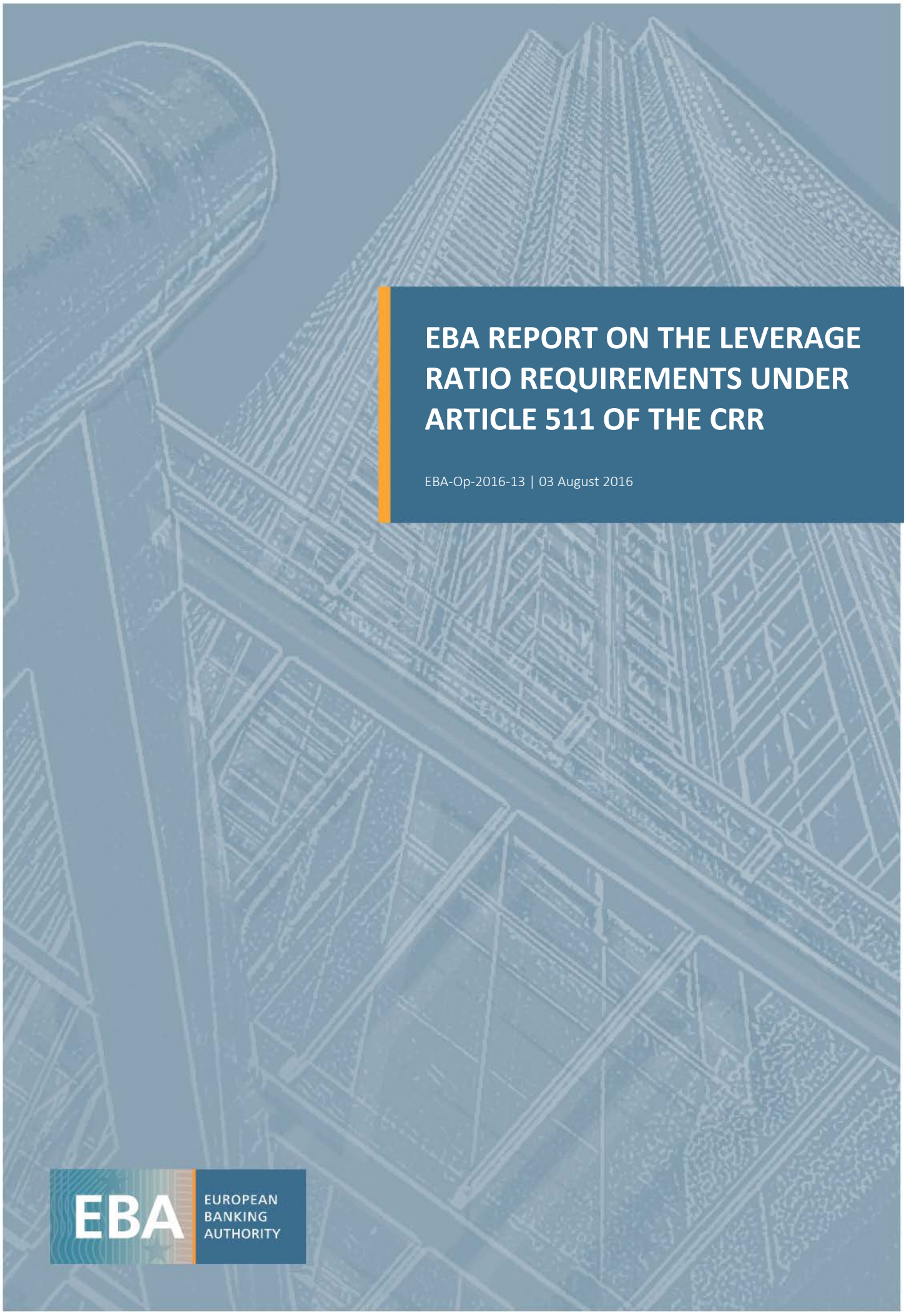

EBA REPORT ON THE LEVERAGE RATIO REQUIREMENTS UNDER ARTICLE 511 OF THE CRR

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EBA EUROPEAN BANKING AUTHORITY

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Abbreviations

ASF	Available stable funding
AT1	Additional Tier 1
BCBS	Basel Committee on Banking Supervision
CCPs	Central counterparty clearing houses
CEM	Current Exposure Method
CET1	Common Equity Tier 1
CoRep	Common reporting
CRD IV	Capital requirements directive IV Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC
CRR	Capital requirements regulation Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012
CSDs	Central securities depositories
EBA	European Banking Authority
ECA	Export credit agency
ESRB	European Systemic Risk Board
EU	European Union
GHOS	Basel Committee's Group of Central Bank Governors and Heads of Supervision
GSII	Globally systemically important institution
HQLA	High-quality liquid assets
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
LCR	Liquidity coverage ratio
LCR DA	Liquidity Coverage Ratio Delegated Act Commission Delegated Regulation (EU) 2015/61 of 10 October 2014 to supplement Regulation (EU) No 575/2013 of the European Parliament and the Council with regard to liquidity coverage requirement for Credit Institutions
LR	Leverage ratio
LR DA	Leverage Ratio Delegated Act Commission Delegated Regulation (EU) 2015/62 of 10 October 2014 amending Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to the leverage ratio
n-GAAP	National generally accepted accounting principles
NSFR	Net stable funding ratio
OEM	Original Exposure Method
PSE	Public sector entity
QIS	Quantitative impact study

REL	Risk of excessive leverage
RWAs	Risk-weighted assets
SA-CCR	Standardised Approach for measuring counterparty credit risk
SFTs	Securities financing transactions
SMEs	Small and medium-sized enterprises
T1	Tier 1 capital
T2	Tier 2 capital
VaR	Value at risk

Executive Summary

Background

In the years preceding the financial crisis, some credit institutions'[1] leverage reached levels that caused both individual entities and the financial system as a whole to be highly financially fragile. A large number of empirical analyses have found that financial institutions globally increased leverage to 'excessive' levels in the early 2000s. While higher levels of leverage at credit institutions compared to other operating institutions may generally be justified due to banks' function of providing liquidity to claimholders and their special abilities with respect to managing risky assets through diversification, excessive levels of leverage make them exceedingly prone to shocks. In that regard, recital 91 of the CRR states that 'risk-based own funds requirements are essential to ensure sufficient own funds to cover unexpected losses. However, the crisis has shown that those requirements alone are not sufficient to prevent institutions from taking on excessive and unsustainable leverage risk'. Against this background, the overarching aim of the leverage ratio (LR) regulation is to limit the build-up of leverage to the degree that financial institutions do not end up with excessive leverage while maintaining comfortable risk-based capital measures.

In order to mitigate risks of excessive leverage, the Basel Committee on Banking Supervision (BCBS) designed the (regulatory) Basel III LR as a simple, transparent, non-risk-based measure to supplement existing risk-based capital adequacy requirements. The Capital Requirements Regulation and Capital Requirements Directive IV (CRR/CRD IV) framework introduced the LR as a new prudential tool, together with related reporting and public disclosure obligations for institutions.[2] In line with the timeline envisaged by the BCBS, recital 94 of the CRR states that 'Reporting obligations for institutions would allow appropriate review and calibration with a view to migrating to a binding measure in 2018'.

By design, the non-risk-based LR may incentivise financial institutions with low-risk business to diversify asset portfolios into high-risk business, in particular when applied on a standalone basis. However, the risk-based approach has its own limitations − for example, there are limits to the accuracy and reliability of modelling financial risks, which can affect both banks' internal models as well as regulatory models in the form of so-called 'Standardised Approaches'.

