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Drivers behind the changes in European banks' capital ratios: a descriptive analysis

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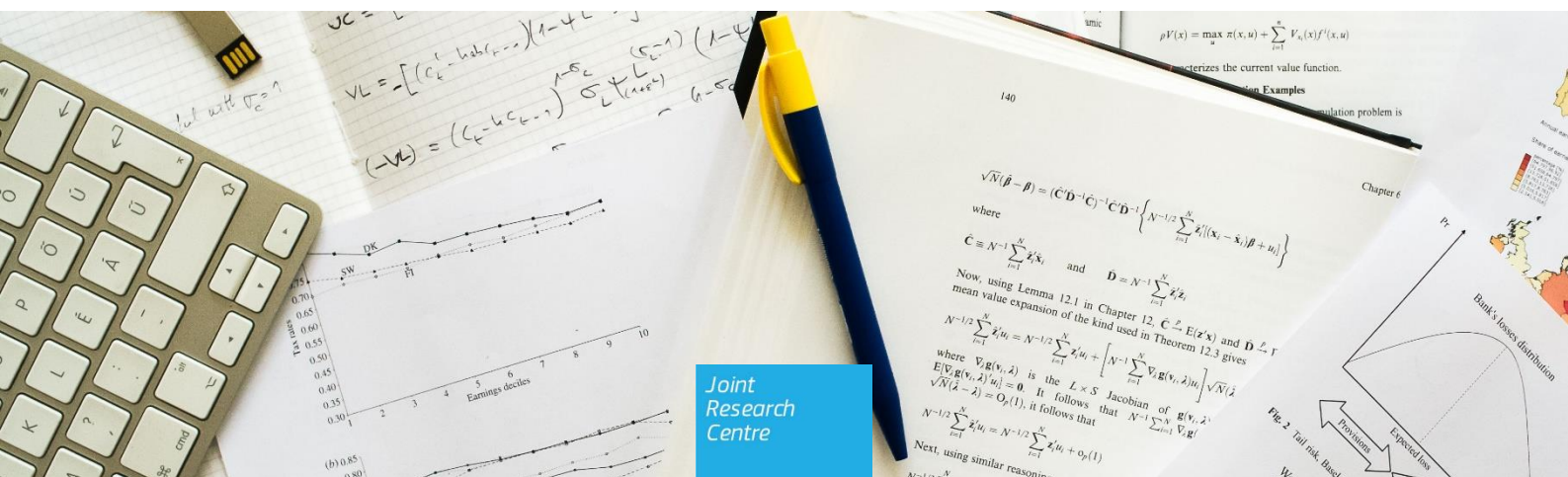
Drivers behind the changes in European banks' capital ratios

A descriptive analysis

Wouter Heynderickx
Jessica Cariboni
Marco Petracco Giudici

2016

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Abstract

After the financial crisis financial regulators increased banks' capital adequacy ratios (CET1/RWA) requirements in order to make the financial system more resilient. The new capital requirements could be achieved through different channels, some of which might affect bank's ability to finance the real economy. We perform a decomposition of the changes in capital adequacy ratios into seven factors to check whether banks adjusted their capital ratio by increasing equity, by reducing loans or securities, or by reducing the riskiness of their assets' portfolio. We employ consolidated balance sheet data of 257 European banking groups including M&A operations and state aid and covering the 2005-2014 period, and find that the main driver alters over time. Our decomposition shows that during the financial crisis the augmentation was mainly driven by new share issuances and government recapitalizations, while during the sovereign crisis a reduction in the RWA-density (RWA/TA) is found. In the post crisis period, we observe a large income effect and a reduction in total assets. Decompositions are also performed at country and major banking group level, showing high heterogeneity in responses to achieve the new requirements.

1. Introduction

In the aftermath of the financial crisis, banking institutions in Europe have been requested to strengthen their capital adequacy ratios in order to restore confidence and stability in the financial system. To this end, the Basel Committee has set new global regulatory standards of the so-called Basel III agreement. The Capital Requirement Directive IV (CRD IV) and Capital Requirement Regulation (CRR) are the translation of this agreement into EU law. The ultimate aim of the CRD IV/CRR is to strengthen the resilience of the EU banking institutions and improve their ability to absorb economic shocks, while at the same time ensuring that banks continue financing economic activity and growth. While the new standards are going to fully enter into force in 2018, the contemporaneous introduction of stress tests and pressure from markets has pushed many banks to increase their capital adequacy ratios already in the period immediately following the financial crisis, without waiting for the full roll-out of the new rules.

Financial institutions can manage to increase the capital ratio by working on different aspects of the balance sheet, namely by increasing capital, decreasing the average riskiness of assets and by reducing total assets (deleveraging). This has led many observers to question the source of the observed increases in capital ratios, and whether these could have consequences for bank's ability to finance the real economy.

These questions can only be answered by performing a decomposition of the total change in the capital ratio in its main components and drivers and has already attracted attention in the literature (Bologna et al. 2014; Cohen & Scatigna 2014; Cecchetti 2014).

We provide a contribution to this literature by performing a decomposition of observed changes in capital ratios for a sample of EU banks over the period 2005-2014. Our main contributions consist in an expansion of the number of factors

used in the decomposition and, starting from public data, in the creation of a new greatly expanded data set which covers a much larger number of banks and, more importantly, takes into account mergers and acquisitions over the period, as well as capital injections from state aid.

In our analysis, therefore, special attention is given to the impact of recapitalizations by the EU-governments and the changes in loan and securities portfolios in the context of deleveraging episodes.

In particular, following the approach from BIS (Cohen & Scatigna 2014), we start by decomposing capital ratios in an equity effect, a risk weight effect (RWA-density) and an asset effect. These are the three main components that drive the variation in capital ratios. Both the equity effect and the asset effect are then split up into sub-effects. Within the equity effect, we discern an income effect, a state aid effect and a residual effect, which we call "Other equity effect". The income effect captures the maximum increase in the CET1 level without attracting new capital. The State Aid effect, which is not estimated in other works, is the percent point increase in capital ratios contributed by governments in the form of CET1 instruments (ordinary shares, CET1 eligible preferred shares, CET1 eligible Contingent Convertibles (CoCos), etc.). The other equity effect includes private capital increases, dividend payments, unrealised gains or losses, etc.

The components of the asset effect, which is to our knowledge not decomposed in other contributions, are the loan effect, the security effect and the other asset effect. The loan effect consists of the changes in loans to customers, which comprise both loans to corporates and loans to households. The security effect describes the change in total securities held.

We find that in every sub-periods the aggregate capital ratio increased. However, the main factor driving the increase changes from period to period. In the pre-crisis period, the income effect dominated, while during the financial crisis the capital ratios increased mainly by recapitalization of the governments. The largest component in the sovereign crisis is the change in RWA-density and after the crisis the income effect dominates. However, the observation for the post crisis period is mainly driven by the largest banks in our data-set.

2. Sample construction & data

To answer these questions, we analyse balance sheet data from a large panel of European banks. We identify 257 banking groups headquartered in the EU, which had together 31.7 billion EUR of assets under their management at the end of 2013 (71% of the total EU banking assets). The sample of the selected banking groups is constructed to keep track of the mergers and acquisition in the banking sector during the sample period (2005-2014). This guarantees a true comparison over the entire sample period on an aggregate level. We exclude banks for which there is only limited data available and if they were not involved in mergers or acquisitions during the sample period.

To construct the sample we start with the European Global Systemic Important Banks (GSIBs) as defined by the Financial Stability Board (FSB 2014). To these banks, we add the banks that were in the European Banking Authority (EBA) capitalization exercise (EBA 2012a) and banks that are under the supervision of the ECB (ECB 2015). In a last step we identify the smaller banks with enough data available and include them into the sample.

During the financial and sovereign crises many banks merged and in some countries the banking sector needed to consolidate to survive. To include these (forced) mergers in the analysis on an aggregate level, we used M&A information in SNL Finance. We keep track of which banks bought a smaller bank and the mergers of similar banks. We add all predecessors to the sample and from the moment the merger or acquisition is completed the predecessor's data is set to zero. In Annex 1 summary statistics and statistics regarding the representativeness of the sample are given.

The data source is SNL Finance for the consolidated balance sheet data. For the state aid data, we have constructed our own data set. For this data set, we started from the state aid database of the European Commission. Here the main numbers of the recapitalizations are found. However, we needed more than only the amount and the name of the bank. The timing of the completed recapitalization is crucial for this type of analysis and also to type of instruments they have used. State aid granted by a subordinated loan, preferred equity, contingent convertibles or common equity have different implications for the capital ratio. Therefore, we have used multiple sources such as annual reports, Ministry of Finance documents, reports of recapitalizations funds, reports of central banks, etc. Within these sources it was crucial to find the amount of state aid, the type of instruments and the date of the finished recapitalization. An overview of the state aid numbers is given in Annex 2.

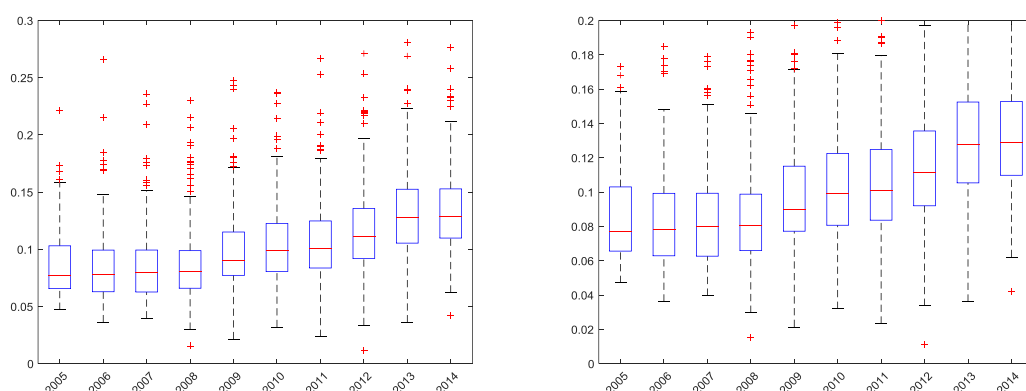
Throughout the paper, we make a distinction between four sub-samples. These sub-samples are grouped by Tier 1 capital as in the EBA's Quantitative Impact Studies (EBA 2015). We separate between **GSIBs**, **large** banks other than GSIBs, **medium** banks and **small** banks (see Annex 2 for descriptive statistics and the data coverage per country).

3. Capital ratios evolution

We start by analysing the evolution of the capital and leverage ratio over time. For the selected sample of banking groups, the evolution over time of the capital ratio (CET1/RWA) and the leverage ratio (CET1/TA) is plotted in Figure 1, and 2. As CET1 numbers are reported by SNL, we use these numbers.

Figure 1 shows the evolution over the entire sample period of the capital ratio. The right graph is a zoom of the left one. It is clear that the capital ratio increases over time. One can also see that the interquartile range remains more or less stable. In the zoomed plot it can be seen that this increase only started in 2009. Before 2009 the median capital ratio remained stable at around 7.5%. At the end of 2014 the median capital ratio increased to 12-13 %.

