting from the GFC also contributes to them being in a healthier state. The US government helped and urged high and quick capital injections which helped deal with mainly getting non performing loans off the books (Bernanke et al, 2019). In Europe the response was much more timid where the banks got recapitalized more poorly than in the US which results in European bank still experiencing elevated levels of non performing loans on their books (Schildbach, 2013; Weigand, 2016; KPMG, 2016). An elevated level of non performing loans can act as drag not only on general revenue but also profitability. The ECB (2015) also has raised concerns about this divergence in profitability and how it endangers the financial stability of the Euro area given the fact that European economies are much more bank based than the US which is markers based economy. This weak profitability endangers the health of the banks which on the longer run can become problematic for a properly functioning economy (ECB, 2015; Schildbach, 2013).

The divergence has naturally also reflected in weak stock performance of European banks in comparison to US banks. Bank stocks went down in tandem during the GFC, but the US banking recovered to a great degree leaving European banks behind. The extend to which the market deems the assets of the European banks credible can also be questioned (Schildbach, 2013). This is the case given the fact that most European banking stocks including all Euro area GSIBs have consistently been trading at price to book ratios lower than one, book value is determined by the banks accountants themselves and the price is determined by the market. Bogdanova et al (2018)

from the BIS have found that price to book ratios are good measure of the financial health of firms, especially so for banks. This is because financial firms depend more on the tangible assets they have on their books, so when the market thinks differently about the value of the banks assets it can be considered as a reliable signal.

The gap in the literature

The Basel Accords are a form of soft law as they can not be enforced by the Basel Committee in member states that have agreed. Naturally out of this follows that member states are the ones responsible for the implementation and oversight of the Basel Accords, this without question includes the Basel 3 accords (BCBS, 2011). This way of doing things is necessary as not every member state can follow the exact same implementation, this does allow for state specific characteristics following the for differences of market based economies like the US and more bank based ones which we find in the Eurozone countries (Frattiani & Pattison, 2015). Howarth and Quaglia (2017) even mention divergent preferences within the Eurozone for the implementation of Basel 3, so it is a clever decision not to force all member states to follow the same sort of implementation, but rather setting the minimum requirements for i.e. capital ratios on the agreement and letting the member states decide how they implement them. For this thesis the differences in implementation for the the European Union and the United states matter the BCBS (2020) in their latest RCAP recognizes differences the differences in the implementation of the Basel 3 Accord and Frattiani and Pattison (2015) in their research paper even provide a comparison of the European implementation and the American one with specifics on the implications of the given implementations in the regions. What the literature fails to do is provide research on how these differences in implementation translate to the relative health in different regions, most importantly the US and Europe because these are the regions which house the most GSIBs (FSB, 2011). This is where gap in the literature is located and this thesis is going to try to fill this gap and or at least provide a start in filling it. It is of utmost importance to figure out how a different implementation is the Basel 3 Accord in the US and the Eurozone affects the health of the GSIBs given the fact, as stated earlier, that these banks have been designated as globally systemically important for a reason, namely their importance in the global financial system. Not to forget that ECB (2015) has stated themselves that divergences in the health of the banking systems can have dangerous implications for the stability of the financial system.

Conceptualization

In this section the relevant concepts for this thesis are going to be defined. A clear definition of the concepts is needed in order for it to be clear what specifically is researched and upon what eventual implications can be drawn. First I will give a brief summary of the technical aspects of the Basel 3 accord in general and then I will proceed with defining the concepts. The first concept will be the European implementation of the Basel 3 accord, the second concept will be the US implementation of the accord, third one banks health and the last concept will be the GSIBs.