[1] This report uses the terms 'financial institutions', 'institutions' and 'banks' interchangeably. These are meant to cover the regulatory notion of 'credit institutions' as defined in the Capital Requirements Regulation (CRR).

[2] Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.

Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

Hence, the LR and the risk-based capital requirements should function in a complementary manner, with the LR defining a minimum capital to total exposure requirement and the risk-based capital ratios limiting risk-taking. In order to achieve this, and considering the role of the LR as a supplementary measure to risk-based capital requirements, calibration needs to be determined in a manner which ensures that both approaches to capital regulation remain relevant.

On 11 January 2016, the BCBS issued a press release informing the public about the agreement reached by its oversight body, the Group of Governors and Heads of Supervision (GHOS), according to which a minimum level of 3% based on Tier 1 capital is expected to apply for the LR from 1 January 2018 onwards. Furthermore, the GHOS discussed additional requirements for institutions which are systemically important at the global level, and the details of such additional requirements are part of a public consultation by the BCBS.[3] The level of 3% was determined after years of careful monitoring of the LR following its introduction as part of Basel III in 2010.

In light of these developments, the European Banking Authority (EBA) has performed its assessment on calibration with a particular focus on an LR of 3% referred to as the 'baseline calibration level'.

Mandate of the report

In order to inform an appropriate review and calibration of the LR, Article 511 of the CRR contains a mandate for the EBA to submit a detailed report on the matter to the European Commission by 31 October 2016. The mandate is presented in detail in section 1.1 of this report. In particular, the CRR requires the EBA to report on various aspects including:

- Whether the LR should migrate to Pillar 1 and, if so, what the minimum level(s) should be, especially taking into account business models and risk profiles.

- The interaction of the LR with the risk-based own funds requirement and liquidity requirements as well as the impact of imposing the LR as a Pillar 1 requirement on various segments of financial markets, and the behaviour of banks. This includes the assessment of the impact on financial markets, risk-taking and the robustness of institutions, balance-sheet structures, institutions' risk-taking behaviour, clearing, settlement and custody activities, operations of central counterparties, cyclicality of the capital and total exposure measure, lending to small and medium-sized enterprises (SMEs), local authorities, regional governments, public sector entities (PSEs), and trade financing.

- More general, overarching elements, such as:

    - The appropriateness of the LR as a tool to suppress the risk of excessive leverage (REL) and whether the CRD IV requirements for managing REL are sufficient.

[3] http://www.bis.org/bcbs/publ/d365.htm

- The impact of accounting differences between accounting standards.

This mandate has been complemented by a call for advice from the Commission in June 2015 requesting, in particular, an analysis of proportionality, as well as the EBA to advance the finalisation of its report on LR as much as possible in order for the Commission to align the timing of possible legislative proposals for the LR and the net stable funding ratio (NSFR). The EBA has indicated to the Commission that the soundness and completeness of data to be used is key and that the submission of the report could not be advanced before July 2016 at the earliest.

This EBA report fulfils the cited mandate and the call for advice from the Commission.

By 31 December 2016, the Commission shall submit a report on the impact and effectiveness of the LR to the European Parliament and the Council.

It has to be noted that the mandate given to the EBA is very extensive, while the timing to deliver the report has been constrained and shortened vis-à-vis the date of 31 October 2016 as stipulated in Article 511(3) of the CRR. On this basis, the EBA strived to cover most of the aspects but some have been less deeply investigated than others.

In particular, the report focuses on the high-level calibration of LR levels and on the impact of imposing these requirements on the banking system. The report also provides an analysis of and content relating to a range of more detailed/technical aspects of the LR calculation rules.

However, a few aspects related to the LR's calculation rules could not be addressed in a fully conclusive manner due to the timeline for the delivery of the report. This also reflects the sequence and current status of the BCBS's work on the LR, in particular, the fact that an agreement about the high-level calibration of the minimum level has been reached but, at the same time, a consultation about definition-related aspects is still ongoing (covering aspects like the treatment of derivatives, including margins, the treatment of pending settlements of regular way purchases or sales of financial assets, etc.).

In view of the extensive scope of the analysis, the EBA had to concentrate firstly on the specific requirements stemming from the mandate, in particular with regard to the calibration, the capital measure, the treatment of some off-balance-sheet items and the treatment of derivatives. The EBA is aware that the industry has also raised awareness of aspects related to, for example, the treatment of cash/cash equivalents, cash deposited at central banks, intragroup exemptions and the treatment of institutional protection schemes. While the EBA could not investigate these aspects for the specific purpose of this report, it stands ready to conduct further work where necessary in cooperation with the Commission services in the context of a legislative proposal for the LR and in the wider context of international discussions.

Methodology of the report

This report assesses leverage-related risks of credit institutions with a particular focus on REL as defined in Article 4(1)(94) of the CRR.

To mitigate REL, an appropriately designed LR requirement should safeguard a minimum capitalisation of credit institutions even where risk estimates are very low. An LR requirement can achieve this by prescribing a minimum amount of Tier 1 capital relative to (non-risk-based) total exposure, which includes on- and off-balance-sheet positions. The Basel LR, which has been calibrated at a minimum level of 3%, is considered as a starting point and as a baseline for the final specification and calibration of the LR requirement for the EU, while EU specificities have been considered where necessary. In particular, the report touches upon the following aspects:

- A description of the **current levels of the LRs** for a representative sample of EU banks. This description includes statistics on the LR levels, along with measures of shortfalls for the whole sample and in each business-model category.

- A **benchmarking analysis** with the objective of investigating the exposure to REL of different categories of credit institutions in relative terms in order to inform the appropriateness of a potential differentiation of the required LR levels, complemented by an **analysis by size buckets** from a proportionality perspective. Specifically, credit institutions were classified by business model, size and global systemic importance and benchmarked on the basis of four dimensions that the EBA views as relevant for assessing REL: level and stability of profitability, stability of funding, stability of the business activity and degree of concentration. As a guiding rule, a category of credit institutions is only considered to be more or less exposed to REL than other entities if at least three of the four risk dimensions point in this direction.

- An analysis of a range of potential impacts of introducing a binding LR requirement in the EU. In particular, the potential impact on the provision of financing (including through repos, derivatives, covered bonds, lending to SMEs and the public sector as well as residential property finance) is estimated through a **simulations-based analysis**. The potential impacts on risk-taking, as well as the robustness and the cyclicality of capital requirements, are investigated through empirical (econometric) studies. In the baseline scenario, it is assumed that 50% of capital shortfalls caused by the imposition of the LR as a Pillar 1 requirement would be mitigated through capital increases, with the remaining 50% mitigated through exposure reductions. In addition, three alternative scenarios are applied.

- Information on the impact of potential adjustments to the LR's definition which is derived through **sensitivity analysis**. Relevant aspects include the capital measure of the LR, the treatment of derivatives (including the application of the Original Exposure Method (OEM)) and the conversion factors applied to low-risk, off-balance-sheet commitments. The report also evaluates the adequacy of potential changes to the LR definition in light of the LR's principles and objectives. Furthermore, a brief description of revisions proposed by the BCBS in its 6 April 2016 consultative document is provided.

Data and sample

As previously indicated, this report aims to assess the appropriateness and impact of introducing minimum ('Pillar 1') levels for the LR. The existing CRR/CRD IV provisions with respect to the LR as well as the Basel III LR ratio framework have been considered a starting point and a reference for the subsequent analysis of the potential adequate calibration.