Figure 1: Boxplot CET1/RWA: Evolution over time & zoom¹

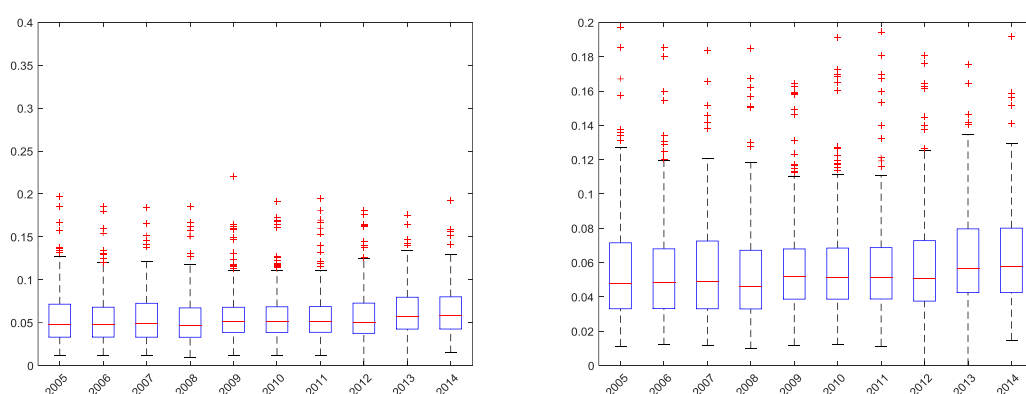


To confirm these numbers and to check the representativeness of our sample, we compare them with the numbers of the EBA Basel III monitoring exercises for the period 2011-2014. In Table 5 in Annex 1, the yearly average capital ratio for our sample and the EBA sample is given. The average capital ratios are somewhat higher than the ones reported by EBA. This difference is mainly due to the larger and more dispersed dataset we employ. Another difference is that the EBA uses weighted averages. To reduce the influence of outliers, we calculate the median and, as shown in Table 5, these numbers are close to the EBA ones.

For the leverage ratio, the same increasing trend cannot be observed (Figure 2). The median leverage ratio is constant over time or slightly increasing in the period 2013-2014. This slight increase in leverage ratio was also found in the EBA Basel III monitoring exercises (see Table 7). If the leverage ratio is interpreted as fluctuating around some “target” value (in this case 5%), this would suggest that the amount of assets is closely related to the availability of capital.

Comparing the Figure 1 and Figure 2, the constant leverage ratio coupled with markedly improving capital ratio suggests that the banks in the sample reduced risk weights starting from 2009 onwards.

Figure 2: Boxplot CET1/TA: Evolution over time & zoom



¹ The capital ratios that are used in these figures are calculated from the SNL definition of CET1 and RWA. They are thus not the fully loaded capital ratios as examined in the EBA quantitative impact studies.

Figure 3 and Figure 4 present the evolution of the capital ratios and leverage ratios distinguishing between the various categories of banks by size. In Figure 3 one can see that small banks start with a higher capital ratio and the increase over time is not that large, while the larger banks (GSIB, Large and Medium) start at a lower level and increase over time. For these banks the capital ratio almost doubled during the sample period, which can be achieved by increasing equity, decreasing the RWA- density (RWA/TA) or decreasing total assets.

The leverage ratio (Figure 4) of the small and medium banks remains constant over time. For the GSIBs the leverage ratio is increasing over time, but it stays below a level of 5%. For the large banking groups the increasing trend is also found and the median reaches the level of 5% at the end of the period. These results suggest that CET1 levels augmented more than the increase in TA or CET1 levels decreased less than the decrease in TA. This is especially true for the larger (GSIB, Large & Medium) banks.

Combining both figures it is clear that the RWA-density is an important factor that banks used to fulfil the capital requirements. However, decomposing changes in capital ratios should give some insights in this.

Figure 3: Boxplot CET1/RWA: Evolution over time by size

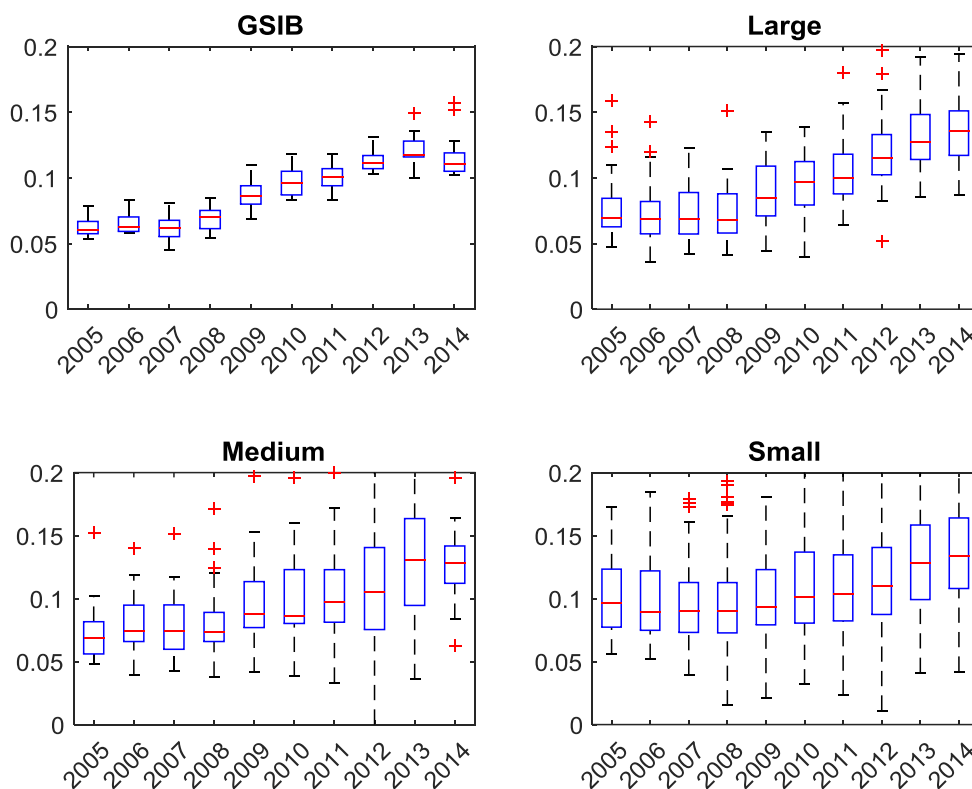
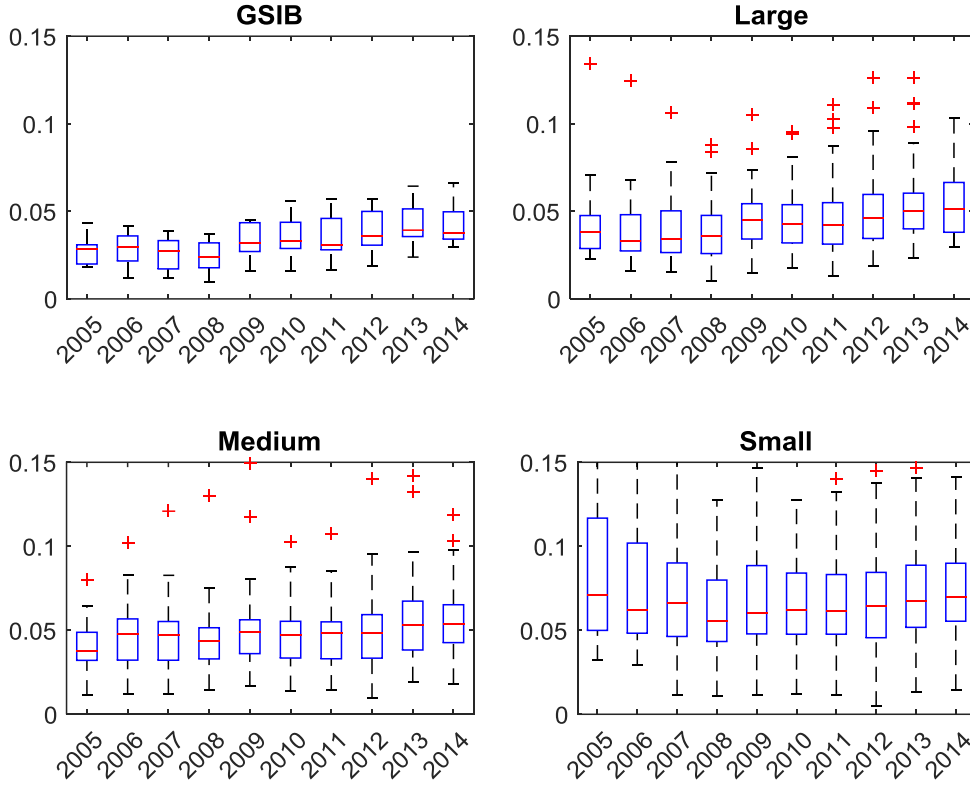


Figure 4: Boxplot of CET1/TA over time by size



4. Capital ratios decomposition

We considered three methodologies to decompose the capital ratios. The first one was adopted by the Bank of Italy (Bologna et al. 2014); another one was applied by BIS (Cohen & Scatigna 2014); and decompositions in other areas such as CO2 emission suggests the Shapley decomposition (Ang et al. 2009). All three methodologies were tested but the BIS approach was deemed to be preferable as it allows for a complete decomposition of the interaction terms and to decompose the main effects into sub-effects.

We perform the decompositions based on the BIS paper. We distinguish between a simple decomposition based on three factors, and a more detailed one that decomposes the capital ratios into seven components. The three factor decomposition is the same as in Cohen and Scatigna (2014), while the seven factor is our extension. For the decomposition we start from the change in capital ratio, rewrite it and add total assets into the equation:

$$\frac{K_1}{RWA_1} \bigg/ \frac{K_0}{RWA_0} = \frac{K_1}{K_0} \frac{RWA_0}{RWA_1} = \frac{K_1}{K_0} \frac{TA_0}{TA_1} \frac{RWA_0}{RWA_1} \frac{TA_1}{TA_0}$$

Taking the natural logarithm of both sides and rescaling it with a factor $F = \left(\frac{K_1}{RWA_1} - \frac{K_0}{RWA_0} \right) / \left[\ln \left(\frac{K_1}{RWA_1} \right) - \ln \left(\frac{K_0}{RWA_0} \right) \right]$ results in:

$$\frac{K_1}{RWA_1} - \frac{K_0}{RWA_0} = F \ln\left(\frac{K_1}{K_0}\right) - F \left(\ln\left(\frac{RWA_1}{TA_1}\right) - \ln\left(\frac{RWA_0}{TA_0}\right) \right) - F \ln\left(\frac{TA_1}{TA_0}\right) \quad (1)$$

The absolute change of the capital ratio is thus expressed in three additive terms. The first term in this equation is the equity effect, the second term captures the risk weight effect and the last term is the assets effect. The equity (respectively asset or risk weight) effect is the part of the total change in capital ratio due to changes in equity (respectively total assets or RWA-density).

In Equation 1 F is a positive constant, the interpretation of the different effects is thus straightforward. A positive equity effect, implies an increase in regulatory capital, a positive asset effect means a reduction in total assets because of the minus sign before F and a positive risk weight effect means a decrease in the ratio $\frac{RWA}{TA}$.

Although a decomposition into three factors is already informative, we choose to decompose the equity and asset effect further (see also Table 1 for an overview). In the equity effect we identify the income effect, the state aid effect and the other equity effect. The latter comprises dividend pay-outs, capital increases by the private sector, changes in the eligibility criteria of equity instruments, etc. The net income effect is an indication of the profitability of the banks and if positive this is the largest possible increase in the equity effect without attracting new funds and thus not paying out dividends. We identify these effects with the following formula:

$$F \ln\left(\frac{K_1}{K_0}\right) = G \frac{Inc_1}{K_0} + G \frac{State Aid_1}{K_0} + G \frac{Other_1}{K_0},$$

with $G = F \ln\left(\frac{K_1}{K_0}\right) / \left(\frac{K_1}{K_0} - 1\right)$. $G \frac{Inc_1}{K_0}$ is the income effect (income attributable to retained earnings), $G \frac{State Aid_1}{K_0}$ the state aid effect (recapitalisation by governments) and the residual capital effect is $G \frac{Other_1}{K_0}$. This can be new issued shares, changes of the capital definitions, etc.

The state aid effect captures the recapitalisation measures used by the European governments to prevent their banking system from collapsing. For the banks that were listed on the DG COMP state aid database, annual reports were screened on the amount of recapitalisation/ repayments and on the timing of (re)payments. In total € 354 billion of recapitalisation measures were identified within the sample, €56 billion was aid given to banks that are not included in the sample. Comparing these numbers with the one reported by DG COMP (€ 444.6 billion), there is about 10% of the officially recorded state aid (around € 35 billion) that we could not assign to any banking group. More details on the amounts per country and per year can be found in Annex 2.