Technical aspects of Basel 3

In this section the technical aspects will be summarized from the agreed proposal of Basel 3 at the BCBS in 2010. Basel 3 aims to increase the resilience of the banking system. It does this quantitatively by increasing tier 1 capital in comparison to Basel 2. This tier 1 capital consists of Common Equity Tier 1 (CET 1) which must at least be 4,5% relative to Risk Weighted Assets (RWA) and additional tier 1 capital which must at least be 1,5% in order to comply with the minimum 6% of tier 1 capital in relation to RWA. Qualitatively the resilience is increased by demanding that CET 1 consists of firm equity alongside retained earnings.

Minimum capital in general, so adding tier 2 capital must at least be 8%. Further an additional 2,5% conservation buffer is added in order to help banks to function properly during periods of distress (BCBS, 2011; Nimwegen & Bruinshoofd, 2016). This amounts to 10,5% of effective capital. A countercyclical conservation buffer which can be enforced by the national regulator is also developed and it can range from 0% up to 2,5%, this one is not really relevant for this research, because it can fluctuate over time, minimum requirements are of importance here. Lastly the BCBS requests additional capital for GSIBs, the systemic risk buffer, which as assessed by the FSB. Later a more detailed description of the GSIBs will be given, but for now it is important to note that they are ranked by the amount of assets they have under management. Buckets or categories are then provided which require additional capital of 1% for 'small' GSIBs and up to 3,5% for the biggest ones (FSB, 2011).

In the Basel 3 accord a leverage ratio has been introduced which is not risk weighted, so all the assets are taken at face value (BCBS, 2011). For example in the capital ratio calculations with have risk weights local currency government bonds have a risk weight of zero percent, so one billion dollars of US government debt has a zero percent risk weight for the capital ratio, but for the

leverage ratio its taken at face value (100%) so 1 billion dollars. The leverage ratio acts as a supplement to the capital ratio by including all assets at face value, worth noting is that off-balance sheet exposure is also added to the calculation. The requirement set by Basel 3 is a minimum of 3% of tier 1 capital divided by total assets, this comes down to about 33 times leverage. This requirement prevents banks from getting excessively big.

Accounting practices, GAAP vs. IFRS

Concerns may be raised that apples and oranges are being compared given different accountancy rules. In the US companies are required to report financial statements under Generally Accepted Accounting Principles (GAAP) which is the US way of accounting and European companies on the other hand are required to report under International Financial Reporting Standards (IFRS). The International Swaps and Derivatives Association (ISDA, 2012) concluded a report which raises concerns for a proper calculation of the leverage ratio. Under GAAP derivative positions can be netted out with collateral that may be received by the bank, under IFRS this is not the case. In this case leverage may become underreported for US banks operating under GAAP. Furthermore this would set the US banks at competitive advantage as they would be able to underscore leverage in a way their foreign competitors could not (ISDA, 2012). As said earlier one the main statutes of Basel 3 is to increase transparency of bank exposure and leverage. The BCBS took notice of this netting out of collateral and in 2014 they made it official that US banks will be required to alongside disclosing financial statements in GAAP they should also provide data where derivatives are not netted out, in essence this means reporting under IFRS standards like the rest of the foreign banks (BCBS, 2014). By taking this measure reporting standards are harmonized which gives the banks a level playing from the Basel 3 perspective.

European implementation of Basel 3

Europe being one the most severely hit regions during the GFC and given the fact that multiple European banks had to receive government bailouts in order to stay alive the EU felt a great urgency to co-develop en implement new banking regulations swiftly. The European Union chose to incorporate the Basel 3 requirements in the Capital Requirements Directive and Regulation 2013/36/EU or simply put CRD/CRR IV, because it is the fourth capital directive that has been issued during the existence of the EU (European Parliament, 2013). In Article 131 the EU acknowledges the fact that GSIBs exist and need higher requirements than normal banks, the systemic risk buffer. Given the fact that the EU operates in the Single Market the requirements in

CRD IV had to be in line with the Single Market in mind. The European Banking Authority (EBA) was given the responsibility to set out the technical requirements for the European banks and the ECB was granted the ultimate supervisory power over the banks, especially over the GSIBs located in the Euro-area, not only because the ECB has experience in cross-border activities but also because since 2014 the Single Supervisory Mechanism applies in the EU which designates one supervisory authority that has final responsibility (Economic Governance Support Unit, 2017).