In this regard, relying exclusively on the data on LR requirements reported by institutions in accordance with the ITS on supervisory reporting proved to be inadequate for the report because these data did not capture the effects of amendments to the CRR definition of the LR, which were introduced through Commission Delegated Regulation (EU) 2015/62 (LR DA). As a result, the EBA conducted a voluntary exercise for institutions to contribute with quantitative impact study (QIS) data based on the reporting templates of the BCBS and performed most of the analysis of this data. Due to the EBA's commitment to the Commission to deliver this report several months ahead of the CRR timeline, the main reference date used is 30 June 2015.

The sample is composed of 246 credit institutions. There was insufficient sample coverage for investment firms to be able to develop an analysis that would be robust enough to draw policy conclusions for these firms. Therefore, the conclusions and recommendations of the report are limited to credit institutions.[4]

The 246 credit institutions in the sample represent approximately 75% of total banking assets in the EU countries, and these entities were classified by competent authorities into 12 distinct business-model categories on the basis of their activities and legal setup. However, given the high diversity of business models across the EU and the comparatively low sample coverage in some business-model categories, the quantitative analysis has been complemented by qualitative reflections in order to reflect additional specificities.

It is to be noted that, depending on the types of analyses which have been performed, different subsets of the sample have been used (as further detailed in section 1.2 of the report).

Findings and recommendations of the report

The following is a summary of the findings derived from the analysis conducted in the report. These findings rely on the methodologies and data used (including the identifying assumptions made). While it is possible to indicate in relative terms which results are more statistically significant within the analysis, it is not possible to fully quantify the uncertainty regarding the validity of these results outside these methodologies and in other populations than the sample used. This is a general potential limitation of econometric investigations: while they are a rigorous way to present the information contained in a dataset, they can be used to support economic judgements and policy conclusions only subject to identifying assumptions (e.g. assuming that the

[4] The EBA is working separately on the prudential framework applicable for investment firms. A report was published on 14 December 2015, proposing a new categorisation of investment firms in particular.

sample of past observations studied in the econometric analysis is representative of the population of banks on which the reform will be conducted and which will be subject to the requirement in the future).

a. General LR framework

CALIBRATION OF THE MINIMUM LEVEL

The results of the quantitative analyses performed suggest that a 3% level of calibration for the LR is generally consistent with the objective of a backstop measure which supplements risk-based capital requirements. In particular, a (Tier 1 capital-based) LR calibrated at a level of 3% would constitute a higher capital requirement than a risk-based Tier 1 capital requirement of 8.5% (consisting of a 6% minimum level plus a 2.5% fully phased-in capital conservation buffer level) for around 33% of the analysed credit institutions. This percentage is very likely to overstate the real effect of the LR because it does not reflect the additional requirements under Pillar 2, or (macroprudential) buffers, both of which may apply to risk-based requirements and, therefore, may somewhat reduce the degree to which the LR drives actual capital requirements. Around 9% of the credit institutions analysed reported an LR below the level of 3% as of 30 June 2015, with an aggregate Tier 1 capital shortfall of EUR 6.4 billion, assuming fully phased-in capital rules. In practice, these credit institutions still have some time to take appropriate adjustment actions.

The results of a simulations-based analysis, estimating the impact of any potential adjustment actions firms that do not meet the LR might take, suggest a high sensitivity to changes in the calibration of the LR. If applied as a requirement to all credit institutions in the sample, the simulation analysis estimates that the potential reduction of exposures would increase significantly beyond an LR level of 3.5%.

At a level of 2% or 2.5%, the supervisory backstop role of the LR would be insufficient, as at those levels it would constitute a higher capital requirement than a risk-based Tier 1 capital requirement of 8.5% for around 15% and 25% of the analysed credit institutions, respectively, which would imply a more narrow application of the LR on only the most leveraged credit institutions.

IMPACT ON PROVISION OF FINANCING

The results of a simulations-based analysis, estimating the impact of potential adjustment actions firms that do not meet the LR might take, suggest the potential impact of introducing an LR requirement of 3% on the provision of financing by credit institutions would be relatively moderate when put into the context of the overall size of the banking sector. The estimated amounts, which are based on a sample, should not be interpreted at face value but rather as indicative estimates and their significance should be evaluated in the context of the aggregate LR exposure of all institutions in the sample, implying that the estimated exposure reductions range from 0.1% to 0.4% of overall exposure. Moreover, those credit institutions which already meet an LR requirement of 3% would have the capacity to increase their exposures, which suggests that a

certain share of potential exposure reductions may be absorbed by other entities within the EU banking system.

The simulations-based analysis assumes that if firms choose to reach compliance with the LR by reducing exposures,[5] they reduce assets with low risk weights first. The results of the simulations suggest that the estimated exposure reductions at a level of 3% might primarily affect sovereign exposures (which may include lending to municipalities, local authorities, regional governments and PSEs), exposures to banks and financial institutions, securitisations and trading book exposures (which also include repos and derivatives). However, under any scenario tested, these estimated exposure reductions are very small compared to the aggregate volume of these exposures in the total sample of credit institutions, suggesting a low overall impact on these market segments. The simulations-based analysis results do not suggest a substantial impact of the LR on exposure classes such as SME exposures, non-financial corporates, residential real estate and other retail exposures as long as the calibration of the LR requirement does not exceed a level of 4%.

IMPACT ON RISK-TAKING AND THE ROBUSTNESS OF CREDIT INSTITUTIONS

The empirical results reveal a very moderate increase in risk-taking at credit institutions with LR levels below 3% after 2010, the year when the BCBS announced the LR as a new prudential measure and communicated 3% as a tentative target. At the same time, the LR, in combination with other prudential measures, initiated a substantial strengthening of the capital position of these entities. In terms of overall robustness, the results suggest that through a reduction of probability of distress, the positive effects of an increase in capital (and in LRs) significantly outweigh the negative effects of the observed moderate increase in risk-taking and should therefore lead to more stable credit institutions overall.

IMPACT ON SENSITIVITY OF CAPITAL REQUIREMENTS TO THE ECONOMIC CYCLE

The empirical results indicate that the LR is somewhat more sensitive to the economic cycle than risk-based capital requirements and is thus the first capital requirement to signal the need for corrective action from credit institutions during booms, i.e. when perceived risk levels are low. In this sense, the LR would be a relatively tighter constraint in booms and a relatively looser constraint in recessions. This empirical observation is also intuitive because the LR exposure measure is not influenced by risk estimates, which may tend to be relatively optimistic during booms and relatively pessimistic during recessions. Given these statistical properties of the risk-based Tier 1 ratio and the LR, it is expected that the combined application of both requirements will reduce the overall cyclicality of capital requirements, since the LR would limit the expansion of exposures on the basis of low risk estimates during booms while risk-based requirements would curb risk-taking in high-risk environments.

INTRODUCTION AS A 'PILLAR 1' REQUIREMENT

[5] The simulations assume firms that are bound by the leverage ratio would reduce their shortfall by a combination of raising capital and reducing exposures (four different scenarios varying the degree of capital/exposure reduction are explored in the report and firms willingness to reduce 'core assets' are taken into account).

Recital 18 of the CRR, as well as the measures of the CRD IV in relation to REL, provides Member States and supervisors with scope for discretion in their application of the LR to credit institutions. This has resulted in a range of practices across Member States, which include binding ('Pillar 1') requirements, the expression of non-binding supervisory expectations towards credit institutions with regard to certain LR target levels and the consideration of the LR as one of a number of quantitative indicators in the course of the supervisory review and evaluation process. While each of these measures appears to be reasoned and justified, considering the objectives of promoting coherence in the regulation of credit institutions through the EU in general, and the function of the LR to supplement risk-based own funds requirements with a simple backstop measure that ensures the maintenance of a minimum level of capital in particular, the introduction of harmonised minimum ('Pillar 1') requirements is deemed beneficial in terms of the consistency and effectiveness of the measure.