We split the asset effect into three sub-effects. We categorize the loan effect, the security effect and the other asset effect. The loan effect captures the changes in the asset effect due to increases or reductions in the net loans to customers, which excludes the net loans to banks. The security effect contains changes in debt and equity instruments and changes in derivative assets.

$$-F \ln\left(\frac{TA_1}{TA_0}\right) = H \frac{\Delta \text{loans}}{TA_0} + H \frac{\Delta \text{Total securities}}{TA_0} + H \frac{\text{Oth Assets}_1}{TA_0}$$

with $H = -F \ln\left(\frac{TA_1}{TA_0}\right) / \left(\frac{TA_1}{TA_0} - 1\right)$ and where $H \frac{\Delta \text{loans}}{TA_0}$ stands for the difference in Net Loans to customers, $H \frac{\Delta \text{Total securities}}{TA_0}$ the difference in total securities which includes debt securities, equity securities, derivatives and other investments. $H \frac{\text{Oth Assets}_1}{TA_0}$ is the residual change that cannot be attributed to the change in loans and securities.

Table 1: Decomposition of the changes in capital ratios

3 factor decomposition	Equity	Risk-weights	Assets
7 factor decomposition	Income	Risk-weights	Loans (to customers)
	State aid		Securities
	Other equity (dividends, capital increase, ...)		Other assets

Within the sample period 2005-2014, we make distinction between different sub-periods. We split the entire sample period up into sub-periods (see **Table 2**) for which we would expect different behaviour of the banks:

- In the *pre-crisis* periods banks are expected to exhibit a leveraging behaviour. Increase in total assets has a negative effect on the capital ratio and this is in general fuelled by an increase in retained earnings (positive income effect). The risk effect could be mixed, i.e. positive since certain assets are perceived as safe and upgraded accordingly, or negative when banks would invest in more risky assets during this kind of periods.
- During the *financial and sovereign crises*, banks incur losses (negative net income) which lead to a decrease in capital ratio. These losses can be, however, compensated by new issuance of capital, whether or not underwritten by the private or public sector (state aid). The direction of the expected equity effect is therefore not clear. The risk effect would contribute to an increase in capital ratio, since banks substitute risky assets with safer ones. One would expect that the assets effect is positive due to a reduction in total assets.
- During the post crisis period a deleveraging behaviour is expected: a decrease in total assets and an increase in equity (retained earnings, issuance of new shares). The risk effect can be positive, when banks shed risky assets by writing down or selling, substitute them with safer ones, or change their evaluation approach, or negative, if more risky assets are bought, or same assets are perceived as more risky due to new regulation or modelling approaches.

To assess the subscribed effects we split up the sample into:

Table 2: Sub-periods considered for the decomposition of changes in capital ratios.

Period	Sample period
Pre- crisis	31/12/2005-31/12/2007
Financial crisis	31/12/2007-31/12/2009
Sovereign crisis	31/12/2009-31/12/2012
Post crisis	31/12/2012-31/12/2014

5. Results

In this section we discuss the results of the four sub-periods and the entire sample period. This analysis is complemented with a decomposition of the GSIBs and decomposition per country. The latter is based on data aggregated by country and from these decompositions we exclude the GSIBs.

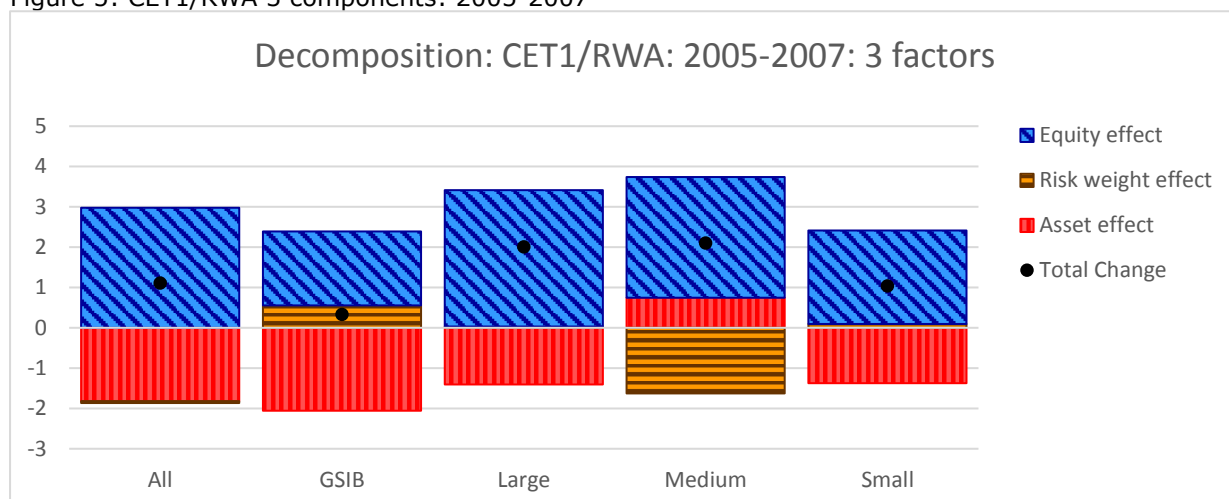
5.1. Pre-crisis: 2005-2007

In Figure 5 the decomposition over the pre-crisis period is given of the CET1/RWA ratio. Each bar refers to a different class of banks (by size). The first bar refers to the entire sample. Within each bar the black dot indicates the total absolute change in capital ratio. For instance, over the pre-crisis period the 257 banking groups increased their capital ratio by 1.11 percent points. This total change is the sum of the three main effects:

- The equity effect (blue part). This is positive when banks increase their CET1 in the considered period.
- The risk-weights effect (orange part). This is positive when banks decrease their risk-weights density (RWA/TA) in the considered period.
- The asset effect (red part). This is positive when banks decrease their total assets in the considered period.

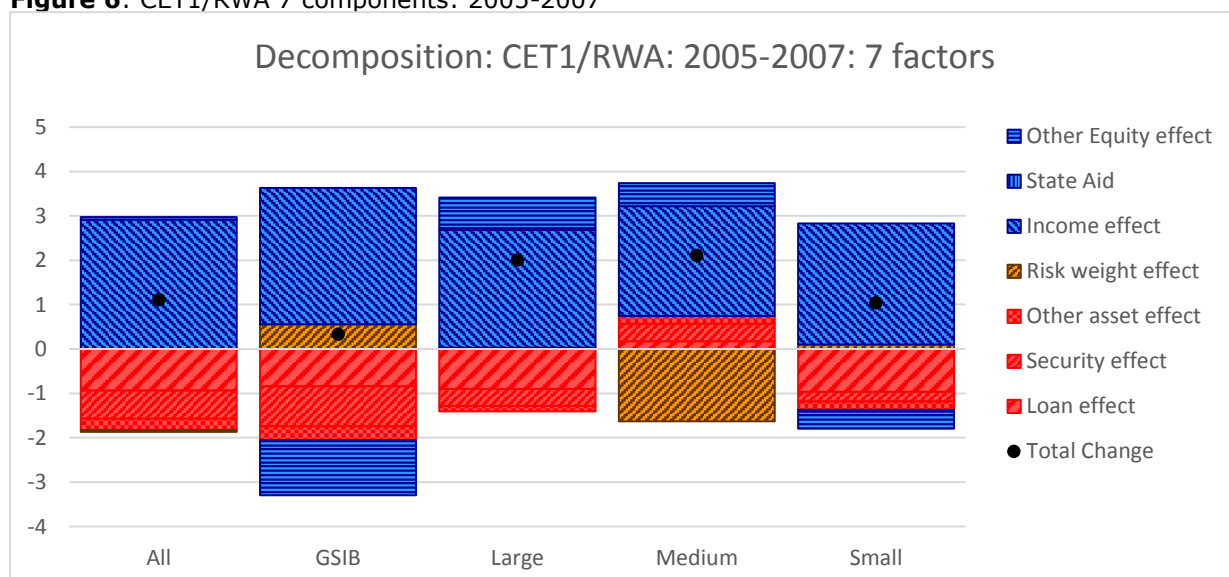
In the pre-crisis period, we observe that the large equity effect is partially compensated by the assets effect. The risk effect is only relevant for the sub-sample of medium banks and GSIBs. One would expect a negative risk weight effect during the years before the crisis. It is often claimed that banks invested in riskier assets before the crisis. However, we do not find this from the balance sheet information. Only for the medium banks the expected negative risk weight effect is found. For GSIBs the effect is positive and thus indicates a reduction in risk weights during the pre-crisis period. This could generally indicate a shift towards a less risky asset mix, however, off balance sheet constructions and other risk transfers are not taken into account in this analysis. A shift of risky assets to these constructions could explain the positive risk effect. Another possible explanation could be the introduction of Basel II, where the internal rating based models led to a reduction in risk weights. Larger banks could have made more use of these advanced models (Hakenes & Schnabel 2011). The GSIBs' positive risk effect could thus be an indication of the implementation of Basel II.

Figure 5: CET1/RWA 3 components: 2005-2007



Splitting the three main effects into the sub-effects, we find that the income effect explains the greater part of the adjustment of the capital ratio. The loan effect is -0.94 pp and it represents an increase in net loans to customers of around € 500 billion for all the banking groups. For the GSIBs the negative other equity effect indicates that these banking groups decrease their capital by paying out dividends for around one third of the income effect (3.08 pp). The loan effect and security effect are of equal importance. For the large, medium and small banks we observe that the income effect is similar in magnitude. For the large banks and small banks the loan effect indicates that they increased mainly loans to customers. This behaviour was also expected for medium banks but not found. The large negative risk weight effect shows that these banks increased their risk during the build-up of the financial crisis.

Figure 6: CET1/RWA 7 components: 2005-2007



5.2. Financial crisis: 2007-2009

During the financial crisis (Figure 7) the equity effect is the main driver behind the increasing capital ratio. This is especially true for the GSIBs, which raised a lot of capital (e.g. Deutsche bank €10.2 billion in 2008, HSBC 15.71 billion Euro in 2008 underwritten by the private sector, or RBS which was recapitalized by the UK government in total for 62.3 billion Euro in 2008 and 2009). This effect is less pronounced for the other sub-samples. The banks that were most severely hit by the financial crisis (GSIB & Large banks) have a small negative effect for the GSIBs and a positive assets effect for the Large banks. The large positive effect for the large banks could indicate write-off of toxic assets or the acquisition of impaired assets by bad banks. The small banks exhibit a negative assets effect and thus they expanded their balance sheets during the financial crisis. The risk effect is for all sub-samples positive and it could indicate a shift towards more safe assets or state guarantees given on risky assets. It is remarkable that the total change in capital ratios is positive during the financial crisis and above 2pp for the larger banks. State aid measures, such as recapitalisation, impaired assets measures and state guarantees, can probably explain a large part of this positive total change. The expected negative effect during the financial crisis is not observed. It is also possible to see how GSIBs, and to a lesser extent large and medium banks, reacted rather quickly to increase their capital ratios, while small banks only moderately increased capitalization.