The US implementation of Basel 3

The US financial system was on the brink of collapse during the GFC and the authorities had to step in boldly in order to avoid a complete meltdown. In making sure that a financial crisis of this magnitude will be prevented the US took measures, former Secretary of the Treasury under Obama and former President of the New York Fed during the GFC Tim Geithner put it nicely with the words ‘Capital, capital, capital’ (Bernanke et al, 2019). In the United the Basel 3 requirements were implemented in provisions of the famous Dodd-Frank act alongside the a rubric called Final US rules, the requirements in the provisions of Dodd-Frank actually turned out to be stricter than the minimum requirements described in Basel 3 but more on this later (Frattiani & Pattison, 2015). The original Dodd-Frank act goes back to 2010, but the provisions that officially add the Basel 3 requirements were finalized in 2013 by the Federal Reserve (Federal Reserve, 2013). The Federal Reserve has the ultimate responsibility and authority over the the implementation of the requirements but has announced that it coordinates closely with the Federal Deposit Insurance Corporation (FDIC) and Office of the Comptroller of the Currency (OCC) in order maintain transparency and smooth cooperation (Federal Reserve, 2013). The US mostly follows the assessment of the FSB in determining GSIBs, but has chosen to be a bit more strict in the requirements (Frattiani & Pattison, 2015).

Banks health

The determinants of banks health are going to be in line with the leading indicators of banks health that is referred to in previous literature and assessment by official authorities like the BCBS. The first measure that is going to be used is most common one that the literature emphasizes, namely sufficient high quality and quantity of capital which can act as a cushion during times of financial distress (Mishkin, 2018; BCBS,2010; Bernanke et al, 2019;). Leverage is another indicator that is used in determining banks health alongside enough HQLA, the combination of not excessive leverage and the maintaining of HQLA helps banks not to lose trust from other market participants

during periods of short term economic distress. As mentioned earlier bank profitability alongside the quantity of NPLs are important indicators of a banks health when looking at the survivability in the longer term (ECB, 2015; Schildbach, 2013). Lastly to reflect what the market thinks of the banks it is relevant to look at price to book ratios over a period of time as the market can assess whether the financial health of a bank is reflected with the assets on the balance sheet (Bogdanova et al, 2018).

Global Systemically Important Bank

A G-SIB is a bank that possesses a large importance for the proper functioning of the global financial system. Failure of such an institution could trigger a financial crisis and could become a threat to the global economy. The FSB has, following the Basel Committee's assessment methodology for G-SIB's identified which banks are to be designated as such (BCBS, 2013). The core criteria of assessment are size, interconnectedness and complexity. G-SIBs are then obliged to follow stricter regulations, an example of this are higher capital requirements. The G-SIBs that are going to be part of this research are going to be specified later.

Research Design

Methodology

In order to answer the research question proposed in this thesis mainly qualitative research is going to be conducted. The method that will be used is a small-N comparative case study. This research method, if conducted properly, has proven to have many advantages (Halperin & Heath, 2017). This method allows for an in-depth analysis of provided cases by laying a greater emphasis on substance and context while not only looking at statistical results. A big risk of using this method is the occurrence of selection bias, therefore the case selection must not be conducted carelessly. In this thesis the impact of the differences of the Basel 3 implementation in the US and Euro-area on the health of their respective G-SIBs is going to be analyzed. Given the complexity of the agreement and the total sum of pages of the Basel 3 agreement and the subsequent European and US implementation exceeds the many hundreds it will be beyond the scope of this thesis to provide to fully analyze each difference in implementation. What is within the scope is looking at the most important differences which are set out in the literature and determining what effect they may have on the health of the G-SIBs to which the regulations apply. The comparative health can be deducted by comparing the main indicators of banks health.