***Recommendation 1*: In line with the agreement reached by the GHOS, a mandatory ('Pillar 1') minimum level of 3% should be introduced for the LR based on Tier 1 capital and this minimum requirement should generally apply to all credit institutions within the scope of the existing CRD IV/CRR requirements for LR, as applicable.**[6]

***Recommendation 2:* The international timetable, which envisages the application of the minimum level of 3% from 1 January 2018 onwards, should be followed; the EU banking sector has been preparing actively, and there does not seem to be a need for a longer transition as a general rule.**

b. Differentiations of the LR levels by business models, size or systemic relevance

The EBA has assessed the exposure of different categories of credit institutions to REL by means of a quantitative benchmarking. Overall, the results do generally not give a strong indication for differences in the degree of exposure to REL across different types of credit institutions, except in the cases of banks that follow a 'cross-border universal bank' business model and which belong to the 'very large' time bucket and are classified as GSIIs (see below).

PUBLIC DEVELOPMENT BANKS AND MORTGAGE BANKS

The quantitative results reveal that LRs vary considerably across different categories of business models, with the median ranging from 2.8% in the case of 'public development' banks to 8.7% in the case of 'automotive & consumer credit banks'. Given these results, it is recognised that prescribing a level of 3% for the LR may impact business models in profoundly different ways. At the same time, it is an objective of the LR to ensure the maintenance of a certain minimum level of capital relative to total exposure and irrespective of risk estimates; this generally also includes those credit institutions which apply, on average, low risk-weights.

[6] In accordance with the CRR, the LR applies on an individual level as described in Chapter 1 of Part One Title II of that regulation and subconsolidated/consolidated level as described in Chapter 2 of Part One, Title II of that regulation.

In terms of business models, there are some institutions that reported an LR below the level of 3% as of 30 June 2015. These are categorised in the business models of public development banks and mortgage banks. The simulations-based analysis results suggest that these firms might reduce some of their exposures at an LR requirement of 3%, unless they chose to meet the requirement by raising capital. At the same time, the results reveal that those public development banks and mortgage banks which already meet an LR of 3% would have substantial capacity to increase their exposures without falling below the level of 3% and could therefore potentially absorb some of the exposures. However, caution is warranted due to the local specificities of these market segments which may complicate a smooth reshuffling of exposures among credit institutions in certain cases.

To complement the quantitative benchmarking analysis, the EBA has exercised some supervisory judgement. It has, in particular, carefully considered the common features of public development banks in the sense that they provide subsidised loans and, at the same time, are part of a diverse landscape of business models across the EU with no single model that could be seen as a 'common standard'. As a result, a variety of mechanisms for channelling and distributing promotional loans exist. Moreover, the EBA has also considered the fact that the current regulatory framework applicable to public development banks already contains some provisions specific to their status. Such exemptions reflect the low risk of loans if their repayment is guaranteed by the public sector, but, at the same time, this may lead to an insufficient awareness of the risks associated with large volumes.

While it does not seem appropriate to exempt public banks from any leverage constraint at all, there are questions over whether (i) the specific constraints attached to this business model would warrant a differentiated (in the sense of lower) LR requirement or (ii) there should be some specific treatment allowed to exclude some exposures from the exposure measure to the extent that they are backed by specific legal mechanisms.

In the event that a differentiated treatment for public development banks is envisaged, the main question would be how to scope it in a targeted manner and without creating possibilities for regulatory arbitrage, i.e. how to avoid that a given proposed beneficial treatment is not applied by entities for which it is not designed. In this context, it also should be considered that many banks do channel promotional public loans or even provide loans to the public sector despite not being public development banks as such. This would then lead to the further question of whether the specific treatment should be on the basis of a specific entity nature or on the basis of a transaction approach.

The most immediate criterion which may be observed as a specificity is the binding legal mandate imposing a public mission on the public development bank while restricting its activities to very specific business areas, which often results in a not-for-profit objective. The 'bindingness' of the legal mandate (at the level at which it has been defined) and the possibilities of changing it shall be very carefully considered. The clearest cases seem to be those where the requirements come directly from Commission decisions and EU State Aid rules. In addition, 'pass through' systems which are operated by public development banks could be considered.

Having considered all the abovementioned aspects (which are detailed further in this report), the EBA came to the conclusion that it is not technically possible to define a list of 'one size fits all' criteria that are sufficiently strong to frame either a lower LR requirement or exemptions in the exposure measure, while at the same time keeping the spirit of the LR design and not opening the door to cases of circumvention. Nevertheless, the EBA believes that it has provided a good overview of aspects to be investigated by the Commission, where deemed appropriate, in its forthcoming legislative proposals.

Similarly, for mortgage banks, the EBA has assessed qualitative aspects to complement the quantitative benchmarking outcome which indicated that mortgage banks would not be exposed to more or less REL in total.

Additional considerations for mortgage banks, which put the benchmarking outcome into a broader context, are that they have some common features such as a specialisation in directly originating or servicing mortgage loans, and they are predominantly funded through the issuance of covered bonds. Therefore, these banks often do not maintain a network of regional branches which would give them broad access to retail deposits, but they may compensate for this through 'match-funding' their long-term loans by means of long-term bond issuances as a mechanism for managing their leverage.

However, it should also be considered that risk estimates and collateral values of the mortgages can fluctuate through the economic cycle and that conditions in wholesale funding markets, on which mortgage banks often rely, can change. These aspects may provide evidence against lowering the LR requirements for mortgage banks.

In conclusion, it is not deemed appropriate to differentiate the LR requirement in the case of public development banks and mortgage banks. This conclusion is based on the benchmarking outcome which suggests neither a higher nor a lower exposure to REL for these entities, additional qualitative considerations regarding their business model and also the difficulty of scoping any specific treatment without jeopardising the objectives of the LR as a non-risk-based supplement and without compromising the comparability of the LR.

CENTRAL COUNTERPARTY CLEARING HOUSES (CCPs)

While the business of operating a CCP generally does not fall under the CRR definition of credit institutions, there are a few CCPs in the EU which hold a banking licence, mainly due to national laws and in order to gain access to central bank refinancing operations in specific monetary regimes. In addition, CCPs in the EU are subject to the requirements of EMIR.[7]

In particular, EMIR prevents CCPs from carrying out usual banking activities, including most forms of maturity transformation and build-up of typical bank leverage by funding (risky) assets with liabilities like (wholesale or retail) deposits. As far as CCPs take deposits (typically in the form of

[7] Regulation (EU) No 648/2012.

margins) from clearing members, this occurs mainly for the purposes of risk management rather than for funding investment activities. In this regard, the amounts as well as the kind (cash vs. securities) of received collateral are somewhat exogenous to CCPs and need to be determined in relation to the volume and risk of a clearing member transaction.

Other considerations are the aspect of a level playing field (most CCPs around the globe will not be subject to an LR in any case) as well as broader financial stability considerations (if CCPs surrendered their banking licence in order to escape an LR requirement they would lose access to central bank liquidity in certain monetary regimes which could have adverse repercussions during crisis situations).

***Recommendation 3*: As a derogation to the general principle of recommendation 1, CCPs, as defined and regulated through Regulation (EU) No 648/2012 (EMIR) and in particular when holding a banking licence and thus being captured by the CRR requirements, should be exempted from an LR requirement.**

CUSTODY BANKS AND CENTRAL SECURITIES DEPOSITORIES (CSDs)

Custody banks displayed a comparatively weak performance in the benchmarking relative to most other categories of business models, indicating a potentially higher exposure to REL in the risk dimensions of stability of funding, stability of business activity and degree of concentration. However, these results have been qualified further in the report, since the underlying risk indicators may be less meaningful for custody banks than for most other bank types.