Figure 7: CET1/RWA 3 components: 2007-2009

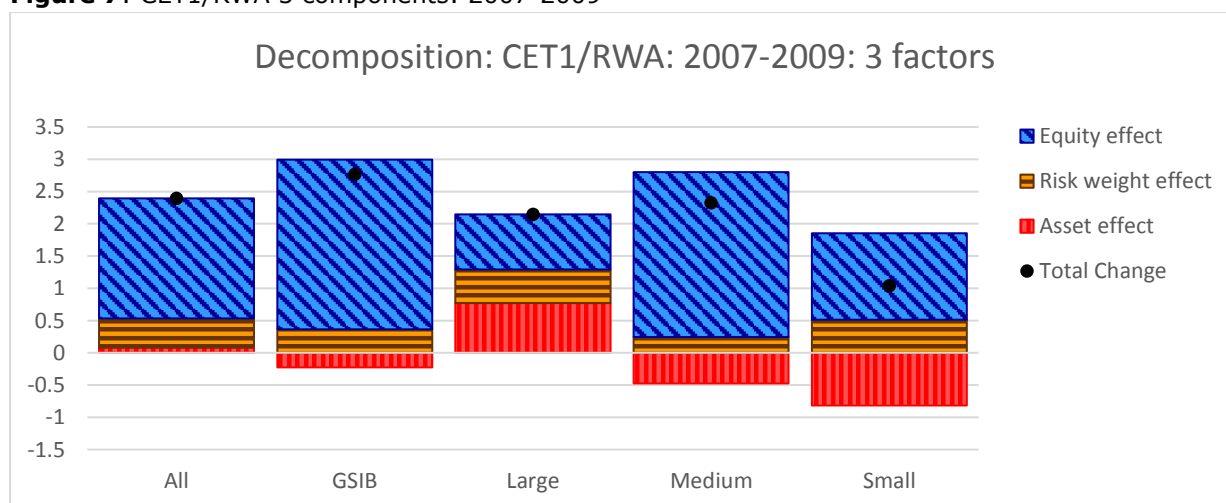
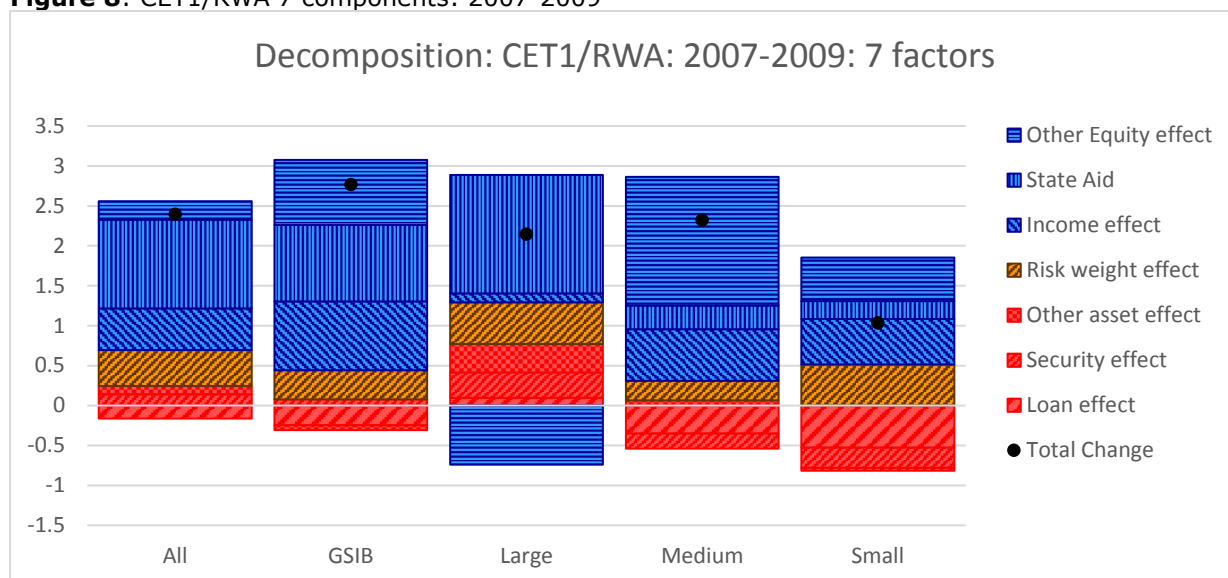


Figure 8 shows the decomposition into the sub-effects. As expected, the income effect is less important compared to other sub-periods. State aid and other equity effect (e.g. issuance of new shares) explain most of the changes in capital ratio. From Figure 8 it is also clear that the large banks, and to a smaller extent the GSIBs, reduced their security holdings during the financial crisis. For the medium and small banks this does not hold, which is probably because of the smaller exposure of these banking groups to CDOs, ABS, etc. The large state aid effect for the large banks and GSIBs was expected but the negative other equity effect of the large banks is not, especially when the income effect is so small (0.65 pp). This could be explained by unrealized losses due to changes in the value of securities held as available for sale. These losses cannot be found in the income statement,

since they are directly accounted for in the equity on the balance sheet. Alternative possibilities are that some large banks had saved enough funds to pay-out dividends, but given the crisis this seems highly unlikely, or that an early adoption of changes in definitions/introduction of CET1 measure could have created this effect.

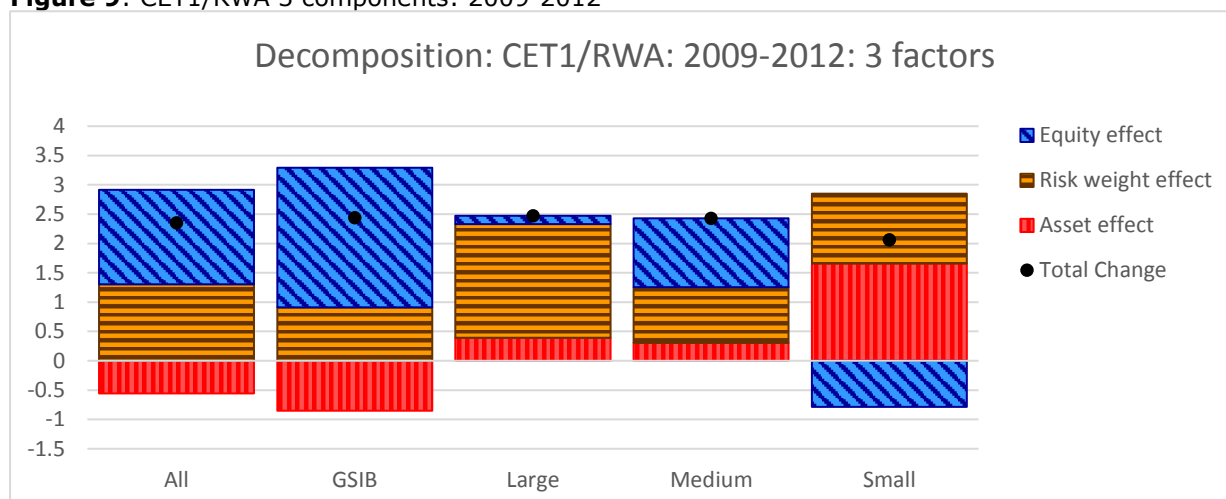
Figure 8: CET1/RWA 7 components: 2007-2009



5.3. Sovereign crisis: 2009-2012

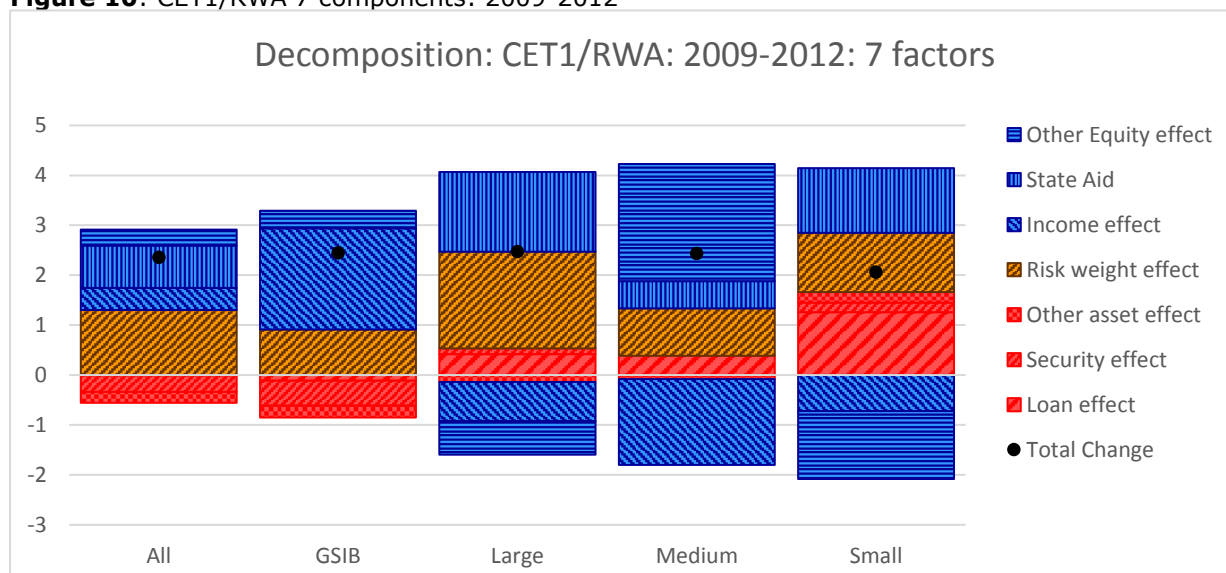
The main driver behind an increase in capital ratios during the sovereign crisis (Figure 9) is the risk effect. The RWA density (RWA/TA) decreased during this period and thus the banking groups shed risky assets or substituted them with safer ones, the asset effect for the aggregate sample is negative. For the GSIBs we observe a large negative asset effect probably driven by the global activities of these banks. The reduction of RWA density is less pronounced compared with the aggregate sample. For the other banks, which have a more local or European focus, a reduction in total assets is observed. The seven factor could give us more insights in the driver behind the reduction of total assets. One would expected that this reduction is mainly driven by a reduction in sovereign bonds (security effect), but the uncertainty that played during the sovereign crisis could also have affected the loans to customers. It can also be noted that, during this period, we find that small banks have particularly large negative equity effect. The large positive asset and risk weight effect counterbalances this.

Figure 9: CET1/RWA 3 components: 2009-2012



The seven factor decomposition (Figure 10) confirms indeed that there is a large difference between GSIBs and the other banking groups. The sovereign crisis reduced the profitability of most of the banking groups. Only the GSIBs were profitable and increased assets (negative loan, security and other assets effect). The other banking groups were hit harder by the sovereign crisis (large negative income effect) and they reduced lending and substituted more risky assets with safer ones (risk effect). Possibly these results are driven by banks with a larger exposure to the sovereign crisis. We try to examine this with a decomposition by country (see further). The negative income effect is compensated by the other equity effect, which includes among others capital increases. The state aid effect for the large banks is mainly due to the aid given to the large Spanish banks and to a smaller extent to the Greek banking sector.