In this thesis the following differences of implementation are going to be analyzed in greater detail. Firstly the differences of the capital adequacy regulations are going to be examined and the way in which the two groups of GSIBs, US and Eurozone, chose to flesh out the requirements. Secondly the leverage ratio requirements are going to be analyzed and compared. Thirdly the price to book ratios for the given G-SIBs is going to be examined as it has proven to be a suited determinant of banks health over a period time. Lastly other factors which are not core parts of Basel 3 but can have substantial impact on banks health are going to be acknowledged like the amount of non-performing loans in the two regions. It is worth mentioning again that when it comes to the Basel 3 comparison of implementation accounting differences are accounted for when the different ratios are being compared.

Data and sources

The G-SIBs that are going to be part of the analysis are comprised based on the assessment of the FSB of G-SIBs that are located in the US and the Euro-Area. For the US this includes: J.P. Morgan

Chase, Citibank, Bank of America, Wells Fargo, State Street, Goldman Sachs, Morgan Stanley and Bank of New York Mellon. For the Euro-area this includes BNP Paribas, Deutsche Bank, Crédit Agricole, ING, Banco Santander, Société Générale and UniCredit (BCBS, 2013; FSB, 2020). The French Bank BPCE is going to be left out of this analysis given the fact that the company is private so the data on the price to book ratios does not exist. The differences in the implementation of the Basel 3 accord are going to be analyzed and how those differences affect the capital, leverage and liquidity coverage ratios which to a certain extent are reflections of banks health alongside other ratios like the price to book ratio.

This thesis will make use of primary as well as secondary sources in order to obtain the desired data. The main sources will be research articles and reports explaining the Basel 3 regulations and what impact they have on the health of the banking system. Reports that summarize the implementations of the Basel 3 regulations in the US and Euro-area and how they differ. Official reports of the ECB, EBA, Federal reserve will be visited in order to understand certain aspects in greater detail. The different ratios that are needed in order to conduct this research are going to be obtained through the FDIC with their Global Capital Index reports and through the financial database Orbis Bankfocus which will be used to complement some data that is missing from the FDIC reports. The period that will be analyzed in this thesis is 2013 to 2017. The reason for this is that even though negotiations in Basel started in 2010 the implementation started to take place in 2013 and was set to be finalized in 2019. As mentioned earlier what occurred was that banks participated in a race to the top and mostly were already compliant with the full standards by 2014 (Nimwegen & Bruinshoofd, 2016). The data up to 2017 is best accessible at this time and it is a relevant period given the fact that the banks were internally still recovering from the GFC when the implementation of the Basel 3 regulations started.

Operationalization

In order to make sure the data is analyzed properly a clear operationalization of the relevant variables needs to be set out. First I will start by operationalizing the independent variable *the difference in implementation of Basel 3* and then I will operationalize the dependent variable *banks health* by decomposing it into different indicators.

Independent variable: Difference in implementation of Basel 3

Capital adequacy

The first difference is how the G-SIBs were made able to comply with the risk weighted tier 1 capital requirements that were set out in the Basel 3 accord which as a reminder needed to be 10,5%. Cohen (2013) identified three ways in which banks can comply with the tier 1 capital ratios. The first way is by increasing the capital base through the raising of capital, this can be done either through new share issuance or by retaining earnings. The second way through de-risking the balance sheet on the asset side, this is done by asset substitution of risky assets into less risky assets, an example would be substitute an amount of corporate loans into government bonds. The third way is by reducing the size of the balance sheet through the sale of assets. The first way is positively correlated with credit growth and the second and third are negatively correlated resulting in credit rationing which is unfavorable to economic growth, especially after periods like the GFC (Nimwegen & Bruinshoofd, 2016). The American and European authorities played a big role in determining the path that the banks eventually chose in complying with the standards as we will see in the analysis.