Similarly to CCPs, CSDs are considered market infrastructures and are subject to specific EU legislations which significantly narrow the scope of their activities. These include the requirements of the CSDR, which contain a restriction of banking services to the settlement activities which are provided only to the participants in the settlement system. Other restrictions from the CSDR on CSDs include the holding of additional capital requirements because of the intraday credit lines as well as stringent requirements concerning the use of bank guarantees on their credit exposures. As with CCPs, due to the performance of a market infrastructure function, the balance sheets of CSDs are somewhat exogenous to CSDs.

Recommendation 4: As a derogation to the general principle of recommendation 1, CSDs, as defined and regulated through Regulation (EU) No 909/2014 (CSDR), should be exempted from an LR requirement.

LOCALLY ACTIVE SAVINGS AND COOPERATIVE BANKS AND SMALL BANKS

On the basis of the benchmarking results, there are indications of a potentially lower exposure to REL in the case of locally active savings and cooperative banks driven by a good performance on the level and stability of profitability, funding and business activity dimensions. However, these types of credit institutions are spread across various size buckets and the benchmarking results do not indicate a lower exposure to REL for the size buckets which capture ‘small’ (LR exposure ≤ EUR 10 billion) and ‘medium-sized’ entities (LR exposure ≤ EUR 100 billion but > EUR 10 billion).

Considering, in addition, that locally active savings and cooperative banks have a relatively high weighted average and median LR (5.3% and 6.6%, respectively), with no single entity in the sample below the 3% level, there do not seem to be sufficiently strong reasons or a practical need to deviate from the 3% baseline level for this business model. More broadly, entities classified in the 'small' size bucket have the highest median LR (6.6%) and the overall benchmarking results for this size bucket is 'neutral' in terms of exposure to REL.

***Recommendation 5:* Locally active savings and cooperative banks, as well as smaller credit institutions, also should be subject to the mandatory (Pillar 1) minimum level of 3%.**

GLOBAL SYSTEMICALLY IMPORTANT INSTITUTIONS (GSIIs)

The quantitative benchmarking results give indications of a potentially elevated exposure to REL in the case of the largest and most complex credit institutions, in particular those that operate the business model of a 'cross-border universal bank' and that are, at the same time, GSIIs.

In January 2016, the GHOS discussed, in the context of their agreement on the generally applicable minimum level of 3% for the LR, additional LR requirements for global systemically important banks (GSIBs which are transposed as GSIIs in the terminology of the EU). This issue was subsequently included in the recently published consultative document (CD) on revisions to the Basel III LR framework.[8]

***Recommendation 6:* Higher LR requirements in the case of GSIIs may be warranted. Future developments at the level of the BCBS should be monitored carefully in terms of design and calibration of these additional requirements for GSIIs.**

In terms of the design of an additional requirement for GSIIs, the BCBS has not yet determined whether a potential surcharge should be flat (i.e. the same for all GSIIs) or flexible (i.e. the size of the surcharge will be based on the bucket of systemic importance). While the report does not investigate the form of higher LRs for GSIIs, the EBA will continue to follow and contribute to the Basel discussions on e.g. a higher minimum requirement or specific buffer requirement, and potential operational consequences associated with a breach of such an additional requirement.

It should be noted that the discussion about higher requirements at the Basel level is limited to GSIIs. In this regard any additional requirement for O-SIIs could be considered in a similar manner and the EBA stands ready to undertake further work where needed.

c. Calculation of the LR

CAPITAL MEASURE

In line with the mandate of the EBA under Article 511(3)(f) of the CRR, this report includes an analysis of the appropriateness of applying Tier 1 capital as numerator of the LR and also quantifies the impact of applying alternative capital measures, notably Common Equity Tier 1

[8] http://www.bis.org/bcbs/publ/d365.pdf.

(CET1) and total own funds, as potential alternatives. The conclusions suggest that applying Tier 1, which is considered part of going-concern capital, is consistent with the LR's forward-looking objectives.

The EBA has supplemented the analysis of alternative capital measures with a quantitative assessment on the impact of applying caps on the recognition of AT1 instruments. The results suggest a relatively low quantitative impact for a moderately calibrated cap. However, these results should be interpreted carefully because they ignore a potential future impact, in particular for banks which would need to raise capital for meeting an LR of 3% and with limited or no ability to resort to alternative means like issuing joint stock or building capital through profit retention.

In addition, it should be noted that introducing requirements in the LR on the amount of CET1 to be held could run contrary to the concept of the LR as a backstop in the sense of a structural balance-sheet measure which is different from the risk-based requirement and which, as a risk-based measure, is focused on the risk of losses. In addition, a cap on the recognition of AT1 instruments would lead to complexity and could indicate doubts about AT1 as a capital instrument.

Furthermore, it should be noted that the discussion about limiting the recognition of AT1 instruments in the LR at Basel level seems to be confined to the LR GSII surcharge, and the outcome is still open.

Recommendation 7: ***The LR numerator should consist of Tier 1 capital. A potential cap on the use of AT1 should be confined to GSIIs and should be in line with the eventual Basel standard. Any inclusion of (gone-concern) Tier 2 capital elements in the LR's capital measure by basing the calculation on total own funds would not be appropriate.***

EXPOSURE MEASURE - DERIVATIVES

The quantitative results suggest that applying the OEM to derivatives tends to result in higher exposure amounts compared to the Mark-to-Market Method. The differences in the exposure amounts, as well as their impact on the total LR exposure, are generally quite small. However, in a few cases the exposure amounts obtained from using OEM are reported as being smaller than those obtained from using the Mark-to-Market Method, which may call for vigilance from supervisory authorities in terms of allowing the use of the OEM at institutions that perform more material derivatives-related activities. In that regard, it is worth noting that the current rules of the CRR allow the application of the OEM for the LR only where an institution applies this method to determine risk-based requirements also.

The results of a preliminary quantitative impact assessment for replacing the Mark-to-Market Method with a modified version of the Standardised Approach for measuring counterparty credit risk (SA-CCR), as envisaged by the BCBS subject to the outcome of its public consultation, suggest that replacing the Mark-to-Market Method with one of the proposed variants of the SA-CCR would, on average, have a small impact on the LR.

Allowing for the exposure-reducing recognition of initial margins for client-cleared derivative transactions under the SA-CCR would result in a small average decrease of the derivatives exposures of the affected institutions. Nevertheless, such a benefit may be significant for the specific clearing business lines within the institutions. According to the industry, the current treatment of client-cleared transactions under the Mark-to-Market Method disincentives the provision of clearing services to clients and these issues could be resolved through a more differentiated approach under the SA-CCR. The EBA will follow closely the outcome of this consultation, as well as consider further enhanced quantitative impact testing, and stands ready to provide, where needed, further technical advice on these developments.

EXPOSURE MEASURE – LOW-RISK OFF-BALANCE-SHEET COMMITMENTS

The EBA performed an analysis of off-balance-sheet positions focused on so-called 'low-risk' commitments which are subject to a credit conversion factor of 10% under the LR. The results suggest that the volatility in the utilisation rates of these commitments is indeed quite low.

IMPACT OF ACCOUNTING DIFFERENCES

Most of the large credit institutions across the EU report the LR on the basis of International Financial Reporting Standards (IFRS). However, national generally accepted accounting principles (n-GAAP) are also applied, mostly at individual level and by smaller credit institutions. A main finding is that the application of n-GAAP does not seem to have a material impact on the calculation of the LR and on its comparability across countries. Also, some of the existing differences between IFRS and n-GAAP affect both the denominator of the LR and its numerator of the LR (Tier 1 capital) and are, therefore, not LR-specific.