Figure 10: CET1/RWA 7 components: 2009-2012

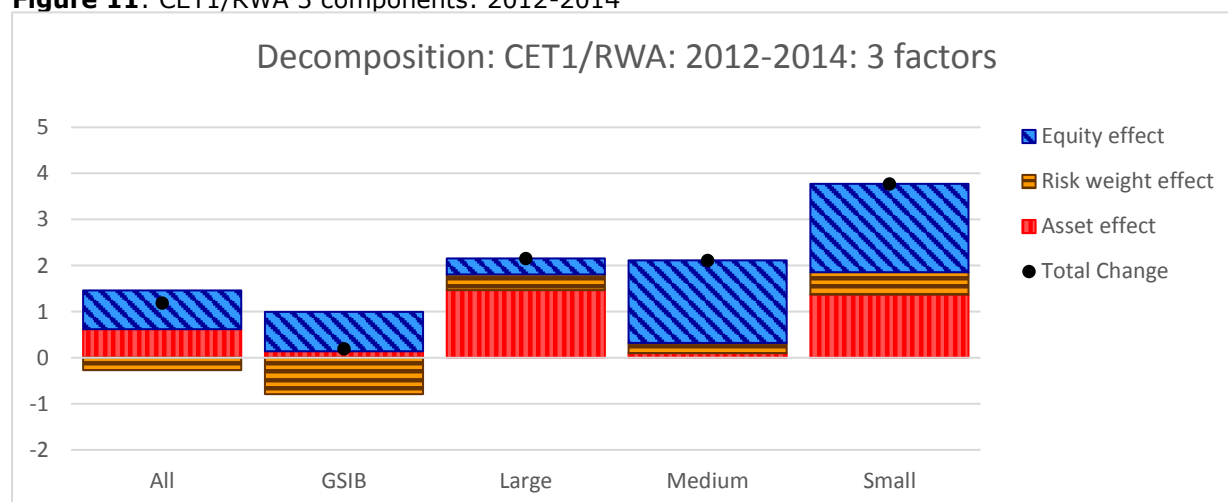


5.4. Post crisis: 2012-2014

In the post crisis period (Figure 11) banks clearly deleveraged. All sub-samples decreased total assets and increased equity. The deleveraging could be attributed

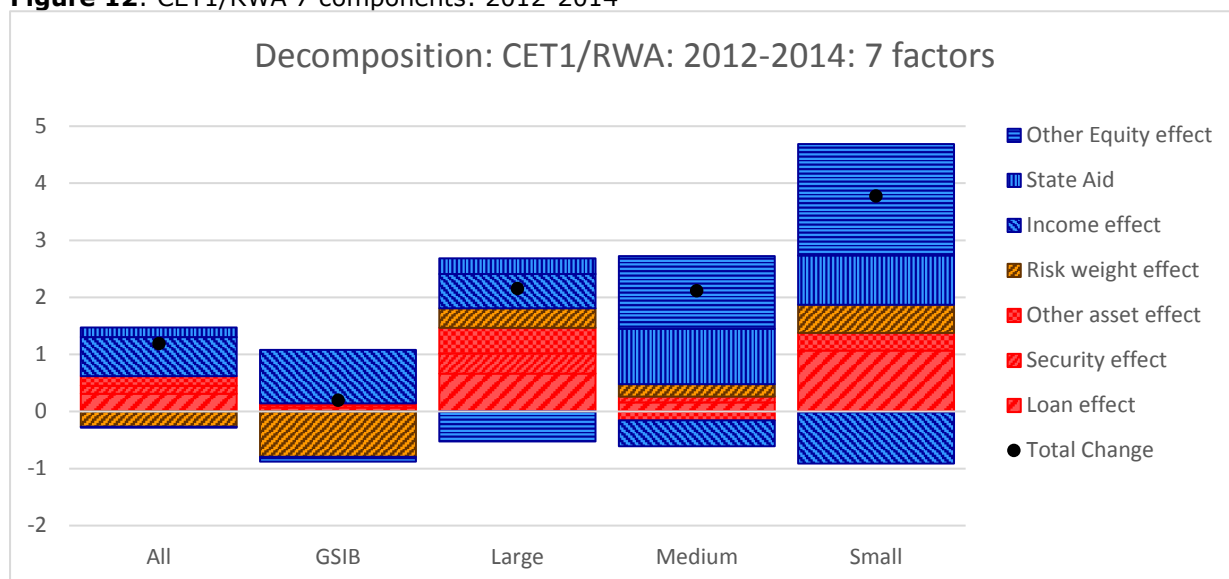
to the stress tests, stricter supervision, new regulation (CRR and CRD4). However, a causal relationship cannot be proved with these descriptive decomposition methods. It should be noted that GSIBs are the only category increasing their RWA density over this period. It is troublesome to see that the whole European banking sectors reduced the book value of assets in the post crisis period. The reduction in assets might be a result of a reduction in loans due to shifts in supply or demand, large write downs of asset portfolios or it could be that the loans given in the build-up of the crisis are expiring and not renewed. The large equity effect for the medium and small banks could facilitate more lending in the future. For the large banks the equity effect is rather low compared to other effects. The seven factors decomposition should shed light on the drivers behind this low equity effect. It could be due to a lower profitability or difficulties to raise new capital. Finally, it can be seen that small banks move decisively to improve their capital ratio in this period, mainly by increasing their equity. The asset effect is also large and positive as in the previous period. Hence, small banks reduced their total assets in two consecutive periods.

Figure 11: CET1/RWA 3 components: 2012-2014



In Figure 12 one can see that both the security and loan effects are positive for the entire sample and sub-samples. The book value of net loans to customers decreased with circa € 100 billion and that of total securities by around € 50 billion. These changes are most marked in the large banks sub-sample. This could be partially related also to the stress tests or maybe to large loan impairments due to deteriorated macroeconomic conditions in the periphery countries, as suggested by the joint decrease in loans and securities. The positive state aid effect indicates that some banks were still in troubles and this could also explain the negative asset effects. For the medium and small banks a negative net income effect is found, which is, however, compensated by the other equity effect (capital increases) and state aid.

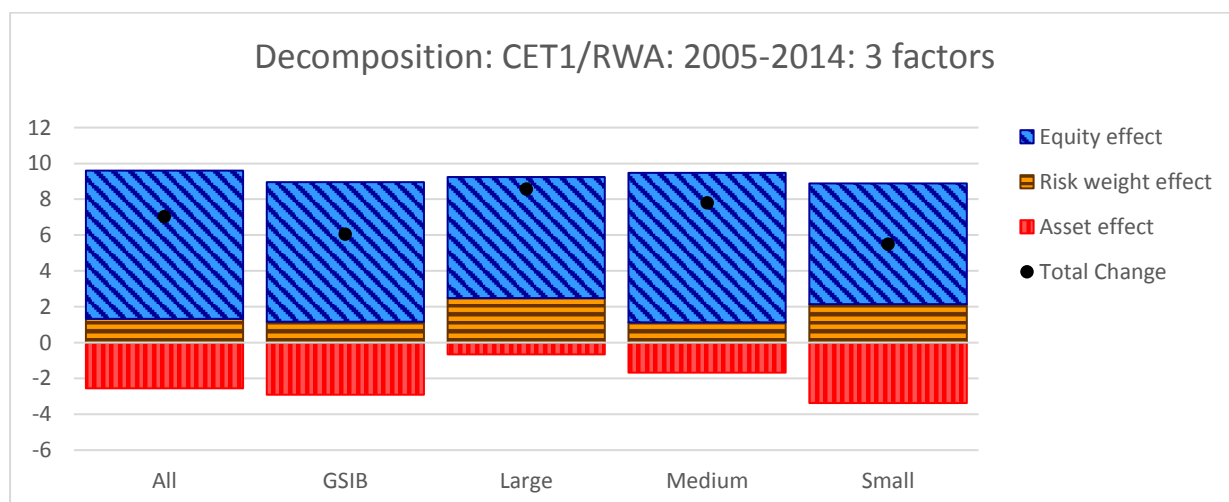
Figure 12: CET1/RWA 7 components: 2012-2014



5.5. Entire period: 2005-2014

As the decompositions of the sub-periods showed an increase in aggregated capital level for the entire sample and all sub-samples, we find over the entire sample period a large increase in capital ratios. Most of the increase in capital ratio for the full sample can be contributed to the increase in equity (8.27 pp).

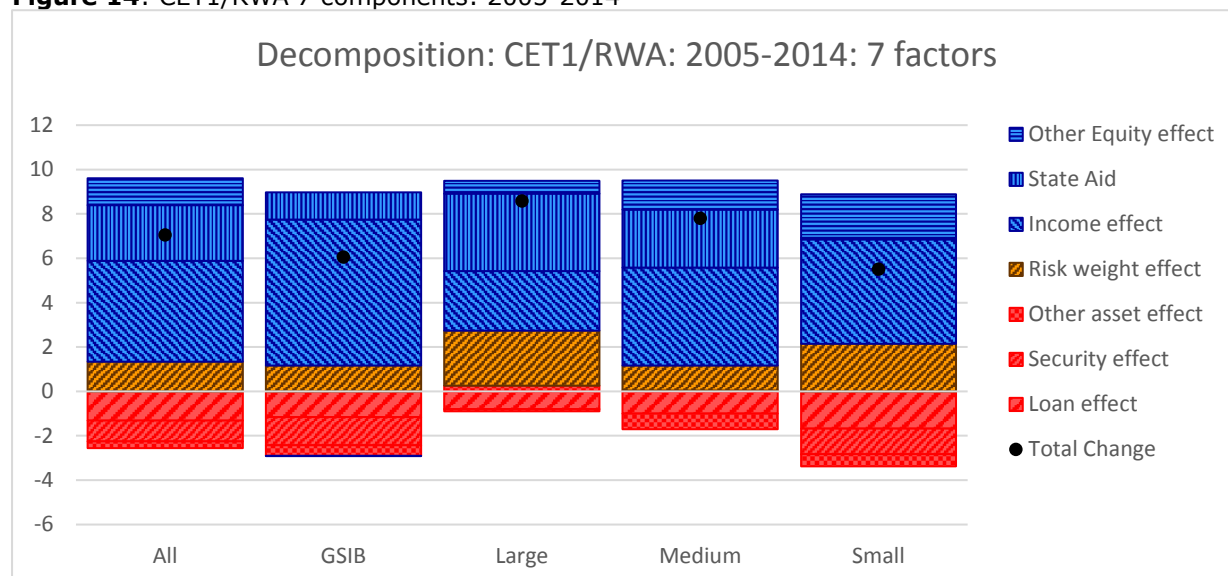
Figure 13: CET1/RWA 3 components: 2005-2014



Examining the seven factors decomposition (Figure 14) we find that the main driver behind the equity effect is the income effect (4.55 pp). For the GSIBs the income effect is even 6.59 pp, while for the other sub-samples it ranges between 2.5 and 5 pp. The state aid effect accounts for 2.5 pp on an aggregate level and is thus an important driver of the increase in capital ratios. For the large banks the state aid effect is even 3.48pp. The other equity effect is positive and thus banks used private external financing to increase their equity levels. For the GSIBs this is not true and a small negative other equity effect is found. Dividend payments over the entire sample period probably explain this negative effect. The negative contribution of the loan effect to the total change in capital ratio indicates

that over the entire sample period the total amount of net loans to customers increased slightly. Only for the GSIBs the security effect is larger than the loan effect. Hence, the GSIBs increased their security holding more than their total net loans over the period 2005-2014.

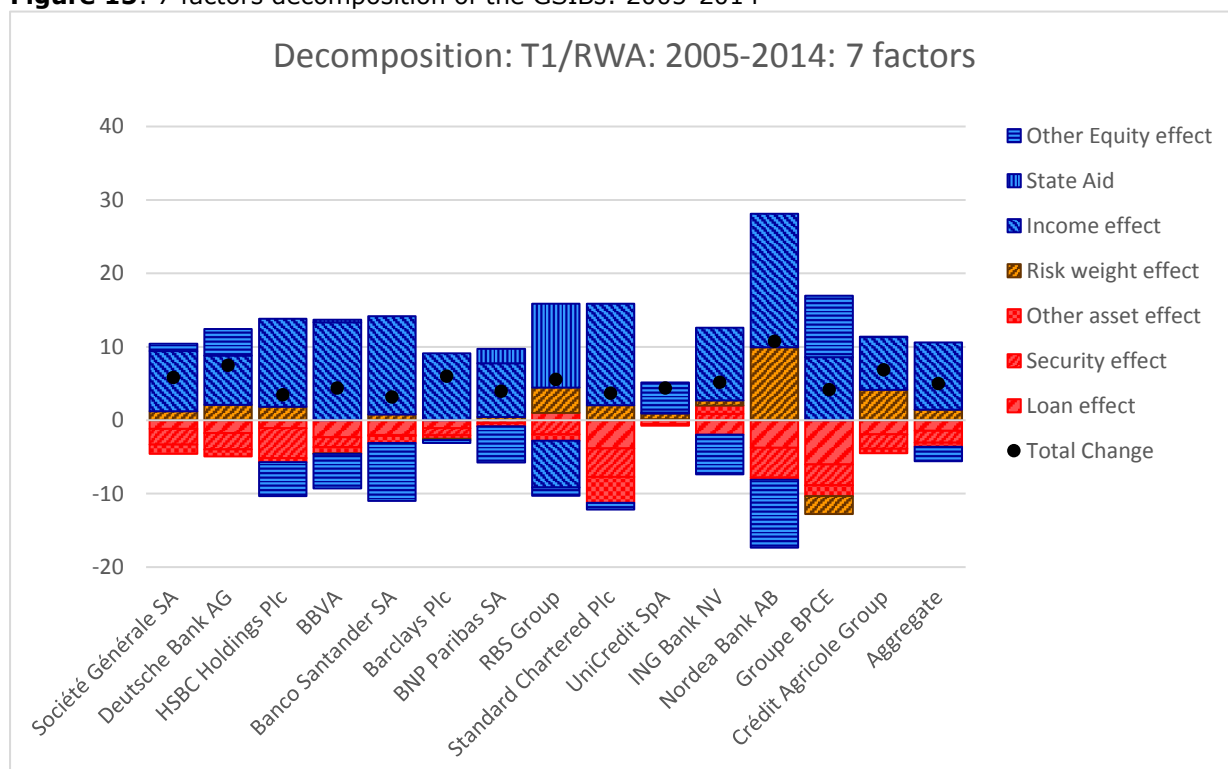
Figure 14: CET1/RWA 7 components: 2005-2014