Leverage

The second observable difference of implementation was that of the leverage ratio. The leverage ratio is calculated by dividing total tier 1 capital by the total exposure of the bank. This calculation is not risk weighted so takes every component of the balance at face value and it includes off-balance sheet items. This measure acts as a supplement for the capital ratios which are risk weighted by making sure that individual G-SIBs do not excessive total exposure which could endanger the whole financial system if the bank would be in trouble. The Basel 3 accord put the minimum leverage at 3%. A leverage ratio on its does not have much explanatory power for the condition of banks health but when comparing the relative differences it certainly can have an effect as perceptions of the market are affected which ultimately determine trust.

Dependent variable: Banks health

In order to operationalize banks health this research will look at several indicators which together will make up the relative health of American G-SIBs on the one hand and Euro-area G-SIBs on the other. It is important to emphasize that all G-SIBs are in much healthier shape internally than they were before the GFC. This research tries to point out the relative health differences of the two groups which to a certain degree can be attributed to the differences in implementation of the Basel

3 accords in the two regions. The first indicator will be relative levels of capital ratios, a higher capital ratio which results in higher shock absorbing capacity logically results in a more healthy bank (Mishkin, 2018). A relatively higher leverage ratio, so more tier 1 capital against the total exposure means a bank is less exposed or is better equipped to withstand turbulent times in the market, makes a bank relatively more healthy. Profitability which can be affected by two aforementioned indicators alongside relative larger amounts of non-performing loans will also be looked at as these are indicators which may not be affected by Basel 3 but are too important to ignore when talking about banks health given their importance (ECB, 2015; Schildbach, 2013). Lastly a more broad measure of price to book ratios will be used in order to compare the relative health of the two groups, a mentioned earlier this is a valid measure in order to determine banks health (Bogdanova et al, 2018). A ratio of below one for a prolonged period of time indicates trouble when it comes the health of the banks, a ratio above one indicates the outlook is stable.

Analysis

In this part of the thesis the analysis which was conducted which will be presented and discussed. We are going to start with by comparing the capital ratio for the period 2013 to 2017 and explain how the two groups of G-SIBs got to them. Then we will continue with comparing the leverage ratios and price to book ratios for the aforementioned period. Then other factors like non-performing loans which have an effect on banks health but were not researched extensively for this paper and were not affected by Basel 3. The tables that will be comprised by me, this went as follows. The FDIC for the period 2013 up to 2017 twice a year released the Global Capital Index series on their website which had list of all the G-SIBs comparing all sorts of values and indicators, which included capital, leverage and price to book ratios (FDIC, 2013a; FDIC, 2013b; FDIC, 2014a; FDIC, 2014b; FDIC, 2015a; FDIC, 2015b; FDIC, 2016a; FDIC, 2017a). I had to comprise the data by hand and calculate the averages for the two groups over the period 2013-2017 myself in excel in order to be able to compare the values. The price to book ratios of Crédit Agricole were missing from the index so I managed to get hold of them through the Orbis Bankscope database.

Capital ratios

It was agreed to in the Basel 3 accord that the final minimum capital 10,5 percent alongside an additional 1 to 3,5 percent for G-SIBs given to which bucket of the systemic importance they fall. The US and Euro-area with agreed to measures and decided not to deviate from these ratios and as we can see in table 1 and 2 all the banks over the period 2013-2017 have complied with this ratio. There is a difference in how the two groups of G-SIBs got there and that has to do with the starting position of the banks in 2013 when the Basel 3 requirements started to become mandatory. As mentioned in operationalization there are three ways for banks to adjust in order to comply with the implemented capital ratios (Cohen, 2013). Raising the capital base through share issuance or retaining earnings, substitute risk weighted assets or simply reducing the length of the balance sheet by selling assets. Nimwegen and Bruinshoofd (2016) found that the former has a positive correlation with credit growth and the latter two have a negative correlation. Nimwegen and Bruinshoofd (2016) also found that US banks were able to comply with the requirements mostly through capital base expansion while the Euro-area competitors relied more on substituting risk and reducing the balance sheet. This has to do with the years after the the GFC to the start of the Basel 3 requirements. The US government was extraordinarily quick in