Some specific aspects nevertheless deserve to be monitored, in particular, the impact of applying trade date accounting versus settlement date accounting on the comparability of the LR (in line with the BCBS consultation) and the impact of changes to accounting standards (e.g. IFRS 9 for financial instruments or the new IFRS 16 for leases). The EBA will monitor closely the outcome of the BCBS consultation which touches on several accounting aspects.

Recommendation 8: ***The EBA recommends no immediate changes to the calculation rules of the CRR LR with respect to areas mentioned in Article 511(3) of the CRR, which include the application of the OEM, the conversion factors for undrawn credit facilities which may be cancelled unconditionally at any time without notice and the Tier 1 capital measure. Future developments at the level of the BCBS should be monitored carefully in terms of the exposure measure.***

d. Other findings and discussions

MARKET LIQUIDITY

Recent discussions on the introduction of an LR have focused on the topic of market liquidity in order to investigate whether financial markets have become less liquid or more prone to episodes of severe illiquidity. Some believe that post-crisis regulatory reform has affected the supply and demand of liquidity by broker-dealers in a significant way. The LR has come under particular

criticism for constraining broker-dealers' balance sheets particularly with respect to low margin business such as securities financing transactions (SFTs).

The EBA has been considering whether such aspects are wider than just regulatory treatment and relate to market liquidity and financial stability aspects at large. For this reason, the EBA has invited the European Systemic Risk Board (ESRB), which has access to relevant data on these aspects, to provide some input on the aspect of market liquidity.

As evidenced by the preliminary analysis provided by the ESRB to the EBA it is difficult to comment at this time on whether the introduction of the leverage ratio, or a particular calibration of it, is likely to significantly affect the future state of market liquidity. The ESRB preliminary analysis suggests there may be some costs associated with the leverage ratio for broker dealers, but that there are also expected to be benefits – the leverage ratio may help to ensure that banks can sustain the provision of services that are important to market liquidity, particularly taking account of stressed periods. The purpose of the ESRB analysis (as provided in Annex III) is to provide a starting point for future, deeper theoretical and empirical investigation into this question.

PROPORTIONALITY

In the context of proportionality, in order to assess whether a lower frequency of the supervisory reporting requirements of the LR should be considered for smaller institutions in order to reduce operational burden, the EBA has performed a time series analysis which assesses the volatility of the LR exposure measure for institutions of different size buckets. The analysis does not show a clear relationship between the size of a credit institution and the variation of its LR or LR exposures.

At the same time, it may be worth exploring whether the ITS on LR reporting could be adjusted further in terms of frequency and/or granularity. In addition, in terms of operating costs it could be noted that by way of Commission Implementing Regulation (EU) 2016/428 of 23 March 2016, the number of data points in the supervisory reporting for the LR has been reduced to 228, which is 84 fewer than the 312 data points of the previous framework. The possibility of allowing a reduced frequency and/or granularity of reporting will be further explored by the EBA on the basis of the relevant mandates in the context of the future update of the ITS on reporting on the LR. The cost-benefit analysis will explore the operating costs caused by the reporting requirements for smaller credit institutions in particular, depending on the granularity and the frequency of these requirements.

***Recommendation 9:* Following the analysis described, and given the backstop nature of the LR, smaller banks should be subject to the same LR requirement as the rest of the banks.**

TRADE FINANCE

Based on the understanding that the average risk weighting of trade finance products is not especially low, the EBA deems that, at the portfolio level, the LR is not expected to have a

constraining effect on these types of transactions. An exception may be export credit agency (ECA)-backed exposures, which may, in some cases, have a risk weight as low as 0%. Given the lack of data on these exposures, it cannot be excluded that, for some institutions, if they would be specifically constrained or bound by the LR, an incentive may be created not to expand/reduce its exposure to this category.

INTERNATIONAL AND EU DEVELOPMENTS THAT WARRANT FURTHER ATTENTION

As mentioned above, via its CD, the BCBS is consulting on the implementation of the SA-CCR in the LR as well as the treatment of pending settlement transactions. In addition, it should be noted that the CD includes other proposals, such as a revised treatment of provisions which eliminates the difference in treatment between general and specific provisions, as well as the issue of open repos. Hence, related developments at the level of the BCBS, which are to improve consistency of the LR with other regulatory requirements, should be monitored carefully. In this regard the EBA stands ready to provide, where needed, further technical advice on these developments.

With regard to EU accounting frameworks it is important to monitor developments, for example, the impact of IFRS 9 on provisioning levels and hence on CET1/Tier 1 capital, on which the EBA is currently preparing an impact assessment, or for the new IFRS 16 for leases which could increase balance-sheet amounts.

1. General remarks

1.1 Mandate and content of the report

1.1.1 Article 511 of the CRR

Pursuant to Article 511(3) of the CRR, the EBA is mandated to submit to the Commission, by 31 October 2016, a report containing an appropriate review and calibration of the LR.

More precisely, Article 511(3) of the CRR mandates the EBA to report on:

- *(a) whether the leverage ratio framework provided by this Regulation and Articles 87 and 98 of Directive 2013/36/EU is the appropriate tool to suppress the risk of excessive leverage on the part of the institutions in a satisfactory manner and degree;*

- *(b) on identifying business models that reflect the overall risk profiles of the institutions and on introducing differentiated levels of the leverage ratio for those business models;*

- *(c) whether the requirements laid out in Articles 76 and 87 of Directive 2013/36/EU in accordance with Articles 73 and 97 of Directive 2013/36/EU for addressing the risk of excessive leverage are sufficient to ensure sound management of this risk by institutions and, if not, which further enhancements are needed in order to ensure these objectives;*

- *(d) whether – and if so, which – changes to the calculation methodology referred to in Article 429 would be necessary to ensure that the leverage ratio can be used as an appropriate indicator of an institution's risk of excessive leverage;*

- *(e) whether, in the context of the calculation of the total exposure measure of the leverage ratio, the exposure value of contracts listed in Annex II determined by using the Original Exposure Method differs in a material way from the exposure value determined by using the Mark-to-Market Method;*

- *(f) whether using either own funds or Common Equity Tier 1 capital as the capital measure of the leverage ratio could be more appropriate for the intended purpose of tracking the risk of excessive leverage and, if so, what would be the appropriate calibration of the leverage ratio;*

- *(g) whether the conversion factor referred to in point (a) of Article 429(10) for undrawn credit facilities, which may be cancelled unconditionally at any time without notice, is appropriately conservative based on the evidence collected during the observation period;*

- *(h) whether the frequency and format of the disclosure of items referred to in Article 451 are adequate;*

- *(i) what would be the appropriate level for the leverage ratio for each of the business models identified in accordance with point (b);*

- *(j) whether a range for each level of the leverage ratio should be defined;*

- *(k) whether introducing the leverage ratio as a requirement for institutions would necessitate any changes to the leverage ratio framework provided by this Regulation and, if so, which ones;*

- *(l) whether introducing the leverage ratio as a requirement for institutions would effectively constrain the risk of excessive leverage on the part of those institutions, and, if so, whether the level for the leverage ratio should be the same for all institutions or should be determined according to the risk profile and business model as well as the size of institutions and, with regard to this, which additional calibrations or transition period would be required.*

In addition, Article 511(4) of the CRR stipulates that the report shall take account of at least the following:

- *(a) the impact of introducing the leverage ratio, determined in accordance with Article 429, as a requirement that institutions would have to meet on:*

    - *(i) financial markets in general and markets for repurchase transactions, derivatives and covered bonds in particular;*