5.6. Decomposition of the GSIBs

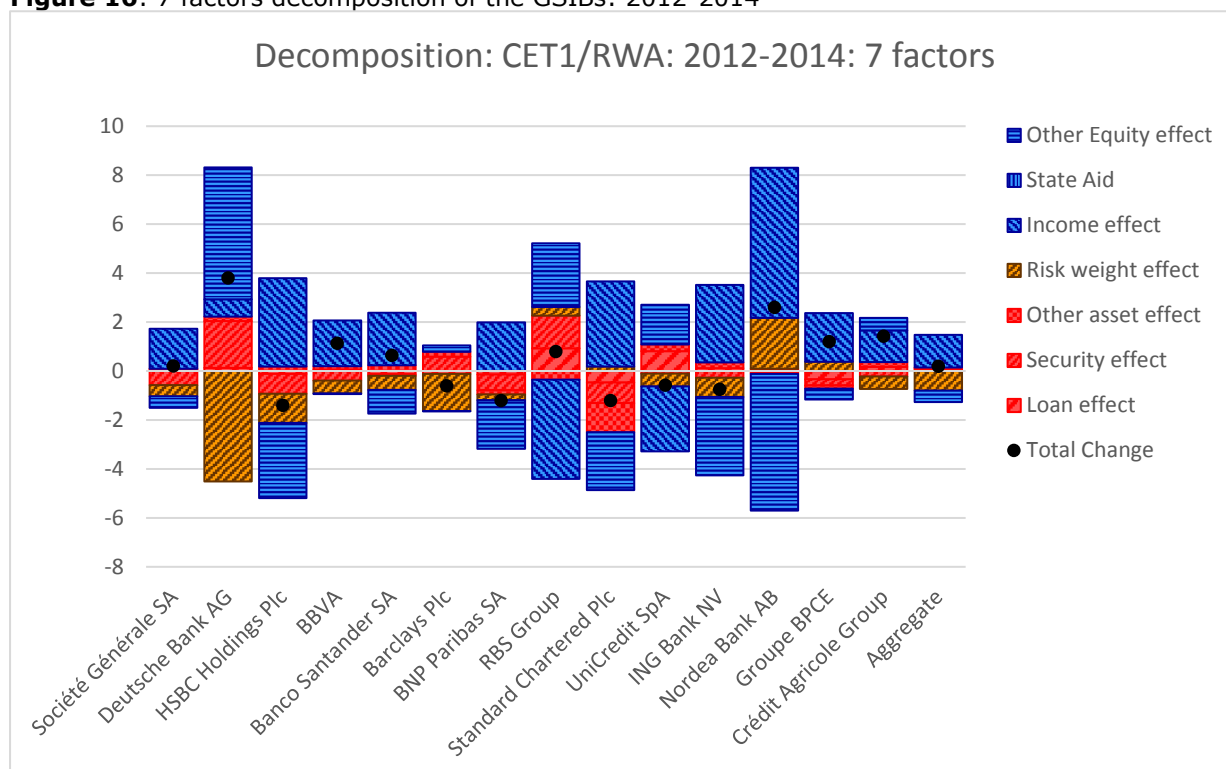
Examining the graphs of the decomposition above, one can see that the entire sample is mostly driven by the changes in the GSIBs sub-sample. Hence, it's important to examine the largest European banking groups a bit closer (see Figure 15 and Figure 16). Over the entire sample period, the GSIBs that still have state aid on their balance sheet are the RBS group, BBVA and BNP Paribas, although the last two didn't receive state aid directly. They bought banks that received state aid and, since the M&A history is used in this exercise, a positive state aid effect is found. Some of these GSIBs received state aid but repaid it (e.g. Société Générale, BPCE, etc.), others did not make use of state aid (e.g. Deutsche bank, HSBC, etc.). The most profitable GSIB over the entire sample period was Nordea (income effect of 18.15 pp), which was partially compensated by a large increase in loans to customers (-3.74pp). All the other GSIBs show similar, but less pronounced effects. Only the RBS group has decreased loans to customers and has realized losses. The other equity effect is for most of the GSIBs negative, which indicates that they paid out capital in the form of dividends or that changes in CET1 eligible criteria reduced the available CET1 levels. Deutsche Bank and Unicredit have a high other equity effect, this is probably because of the large shares issuances these banks did in the observation period (Deutsche bank € 18.7 billion and Unicredit €14.5 billion).

Figure 15: 7 factors decomposition of the GSIBs: 2005-2014



When looking at the post crisis period (Figure 16) the story is much more different, with Deutsche bank and Nordea as the most extremes. Deutsche bank reduced the security portfolio, increased capital and increased RWA density. The income effect of Deutsche Bank is rather small, while this is the opposite for Nordea. Nordea made a large profit and paid most of this profit out to the shareholders (large negative other equity effect) during 2013 - 2014. For Nordea we also observe a large positive risk weight effect, pointing to important risk shedding. For the other GSIBs we can conclude that a profitable GSIB pays out a large part of its profit and this is a sign that these banks have no problem to comply with the new capital regulation. The GSIBs increased both loans and securities holdings. GSIBs with a small or negative profit tend to raise equity externally and also reduce assets (loans and securities). This decreased profitability could be caused by the new capital requirements, macroeconomic conditions, etc.

Figure 16: 7 factors decomposition of the GSIBs: 2012-2014

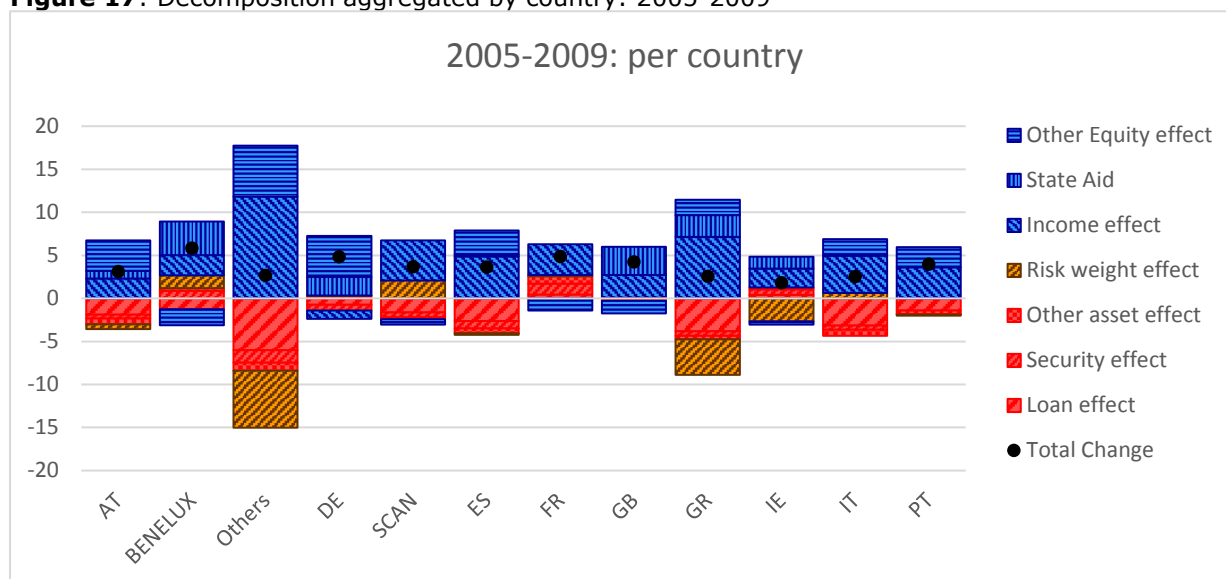


5.7. Decomposition of capital ratios grouped by country: Excluding GSIBs

The changes in capital ratios are expected to depend on the economic conditions. To examine the impact of the economic conditions, we aggregate the banking groups on a per country basis. Splitting assets per country for the GSIBs is a difficult task and therefore we exclude the GSIBs in this country analysis. Special attention is given to the countries hit by the sovereign crisis (Ireland, Greece, Spain, Portugal and Italy) and to Germany, France and the UK.

Figure 17 describes the changes in capital ratio for the period 2005-2009. For this period, the banks located in the periphery countries increased their loans to customers fuelled by an increase in equity (mainly income effect). For the banks located in the other countries a similar effect is found, but the loan effect is smaller in size compared to the banks in the periphery countries. For France we even observe a small reduction on the aggregate level of loans.

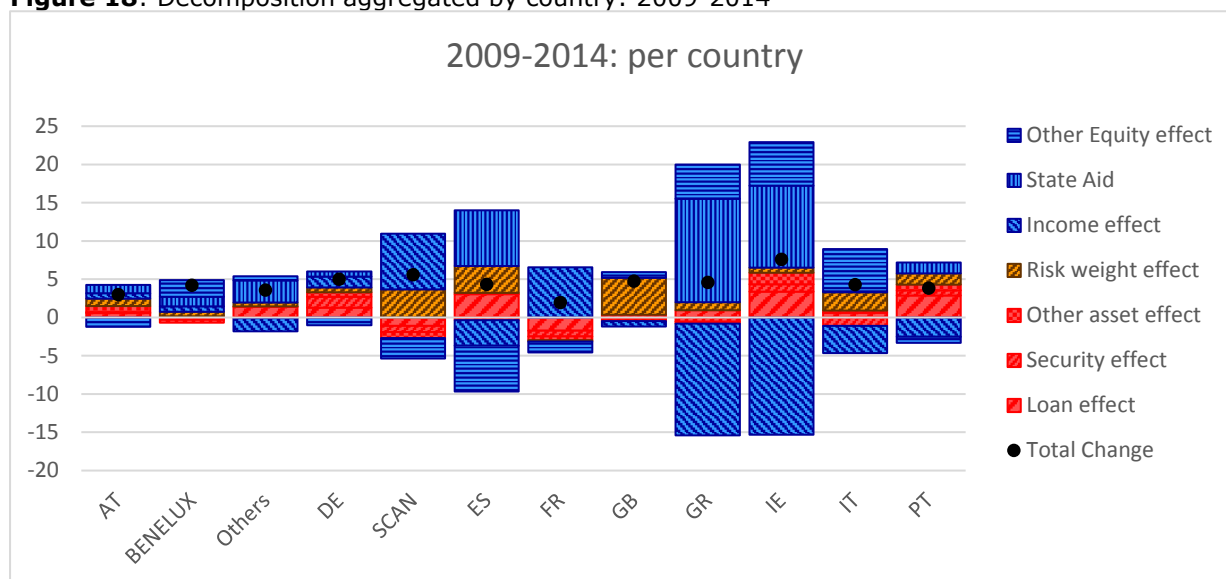
Figure 17: Decomposition aggregated by country: 2005-2009



BENELUX is the aggregate of Belgium, Netherlands and Luxemburg. SCAN are the Scandinavian countries, which include Sweden, Finland and Denmark. The category Others include the EU countries, which are not separately shown in the graph.