recapitalizing the banks using the Troubled Asset Relief Program which initially was authorized at 700 billion dollars (Bernanke et al, 2019). This helped US banks recapitalize quickly before 2013 in a relatively cheap way because in the aftermath of the GFC bank valuations were low making share issuance relatively expensive. This made US G-SIBs already highly compliant by 2013 and compliance via de-risking or balance sheet reduction was prevented making economic recovery more likely. Euro-area G-SIBs on the other hand were not as lucky in getting a quick recapitalization from their governments but rather receiving great criticism for their risky behavior. Euro-area banks, given the fact that share issuance was expensive, adjust to comply with the implementation via risk substitution and balance sheet reduction (Nimwegen & Bruinshoofd, 2016). This resulted in a credit contraction, which in the aftermath of the GFC was not very favorable. As an illustration Bernanke et al (2019) report that for all the capital that US banks raised in the period 2008-2016 roughly 90% was raised in 2008-2010, for the European banks the ratio is at 50%. So although the implementation of the 10,5% minimum requirement was the same in Europe and US, the US provided much more favorable conditions for compliance. Not to forget that capital base expansion in order to comply with capital ratios is positively correlated with credit growth making an economic recovery relatively easy. This made the environment in which US banks operate more healthy, which makes raising the health of the banks quicker as well.

What we see in table 1 and 2 is the average tier 1 capital ratios for US G-SIBs in table 1 and Euro-area G-SIBs in table 2 for the period 2013 to 2017. Average data like this was not available so the

Table 1

Tier 1 capital ratios of US G-SIBs	Averages for period 2013-2017 in %
Bank of America	12,43
Bank of New York Mellon	13,38
Citibank	14,33
Goldman Sachs	14,83
JP Morgan Chase	12,88
Morgan Stanley	16,85
State Street	15,52
Wells Fargo	12,61
U.S. G-SIBs Average	14,11

Source: FDIC

Table 2

Tier 1 capital ratios of EU G-SIBs	Averages for period 2013-2017 in %
Banco Santander	11,9
BNP Paribas	12,37
Credit Agricole	13,98
Deutsche Bank	15,55
ING	14,41
Societe Generale	13,44
Unicredit	13,28
EU G-SIBs average	13,29

Source: FDIC, Bankscope

calculations were made by me using the data mentioned in the first paragraph of the analysis. The US ratios are on average a bit higher making them in essence more healthy when compared to the European ratios. The differences seem not to be very big but as we now know from the previous paragraphs the conditions for banks to make internal adjustments banks made in order to comply with Basel 3 were much more favorable in the US. This made US banks internally internally stronger which enabled them to participate and facilitate economic growth more easily through the provision of credit.

Leverage ratio

The minimum tier 1 capital to total exposure ratio or simply the leverage ratio that was demanded from Basel 3 was set at 3 percent. In Europe the 3 percent minimum requirement was embraced for all banks. In the US on the other hand the 3 percent minimum faced opposition which demanded a higher leverage ratio for G-SIBs because it deemed 3 percent as not being enough and the context in which domestic banks and G-SIBs operate in is different. The US did not get their way in the official Basel 3 agreement so they implemented Basel 3 leverage ratio in a stricter way. The Federal Reserve in coordination with the FDIC and the OCC introduced the Supplementary Leverage Ratio (SLR) which forced G-SIBs to maintain at least a leverage ratio of 5 percent. What we can see in table 3 and 4 is the leverage ratios for US and Euro-area G-SIBs the period 2013-2017. A higher ratio means banks have more tier 1 capital against their leveraged exposures. Again averages for G-