    - *(ii) the robustness of institutions;*

    - *(iii) business models and balance-sheet structures of institutions; in particular as regards low-risk areas of business, such as promotional credit by public development banks, municipal loans, financing of residential property and other low-risk areas regulated under national law;*

    - *(iv) the migration of exposures to entities which are not subject to prudential supervision;*

    - *(v) financial innovation, in particular the development of instruments with embedded leverage;*

    - *(vi) institutions' risk-taking behaviour;*

    - *(vii) clearing, settlement and custody activities and the operation of a central counterparty;*

    - *(viii) cyclicality of the capital measure and the total exposure measure of the leverage ratio;*

    - *(ix) bank lending, with a particular focus on lending to SMEs, local authorities, regional governments and public sector entities and on trade financing, including lending under official export credit insurance schemes;*

- *(b) the interaction of the leverage ratio with the risk-based own funds requirements and the liquidity requirements as specified in this Regulation;*

- *(c) the impact of accounting differences between accounting standards applicable under Regulation (EC) No 1606/2002, accounting standards applicable under Directive 86/635/EEC*

and other applicable accounting framework and other relevant accounting frameworks on the comparability of the leverage ratio.

1.1.2 Call for advice by the Commission to the EBA

This mandate has been complemented by a call for advice from the Commission in June 2015 requesting, in particular, an analysis of proportionality, as well as the EBA to advance its report on LR as far as possible in order for the Commission to align the timing of possible legislative proposals for the LR and the NSFR. (N.B. by 31 December 2016, the Commission shall submit a report on the impact and effectiveness of the LR to the European Parliament and the Council.)

1.1.3 Content and limitations of the report

This report fulfils the cited mandate and the call for advice from the Commission, although some aspects have been more deeply investigated than others due to constraints on timing to deliver the report.

In particular, the report focuses on the high-level calibration of LR levels which credit institutions should be required to meet and on the impact of imposing these requirements on the banking system. The report also provides an analysis of and content relating to a range of more detailed/technical aspects of the LR calculation rules by business models, the capital measure and the treatment of some off-balance-sheet items and the treatment of derivatives. The EBA has furthermore addressed a range of aspects raised in the Commission's call for advice from June 2015, in particular, aspects of proportionality (in terms of operational burden related to the frequency of reporting requirements and in terms of applying the LR on entities with different sizes).

However, a few aspects related to the LR's calculation rules could not be addressed in a fully conclusive manner. In particular, further analysis may be needed of some definitional aspects regarding the exposure measures as part of an ongoing consultation by BCBS (this is the case, for example, with respect to the treatment of derivatives including margins, the treatment of pending settlements of regular way purchases or sales of financial assets, etc.).

While the EBA could not investigate these aspects for the specific purpose of this report, it stands ready to conduct further work where necessary in cooperation with the Commission services in the context of a legislative proposal for the LR and in the wider context of international discussions.

1.2 Data source and sample

1.2.1 Main data source

This report aims to assess the impact of introducing a LR requirement so as to advise the Commission on its calibration. The definition of the LR under the global standards adopted by the BCBS, which has been implemented in the EU via the Commission Delegated Regulation (EU) 2015/62 of 10 October 2014 amending Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to the leverage ratio (LR Delegated Act or LR DA), has been considered the starting point for the analysis of the impact of its introduction in the EU and for the subsequent assessment of the potential need for a recalibration.

Consequently, the data used for the production of this report are mainly based on the QIS templates defined and used by the BCBS[9] to monitor, on a half-yearly basis, the LR position of the globally active institutions. The EBA did not use the standard common reporting (CoRep)[10] which does not yet account for the changes made in the calculation of the Basel LR in January 2014.[11]

An EU-specific template is also used to collect data on the evolution of the income and some balance-sheet items between December 2004 and December 2014. These data are especially needed to assess EU institutions' exposures to REL.

1.2.2 Sample

To ensure sufficient representativeness, diversity and coverage of the EU banking sector, the EBA has extended this voluntary data collection on LR to non-BCBS EU countries and to non-globally active institutions. As a whole, 246 institutions from 20 EU countries submitted LR data as of June 2015. Efforts have also been made to collect data on specialised business models (e.g. promotional banks, mortgage banks), the analyses of which are specifically mandated by the CRR (Table 1).

[9] https://www.bis.org/bcbs/qis/.

[10] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.083.01.0001.01.ENG&toc=OJ:L:2016:083:TOC.

[11] The longer time for the implementation of the definitional change in the EU regular (CoRep) reporting framework must be seen against the backdrop of the following: first amendments to the CRR had to be made by way of the Commission Delegated Regulation (EU) 2015/62 (published in January 2015), after which the EBA had to prepare, consult on and submit the amendments to the ITS on LR reporting to the Commission (submission date of 15 June 2015), after which the Commission adopted the new standard (31 March 2016), which, considering a 6-month implementation timeline for institutions, means that 30 September 2016 will be the first reporting reference date in accordance with the new definition.

Table 1: Number of institutions in each business-model category

Business model name[12]	Number of institutions
Cross-border universal banks	34
Local universal banks	71
Consumer credit banks (including automotive banks)	8
Building societies	7
Locally active savings and loan associations/cooperative banks (including mortgage banks)	68
Private banks	3
Custody banks	5
Merchant banks	3
Leasing and factoring banks	4
Public development banks	12
Mortgage banks including pass-through financing mortgage banks	12
Other specialised banks	19
Total	246

Source: EBA QIS

Table 2 provides a detailed description of the sample used for the analyses of the various sections of the report. It is to be noted that for the various sections it has not been possible to apply exactly the same sample, as the analysis methods underpinning the different sections require slightly different data items or different reference periods. For example, in sections 2.3 and 3, which are data intensive but which focus only on the June 2015 data point, the number of institutions is quite high (246 institutions). On the contrary, section 8, which covers a 10-year-long period, only includes 114 institutions.

[12] Refer to section 3.2.3 for further description of the business.

Table 2: Description of the sample and data source used in the different sections of the report

Sections	Data source	Time range for the analysis	Number of banks	Sample coverage (share in total banking assets)	Explanation of the sample size
Section 2.3: LR framework under CRR/CRD IV	EBA QIS	June 2015	242	–	The same sample as in the benchmarking analyses for the determination of REL is used (see below), except a few exclusions due to potential issues in the reporting of own funds.
Section 2.4: Reporting requirement	EBA QIS	December 2012–December 2014	107	–	Include only those institutions which consistently participated in the LR QIS data collection between December 2012 and December 2014.
Section 3: REL	EBA QIS	June 2015	246	75%	Include all those institutions which submitted LR data as of June 2015 and completed fully the EU-specific template on LR.
Section 4: Impact on the architecture and interaction of prudential requirements	EBA QIS	June 2015	116	–	Include all institutions which submitted both LR and LCR data as of June 2015.
			158	–	Include all institutions which submitted both LR and NSFR data as of June 2015.
			172	–	Include all institutions which submitted both LR and Tier 1 capital ratio data as of June 2015.
Section 5: Impact on the provision of financing by credit institutions	EBA QIS	June 2015	149	67%	Includes all institutions which submitted LR data, Tier capital ratio and LCR as of June 2015.
Section 7: Impact on risk-taking and the robustness of institutions	SNL Financial Bloomberg ECB	December 2005–December 2014	285	–	Includes all possible EU institutions which submitted the relevant data for the period December 2005–December 2014.

Section 8: Impact on the cyclicality of capital requirements	Bankscope EBA QIS OECD ECB data warehouse	December 2000–December 2014	114	–	Include only those institutions which consistently reported the data on the variables needed for the analysis between December 2000 and December 2014. Sampling was performed in order to have at least 80% of total banking assets for each country considered.