The evolution of the capital ratios in 2009-2014 (Figure 18) tells a different story. The banks of the periphery countries and German banks reduced their assets (the main sub-effect is loan effect). The large reduction goes along with a decrease in profitability or even large losses on an aggregate level. Large impairments on loans could explain this effect, or a decrease in the demand or supply of loans. In France and the Scandinavian countries (SCAN) the asset effect was negative and the net income effect positive. It is strange that this is not observed for Germany as one would expect. German banks have a large exposure to Italy, Spain and eastern countries which could be an explanation of a reduction in total assets and a lower profitability. For Spanish banks a large negative other equity effect is found (-5.99 pp) and this cannot be attributed to dividend pay-outs, since the income effect is also negative. Other causes like the eligibility criteria of CET1-instruments (e.g. the exclusion of deferred tax assets that are based on future profitability) could explain this large negative effect. For Spanish, Greek, Irish and Portuguese banks a large part of the negative income effect is compensated by recapitalisation measures.

Figure 18: Decomposition aggregated by country: 2009-2014



BENELUX is the aggregate of Belgium, Netherlands and Luxemburg. SCAN are the Scandinavian countries, which include Sweden, Finland and Denmark. The category Others include the EU countries, which are not separately shown in the graph.

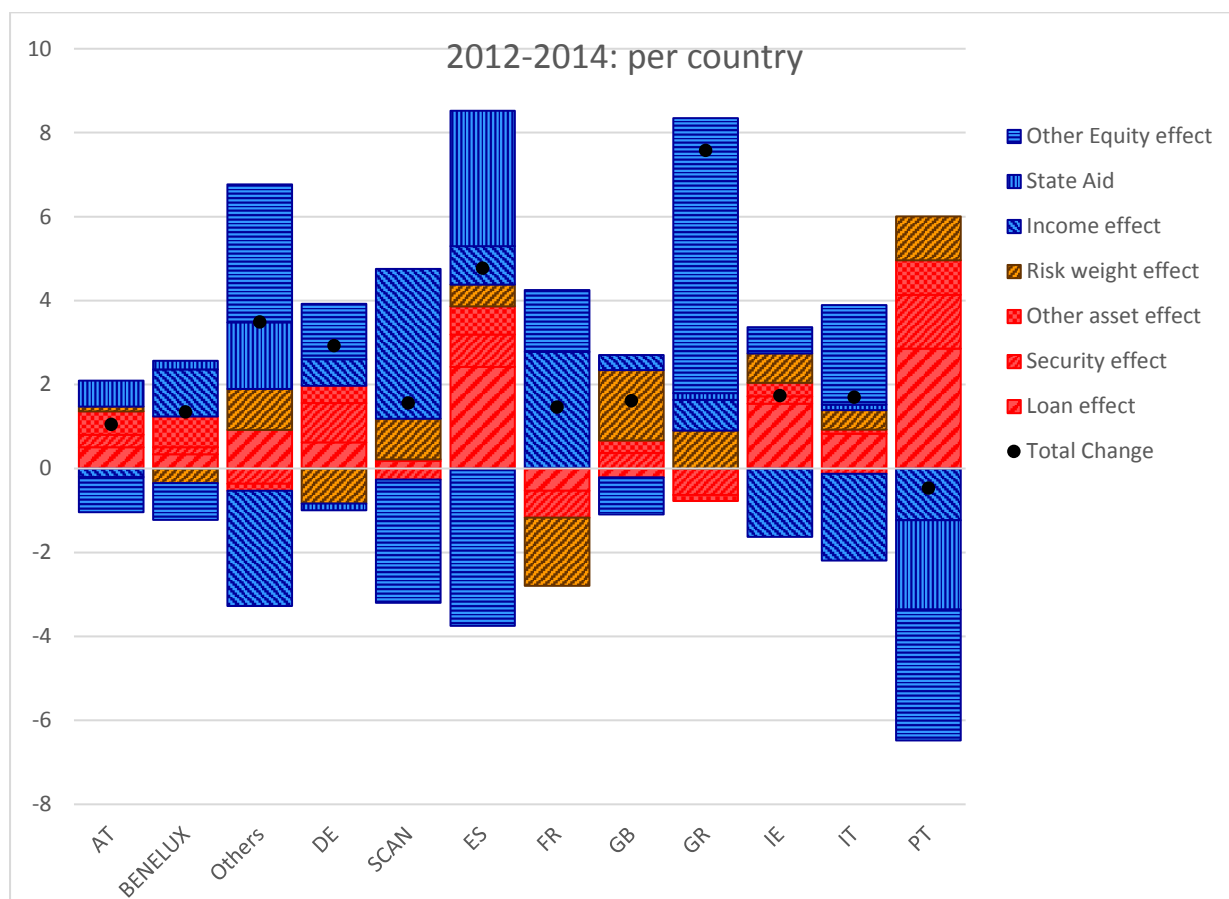
During 2013 and 2014 (Figure 19) only the British and the French banks enlarged their loan portfolios. The banks located in other countries reduced on an aggregate basis their loans to customers. This is especially true of Spanish and Portuguese banks. This reduction in loans is remarkable and coincides in terms of timing with implementation of the new capital requirements regulation. However, the large differences between banks located in different countries indicate that the new regulation is not the main driver behind this reduction in loans. If this would be the case, all banks would be affected in a similar way and this cannot be detected in this figure. This suggests that the main cause of this reduction in assets and loans is due to macroeconomic conditions. A smaller part could be due to the new regulation but the contribution from different sources cannot be attributed from this descriptive analysis. A longer series of data would be used, in conjunction with an econometric analysis, would be needed to attempt confirming the existence and magnitude of this effect. It is remarkable that there was no reduction in the book value of Greek loans, but it could be possible that the large increase in equity facilitated loans' creation.

In this period, the asset effect is the main driver of the change in capital ratios for most of the banks. For the Greek, Portuguese and French banks the equity effect dominates. For these banks all the sub-effects have the same sign. For Greek and French banks it is a large positive equity effect, but for Portuguese banks it is a large negative effect. The repayment of the state aid effect (circa € 3.5 billion) shows that these banks still could generate enough cash flow to repay the government or that they were able to issue debt or hybrid instruments at more beneficial terms in the private market.

The risk weight effect is in general positive. Combining this with the reduction in total assets, banks seem to shed risk (possibly by selling or writing down their most risky assets) and thus reducing both the RWA- density and total assets. This is especially evident in Spain, Portugal and possibly, but to a lesser extent, in the

Scandinavian countries. For banks located in Belgium, Netherlands and Luxemburg (BENELUX), France and Germany this is not true. These banks increased the riskiness of their assets on an aggregate level. For France this happened vis-à-vis an increase in total assets in all categories, while in Germany on the backdrop of a generalize balance sheet contraction.

Figure 19: Decomposition aggregated by country: 2012-2014



BENELUX is the aggregate of Belgium, Netherlands and Luxemburg. SCAN are the Scandinavian countries, which include Sweden, Finland and Denmark. The category Others include the EU countries, which are not separately shown in the graph.

6. Conclusions

We have performed a descriptive analysis where we quantify the main drivers behind the increase in capital ratios for a large sample of European banking groups. We identify three main effects and seven sub-effects. The equity effect is split into the income, state aid and other equity effect, the assets effect is decomposed into the loan, security and other assets effect, while the RWA-density is not split up in sub-effects.

The income effect captures the maximum increase in the CET1 level without attracting new capital. The State Aid effect is the percent point increase in capital ratios contributed by governments in the form of CET1 instruments. The other equity effect includes private capital increases, dividend payments, unrealised gains or losses, etc. The loan effect consists of the changes in loans to customers and the security effect describes the change in total securities held.

In general, we find an increase in capital ratios over the period 2005-2014 and over all sub-periods (2005-2007, 2007-2009, 2009-2012, and 2012-2014). For the leverage ratio (CET1/TA), we observe only a rise in the period 2012-2014. The main increase in capital ratios is thus not due to a decrease in total assets, but rather a reduction of the RWA-density (RWA/TA).

We draw our conclusions on a sample of 257 European banks with in total around 32 billion of assets under their management. In this sample of banks, we distinguish four bank categories based on Tier 1 capital: GSIB, Large, Medium and Small banks. Our analysis shows that for all bank categories our conclusion holds. However, the most important effect, that drives these increasing capital ratios, varies for the different bank categories.

In the pre-crisis period (2005-2007) banks were very profitable and hence the key driver of an increase in capital ratios is the income effect in all defined categories. During the financial crisis (2007-2009) the equity effect still drives the augmentation of the capital ratios. For GSIBs and large banks recapitalizations account mostly for the observed increase. For the medium and small banks the positive income effect is an important factor in the observed change of the capital ratios.

During the sovereign crisis (2009-2012) a positive risk effect (decrease in RWA-density) is observed in all sub-samples. This indicates that banks in this period reduced the riskiness of their portfolios by selling risky assets and substituting them with safer ones. This could be done by selling the assets in the market, but government guarantees and bad banks have facilitated this reduction in riskiness. We also observe that banks, excluding the GSIBs, had on an aggregate level a negative income effect and a positive asset effect. Hence, banks deleveraged in this period.

In the period 2012-2014, the positive asset effect indicate that banks reduced their total assets. Both the loan and security effect is positive. For the small banks this counterbalances the negative income effect.

Looking at the GSIBs individually, we observe outliers that can influence the aggregate levels. For example the state aid component of RBS and the risk effect of Deutsche Bank are outliers that are reflected in the aggregate levels.

It is important to stress that our analysis is based on aggregate levels and thus we cannot conclude that all banks behaved in a similar way. Therefore, results should be carefully read and conclusions cannot be extended to an individual level.

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ANNEX 1: Sample Construction and data statistics

1. Selection of most important banks in 2014:

- a. European GSIBs published by the financial stability board (banks: 14 , TA (2014): 18 trillion)
- b. Banks that were in the EBA capitalization exercise (EBA 2012)² (added 49 banks, TA (2014): 9 trillion)
- c. Banks under ECB supervision (ECB 2015)³ (added 46 banks, TA (2014): 3.5 trillion)
- d. SNL Banks that have enough data available for the entire sample period (2004-2014) (added 90 banks, TA (1 trillion))

Results in 199 European Banks: TA (2014) 31 trillion

2. Adding predecessors of these banks by using M&A banking deals of SNL. This should make sure that the aggregate levels can be compared over time

- a. Selected all M&A deals regarding banking sector for the period 2004-2014
- b. Mapping of deals to correct buyer and target bank
- c. Removing observations years from the moment that deal is completed

Results in 293 Banks

3. Removing banks with no or almost no data or outliers: 257 banks (TA (2014): 31.8 trillion)

List of banks

Grouping of banks is done according T1 capital as in the Quantitative impact Studies (QIS) of the EBA (2015).⁴

- GSIB (Global Systemically Important Bank): list 2014 of the Financial Stability Board (FSB)⁵
- Large Bank: T1 capital > 3 billion
- Medium Bank: T1 capital ≤ 3 billion & T1 capital > 1.5 billion
- Small Bank: T1 capital ≤ 1.5 billion

² [61 Banks' Capital Position as of 30 June 2012](#)

³ [List of significant supervised entities](#)

⁴ [CRD IV – CRR / Basel III monitoring exercise](#)

⁵ [2014 update of list of global systemically important banks \(G-SIBs\)](#)

Table 3: Country Coverage: Loans and Total Assets

Country	Total loans in sample (2014)/stocks of loans to EA and domestic market (2014) Source: ECB ⁶	TA in sample (2013)/ TA EBA (2013) Source: EBA ⁷
AT	104.52%	62.70%
BE	207.03%	61.72%
BG	14.32%	18.13%
CY	95.89%	92.21%
CZ	0.00%	0.00%
DE	70.66%	56.75%
DK	83.62%	60.58%
EE	0.00%	0.00%
ES	121.65%	108.87%
FI	50.60%	21.66%
FR	142.41%	84.40%
GB	156.50%	84.52%
GR	106.43%	NA
HR	2.01%	3.45%
HU	0.00%	44.07%
IE	130.28%	34.78%
IT	100.90%	66.30%
LT	18.21%	0.00%
LU	21.14%	7.47%
LV	0.00%	17.33%
MT	48.03%	16.41%
NL	184.46%	91.09%
PL	40.13%	21.93%
PT	69.16%	59.12%
RO	27.67%	12.64%
SE	151.93%	86.93%
SI	51.43%	61.32%
SK	42.25%	38.95%
EU	NA	71.53%

⁶ Loans to Non-financial corporates and household located in the Euro Area and the domestic market: ECB statistics

⁷ EBA data gathered from: <http://www.eba.europa.eu/supervisory-convergence/supervisory-disclosure/aggregate-statistical-data>.