Table 3

Leverage ratios of US G-SIBs	Averages for period 2013-2017 in %
Bank of America	5,29
Bank of New York Mellon	4,46
Citibank	5,73
Goldman Sachs	4,63
JP Morgan Chase	5,19
Morgan Stanley	4,25
State Street	5,23
Wells Fargo	8,18
U.S. G-SIBs Average	5,37

Source: FDIC

Table 4

Leverage ratios of EU G-SIBs	Averages for period 2013-2017 in %
Banco Santander	3,19
BNP Paribas	3,70
Credit Agricole	4,21
Deutsche Bank	2,8
ING	4,93
Societe Generale	3,54
Unicredit	3,98
EU G-SIBs average	3,76

Source: FDIC, Bankscope

SIBs over a period of time were not available so the numbers were calculated by me using the data mentioned in the first paragraph of the analysis.

The result of the stricter Basel 3 leverage rule implementation has a number of implications to banks' health. The extra requirement increases the high quality capital for US G-SIBs in comparison to Euro-area G-SIBs making them less vulnerable as the relative exposure is lower. Furthermore as Adrian Shin (2010) have found banks that are more leveraged on average rely more on short term funding which oftentimes is unstable there is market turbulence. This suggests that EU G-SIBs are less resilient during times of turbulence than their US competitors. Additionally as Geanakoplos (2010), and Acharya and Viswanathan (2011) have found, when economic conditions worsen it becomes more difficult for higher leveraged firms to raise capital in order to roll over their short term debt which results in deleveraging by the sale of assets. A large relative share of leveraged firms in high this may lead to unexpected drying up of market liquidity, which makes asset prices drop further making the problem worse.

Price to Book ratios

Price to book ratio is a ratio which equates the the stock market capitalization per share which determines the *price* against the firms own *book* value per share. This ratio then determines what the market perception is of the firms own valuation against the one of the market. As mentioned earlier the price to book ratio are a good measure in order to assess a firms longer term financial health, even more so for firms with relatively many tangible assets (Bogdanova et al, 2018). Banks are firms that almost strictly are engaged in tangible assets for example given by the fact that it known beforehand what profit a loan carries. It is common for firms to trade on the open market at a price to book ratio of 1 or higher if the market has a good prospect of the firm and thinks that firms accountants value the assets on the book at fair value. As in theory as a firm would dissolve and all assets would be sold the eventual book value should be reached making it logical that the stock price should at least reflect the ratio of 1 in comparison to the book value. A ratio lower than 1 over a period of time therefore means that the market does not think the in the same way as the firm about the value of the assets and the way in which the firm is run.

What we see in table 5 and 6 are the averages of the book values of US and Euro-area G-SIBs for the period 2013 to 2017, again this data was not available for these groups of banks for the analyzed period thus was calculated by me. What we can in the table 5 and 6 see that in the period in which the Basel 3 regulations were implemented which was in 2013 including years thereafter on average

Table 5

Price to Book ratios of US G-SIBs	Averages for period 2013-2017
Bank of America	0,77
Bank of New York Mellon	1,23
Citibank	0,76
Goldman Sachs	1,07
JP Morgan Chase	1,13
Morgan Stanley	0,99
State Street	1,51
Wells Fargo	1,59
U.S. G-SIBs Average	1,13

Source: FDIC

Table 6

Price to Book ratios of EU G-SIBs	Averages for period 2013-2017
Banco Santander	0,88
BNP Paribas	0,76
Credit Agricole	0,49
Deutsche Bank	0,53
ING	1,01
Societe Generale	0,64
Unicredit	0,57
EU G-SIBs average	0,69

Source: FDIC, Bankscope

US G-SIBs had a price to book ratio of 1,13 in comparison to 0,69 for Eurozone G-SIBs. This means US G-SIBs enjoyed a price to book ratio which on average is 64 percent higher than that of Euro-zone G-SIBs. More worrisome is the fact the the Euro-zone average is far below one showing the market is not confident in values that the banks have attributed to their book. The further implication is that the health of US G-SIBs in comparison to Euro-zone G-SIBs using this metric proves to be higher and it is therefore not coincidental that this discrepancy remained during the period of the Basel 3 implementation.