Table 4: Summary statistics: TA, RWA, CET1 & T1 in million €. Source: SNL Finance

		2014					2005				
		All	GSIB	Large	Medium	Small	All	GSIB	Large	Medium	Small
TA	N	180	14	56	32	78	135	14	40	15	66
	Sum	31,736,336	18,199,029	11,414,241	1,444,862	672,550	23,233,045	11,335,653	9,184,920	989,575	629,482
	Median	34,728	1,287,217	127,303	38,442	6,335	17,972	835,134	158,330	49,887	7,591
	Mean	174,375	1,299,931	203,826	45,152	8,622	124,241	871,973	229,623	65,972	9,538
	Max	2,176,062	2,176,062	1,101,075	153,505	88,249	1,345,304	1,345,304	787,184	228,630	39,186
	Min	126	599,678	26,311	15,459	126	-	182,351	38,225	23,843	71
RWA	St dev	382,997	535,612	203,142	25,259	11,644	256,771	378,884	177,591	51,963	9,335
	Sum	11,164,322	6,306,086	4,022,719	541,024	294,492	9,620,291	4,638,597	4,216,925	358,301	381,923
	Median	15,460	402,935	53,058	16,467	3,265	16,695	377,700	84,103	23,093	5,026
	Mean	62,024	450,435	71,834	16,907	3,776	69,712	356,815	105,423	23,887	5,787
	Max	1,007,648	1,007,648	308,769	25,169	14,814	701,242	701,242	371,220	38,046	18,135
	Min	94	145,475	20,700	8,153	94	73	106,754	30,194	12,103	73
CET1	St dev	133,570	202,775	61,815	4,932	3,291	119,031	162,277	68,386	7,254	5,122
	Sum	1,363,405	720,872	536,577	67,849	38,106	496,684	265,926	187,209	18,616	24,835
	Median	2,030	48,818	7,245	2,107	457	1,021	20,295	5,377	1,720	374
	Mean	7,617	51,491	9,582	2,189	489	4,869	22,160	7,800	1,862	452
	Max	109,834	109,834	39,522	2,993	1,495	55,122	55,122	22,790	2,656	1,301
	Min	(5)	22,840	2,492	1,352	(5)	9	6,720	2,749	1,188	9
T1	St dev	15,329	21,423	8,312	485	398	8,656	12,683	5,924	530	374
	Sum	1,491,194	805,104	573,915	72,255	39,921	773,297	359,167	348,480	32,120	33,530
	Median	2,076	55,203	7,510	2,249	471	1,574	27,420	6,367	2,173	422
	Mean	8,284	57,507	10,248	2,258	512	5,771	27,628	8,712	2,141	508
	Max	125,956	125,956	50,947	2,993	1,495	63,112	63,112	30,069	2,986	1,440
	Min	(5)	25,604	3,026	1,508	(5)	9	8,220	3,215	1,532	9
	St dev	17,208	24,687	9,582	473	417	9,678	14,307	5,999	493	422

Table 5: Comparison of average capital ratio with EBA Basel III monitoring exercises (end of year). Sources: (EBA 2012b; EBA 2013; EBA 2014; EBA 2015).

		2011						2012					
		Sample		EBA				Sample		EBA			
		Current		Current		Basel III		Current		Current		Basel III	
		GSIB-Large	Medium-Small	G1	G2	G1	G2	GSIB-Large	Medium-Small	G1	G2	G1	G2
CET1	Median	10.1	10.1					11.4	11.0				
	Mean	9.9	11.4	10.3	10.6	6.9	7.2	11.7	12.3	11.5	11.3	8.4	7.9
	N	61	134	41	111	41	111	59	131	40	122	40	122
T1	Median	11.3	11.1					12.5	11.8				
	Mean	11.5	12.2	12	11.4	7.1	7.7	13.1	12.9	13	12	8.5	8.5
	N	63	140	41	111	41	111	62	137	40	122	40	122
T2	Median	14.0	14.1					15.1	14.4				
	Mean	14.3	14.2	14.2	14.1	8	9.6	15.9	14.6	15.2	14.6	9.6	10.1
	N	62	132	41	111	41	111	61	129	40	122	40	122
		2013						2014					
		Sample		EBA				Sample		EBA			
		Current		Current		Basel III		Current		Current		Basel III	
		GSIB-Large	Medium-Small	G1	G2	G1	G2	GSIB-Large	Medium-Small	G1	G2	G1	G2
CET1	Median	12.5	12.9					12.8	13.3				
	Mean	13.1	13.7	12.4	13.2	10.1	10.3	13.4	14.0	12.2	13.5	11.4	11.9
	N	59	122	39	100	39	100	60	119	45	160	45	160
T1	Median	13.2	13.1					13.9	13.7				
	Mean	14.4	14.5	13.8	13.8	10.2	10.9	14.2	14.5	13.5	13.7	11.9	12.7
	N	60	125	39	100	39	100	60	120	45	160	45	160
T2	Median	16.5	15.2					16.6	15.3				
	Mean	17.2	15.8	16.6	16.6	12.1	12.8	16.8	15.7	16.3	15.7	14.2	14.5
	N	58	117	39	100	39	100	59	113	45	160	45	160

The data is expressed in percentage (%) and N is the number of banks in the sample.

Table 6: Descriptive statistics capital ratios: sample

		2011		2012		2013		2014	
		GSIB-Large	Medium-Small	GSIB-Large	Medium-Small	GSIB-Large	Medium-Small	GSIB-Large	Medium-Small
CET1	Median	10.1	10.1	11.4	11.0	12.5	12.9	12.8	13.3
	Mean	9.9	11.4	11.7	12.3	13.1	13.7	13.4	14.0
	Q05	6.8	4.7	8.8	4.3	9.8	6.5	10.2	7.6
	Q95	14.9	19.0	16.1	22.0	18.6	22.7	19.9	22.8
	Q75	11.4	13.3	12.6	14.1	14.3	16.1	14.8	15.6
	Q25	9.0	8.2	10.4	8.4	11.4	9.9	11.2	10.9
	Min	-6.4	2.3	5.2	-1.9	8.6	-1.2	8.7	-1.9
	Max	18.0	90.1	19.7	111.1	21.2	101.0	23.3	73.0
	N	61	134	59	131	59	122	60	119
T1	Median	11.3	11.1	12.5	11.8	13.2	13.1	13.9	13.7
	Mean	11.5	12.2	13.1	12.9	14.4	14.5	14.2	14.5
	Q05	7.8	6.6	9.1	4.7	10.5	7.6	10.6	9.0
	Q95	17.4	19.2	19.3	21.9	20.5	22.7	20.8	22.7
	Q75	13.0	13.9	14.3	15.2	15.8	16.5	16.1	16.1
	Q25	10.0	8.8	11.2	9.2	11.9	10.7	11.8	11.2
	Min	-6.0	2.3	5.0	0.6	8.6	-1.1	8.7	-1.9
	Max	31.3	90.1	30.9	111.1	32.5	101.0	23.3	73.0
	N	63	140	62	137	60	125	60	120
T2	Median	14.0	14.1	15.1	14.4	16.5	15.2	16.6	15.3
	Mean	14.3	14.2	15.9	14.6	17.2	15.8	16.8	15.7
	Q05	9.2	9.3	10.0	8.5	11.9	10.5	12.4	11.0
	Q95	20.0	21.3	21.1	22.1	22.3	24.3	24.0	23.2
	Q75	16.6	15.9	17.5	16.7	19.4	18.2	18.5	17.6
	Q25	12.2	11.9	13.8	12.1	14.9	13.1	14.0	13.1
	Min	-5.0	4.4	9.5	1.2	11.1	-4.2	12.0	-1.3
	Max	42.6	26.7	41.8	28.2	40.1	29.2	25.6	28.5
	N	62	132	61	129	58	117	59	113

Table 7: Comparison of average leverage ratio with EBA Basel III monitoring exercises (end of year). Sources: (EBA 2012b; EBA 2013; EBA 2014; EBA 2015).

	2011						2012					
	Sample		EBA				Sample		EBA			
	Current		Current		Basel III		Current		Current		Basel III	
	GSIB - Large	Medium-Small	G1	G2	G1	G2	GSIB-Large	Medium-Small	G1	G2	G1	G2
Median	4.2	5.5					4.2	5.6				
Mean	4.3	6.4	4.1	4.6	2.9	3.3	4.7	6.4			2.9	3.4
N	61	136	41	111	41	111	59	131	40	122	40	122
	2013						2014					
	Sample		EBA				Sample		EBA			
	Current		Current		Basel III		Current		Current		Basel III	
	GSIB - Large	Medium-Small	G1	G2	G1	G2	GSIB-Large	Medium-Small	G1	G2	G1	G2
Median	4.5	6.5					4.6	6.5				
Mean	5.2	6.9	4.5	5.1	3.7	4.5	5.3	7.0	4.8	5.3	4.2	5
N	59	122	39	100	39	100	60	119	45	160	45	160

The data is expressed in percentage (%) and N is the number of banks in the sample.

ANNEX 2: Recapitalisation per country in billion €

	BE	DK	DE	IE	GR	ES	FR	IT	LU	NL	AT	PT	SI	GB	Listed Countries
2008	15.4	0	11.2	0	0	0	13.04	0	2.88	6.44	0.9	0	0	21	70.86
2009	3.5	3.22	33.72	7	4.34	1.3	11.8	4.05	-0.38	3.95	4.77	0	0	62.32	139.59
2010	0	0	2.68	4.63	0	8.7	0	0	0	1.53	0.6	0	0	0	18.14
2011	0	0	4.64	17.02	2.04	10.98	0	0	0	0	0	0	0.25	0	34.93
2012	2.92	0	0	0	27.8	37.97	2.59	0	0	0	0.97	6.15	0.48	0	78.88
2013	0	0	0	0	1.59	1.7	0	2.17	0	2.2	1.75	0	2.69	0	12.1
2014	0	0	0	0	2.86	0	0	0	0	0	0.75	0	0.24	0	3.85
In sample (A)	21.82	3.22	52.23	28.64	35.76	60.64	27.42	6.22	2.5	14.12	8.99	6.15	3.42	83.31	354.44
State aid assigned to banks which are not include in the sample (B)	1.5	0	1.9	34.7	0.08	0.69	0	0	0	9.27	2.21	1.7	0	3.52	55.57
Total (A)+(B)	23.32	3.22	54.13	63.34	35.84	61.33	27.42	6.22	2.5	23.39	11.2	7.85	3.42	86.83	410.01
Reported 2008-2013	23.32	10.77	64.17	62.78	40.85	61.85	25.05	7.95	2.6	23.02	11.1	7.85	3.15	100.14	444.6
Missing: Reported -(Total-2014)	0	7.55	10.04	-0.56	7.87	0.52	-2.37	1.73	0.1	-0.37	0.65	0	-0.03	13.31	38.44

Sources: Proprietary data base constructed from State aid data base European Commission, balance sheets, Ministry of finance reports, reports of recapitalization schemes, etc.

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