Conclusion

In this thesis the following research question was tried to be answered: *Why are European Globally Systemically Important Banks in worse shape than American Globally Systemically Important Banks? A comparison of the Basel 3 accord implementation.* It did so by comparing certain elements of the different implementation of the Basel 3 accord and assessing on what the impact is on the relative health of on the one side US G-SIBs and Euro-area G-SIBs on the other. First an introduction was given to why a new Basel 3 accord was needed which was needed in order to set the sentiment of how bad things actually were at the time and why it is important that the weaknesses should be resolved for the survivability of the global financial system.

In answer to the research question, the following three things were analyzed. Firstly the differences of capital ratios were discussed alongside the different conditions that were provided in the two regions. Where it came down to with the capital ratios is that G-SIBs post crisis severely increased their capital ratios across the board as was agreed upon in the Basel 3 accord. The results were a bit better for US G-SIBs capital ratio wise in comparison to the Euro-area ones. The main difference was in the fact that the US government provided much more favorable conditions for their banks in order to comply with the new standards not affecting credit growth not affecting bank profitability in a negative way, in the Euro-area besides the bailouts did not stand ready to accommodate anything more. This resulted in Euro-area banks which were less profitable because of the contraction in credit growth. Secondly the differences in leverage ratios were analyzed, the conclusion here is that the US chose for a stricter implementation of the leverage ratio of the Basel 3 accord, the Americans chose 5 percent where the Euro-area maintained 3 percent, this makes Euro-area G-SIBs more leveraged which makes them less resilient against shocks making them less healthy overall and certainly in comparison to US G-SIBs. Thirdly the price to book ratios were analyzed which have proven to be good measure in determining the financial health of companies and even more so for financial firm given the large amounts of tangible assets on their books. What we see across the board that in the period that the Basel 3 regulations became law price to book ratios of US G-SIBs greatly outperformed their Euro-area competitors resulting in less healthy G-SIBs in the Euro-area. When accumulating all the factors we can see that the implementation of Basel 3 in the two regions played a role with respect to the health of the G-SIBs and it can be

concluded that US G-SIBs have proven to be more healthy in comparison to their Euro-area competitors.

Discussion

In this thesis I analyzed what the implications were for the health of G-SIBs in the US and Euro-area as a result of the difference in implementation of in the two regions. However for further research additional things can be researched, for example the designation of a zero percent risk weighting in the risk weighted assets computation. This results for example in an Italian government bond being risk weighted at 0 percent in the Euro-area whereas in the US their government bonds get a zero rating. One can justifiably argue that the risk on an Italian bond is higher than the US bond. Further research into this may make the calculation for risk weighted assets more reflective of reality and resulting in corrected capital ratios.

Furthermore this thesis did not focus on analyzing the presence of NPLs on the books of banks and how that may contribute to banks health. It is known from previous research that there is still a relatively high presence of NPLs at European banks which drags profitability lower (Schildbach, 2013; ECB, 2015). This may be a good addition for future research on the topic in order to give a more complete picture of the situation. Nonetheless this thesis provides a good basis in order to asses where the health of the different G-SIBs is in the aftermath of the implementation of the Basel 3 regulations. For a future Basel 4 accord a recommendation can be made, namely giving more power of the Basel Banking Committee on Supervision by for example making them able to punish banks not complying and making the deadlines for new requirements mandatory instead of a trajectory in which countries can choose themselves what to implement. Lastly a more quantitative study can be done on this topic taking into account the differences of the Basel 3 implementations, this would make it able to asses what each percentage point decrease in for example the capital ratio would mean for the profitability or the price to book ratio of a given bank or like in this thesis, different groups of banks.

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