1.2.3 Coverage

Table 3 and Table 4 show the coverage of the sample that is used for the benchmarking (section 3) and the simulation analyses (section 5).

The global coverage in both analyses is quite high. The sum of total assets of the 246 institutions included in the sample used for benchmarking analysis is EUR 32 878 billion and of the 149 institutions included in the simulations is EUR 26 323 billion. Comparing these with the total assets of the financial system in the EU (which amounts to EUR 40.881 billion) gives coverage of 75% and 63%, respectively.[13]

However, it should be noted that the coverage in each individual country varies across the sample (i.e. from 4% to 110%/111%), and that the numbers may be over- and under-estimated to various extents due to methodological bias.[14]

Table 3: Sample used in the benchmarking analysis (Section 3) June 2015

	Number of participating institutions	Total assets (billion EUR)		
	EBA QIS	EBA QIS	Total monetary and financial sector	Coverage
Austria	6	614	870	71%
Belgium	12	570	1 116	51%
Czech Republic	14	150	204	73%

[13] Total assets as reporting in ECB Statistics, Aggregated balance sheet of MFIs (https://www.ecb.europa.eu/stats/money/aggregates/bsheets/html/outstanding_amounts_2015-06.en.html and http://sdw.ecb.europa.eu/reports.do?node=1000003159).

[14] The sum of total financial assets in each country reported in the ECB statistics includes assets of resident branches of institutions that are headquartered abroad, but excludes assets of resident institutions' foreign branches. This means that the sum of total assets in each country is not fully comparable to the total assets of institutions reported in the QIS data, as the same method does not apply in the QIS data. The QIS data report consolidated total assets of a group (i.e. including foreign branches). This means that the sum of total assets of large banking groups that have a lot of branches in other countries might exceed the estimated total assets of a country's financial system (as the group data include all foreign branch operations), while the sum total financial assets in the country attributes those operations to where the branch is active. Conversely, if a country's financial system hosts a lot of foreign branches, while domestic institutions in our sample are relatively small, the coverage will appear lower on a country level, as the denominator includes branch operations of foreign institutions.

Germany	83	5 184	7 799	66%
Denmark	13	945	1 049	90%
Spain	11	3 215	2 901	111%
France	14	6 751	8 184	82%
United Kingdom	11	7 588	9 739	78%
Greece	4	342	386	88%
Ireland	13	411	1 058	39%
Italy	26	2 512	3 984	63%
Luxembourg	3	35	997	4%
Latvia	2	9	31	28%
Malta	4	19	50	39%
Netherlands	12	2 278	2 524	90%
Norway	3	462	533	87%
Poland	5	93	397	23%
Portugal	5	240	463	52%
Sweden	4	1 446	1 316	110%
Slovakia	1	13	66	20%
Total	**246**	**32 878**	**43 668**	**75%**

Source: ECB, EBA calculation

Table 4: Sample used in the simulation analysis (chapter 4.4)

	Number of participating institutions	Total assets (billion EUR)		
	LR QIS	LR QIS	Total monetary and financial sector	Coverage
Austria	2	150	870	17%
Belgium	4	455	1 116	41%
Germany	74	4 956	7 799	64%
Spain	5	2 429	2 901	84%
France	8	6 654	8 184	81%
United Kingdom	7	5 019	9 739	52%
Greece	1	111	386	29%
Hungary	2	37	113	33%
Ireland	3	41	1 058	4%
Italy	16	2 312	3 984	58%
Luxembourg	1	43	997	4%
Netherlands	12	2 336	2 524	93%
Poland	5	94	397	24%
Portugal	5	240	463	52%
Sweden	4	1 446	1 316	110%
Total	**149**	**26 323**	**41 847**	**63%**

Source: ECB, EBA calculation

2. The LR requirement: definitional issues and state of implementation

2.1 Summary section

MAIN OBJECTIVES OF THE SECTION

- This section covers a range of aspects with regard to the existing LR framework. In particular, the section:
  - presents the underlying objectives and rationale for the introduction of an LR as a new requirement in the regulatory framework
  - gives an overview of current CRR definition of the LR and potential changes to this definition that are being consulted upon by the BCBS
  - assesses the adequacy of the treatment of derivatives and -low risk' off-balance-sheet positions as well as Tier 1 as the capital measure of the LR
  - investigates the materiality of divergences stemming from the application of different accounting frameworks with regard to the comparability of the LR
  - assesses the adequacy of existing supervisory reporting requirements for the LR with a particular focus on proportionality
  - provides a short summary of measures and approaches taken with regard to REL under the supervisory review and evaluation process (SREP) as envisaged by the CRD IV
  - reviews different national applications of the LR inside and outside the EU and provides a summary of the guidance by the ESRB on the macroprudential use of the LR.

METHODOLOGY

- A review of literature is used to identify the motivations and the expected benefits stemming from the introduction of the LR requirement.
- Sensitivity analyses are performed based on QIS data to quantify the impact of changes to the LR definition with regard to the capital measure and the treatment of derivatives.
- Descriptive time series analyses are performed based on QIS data to assess the volatility of utilisation rates for 'low risk' off-balance-sheet commitments and the volatility of the LR and its denominator across different size buckets of credit institutions.

- The reviews regarding accounting-related aspects and measures under the SREP are based on a stocktake of practices in the different EU jurisdictions.

KEY FINDINGS

MOTIVATION FOR INTRODUCING AN LR REQUIREMENT

- The BCBS introduced the LR as a simple, transparent, non-risk-based measure to supplement existing risk-based capital adequacy requirements. In particular, the LR, as a new regulatory measure, was primarily intended to limit the build-up of excessive leverage in the banking sector to avoiding destabilising deleveraging processes and to reinforce the risk-based capital requirements by a simple, non-risk-based 'backstop' measure. The CRR implementation broadly mirrored these objectives, stating in recital 91 that 'risk-based own funds requirements are essential to ensure sufficient own funds to cover unexpected losses. However, the crisis has shown that those requirements alone are not sufficient to prevent institutions from taking on excessive and unsustainable leverage risk'.

- The LR therefore complements other prudential requirements, notably risk-based capital ratios, the liquidity coverage ratio (LCR) and the NSFR by adding a simple and transparent measure which provides an indication of how intensively the banking business is developed. Specifically, the LR requirement is meant to ensure that a minimum capitalisation is preserved at all times and is independent of time-varying risk estimates, thus preventing an unsustainable/excessive build-up of leverage which may trigger unintended corrective measures, including the distressed selling of assets, in crisis situations.

- However, the role of the LR as a supplementary 'backstop' measure implies that calibration has to be effected in a manner that ensures other prudential requirements, in particular those of the risk-based capital ratios, remain relevant and prudent capitalisation is reinforced.

LR DEFINITION UNDER THE CRR AND PROPOSED CHANGES BY THE BCBS

- The calculation of the LR is defined in Article 429 of the CRR. This article was amended by a Delegated Act[15] of the Commission to incorporate a set of revisions published by the BCBS in January 2014. As a consequence, the EU definition of LR largely mirrors the current status of the Basel text with some additional technical specificities due to wider scope of application of EU regulations and the corresponding need to reflect as appropriate some EU specificities (i.e. while the Basel standards are designed for large, internationally active institutions, the EU framework applies to all credit institutions at both consolidated and individual level, as well as to certain types of investment firms).

- A set of changes to the LR definition proposed by the BCBS are being consulted upon and are intended to address a number of issues which have emerged during the first years of applying the LR as new prudential measure. These ongoing developments should be carefully monitored in the context of EU implementation.

CAPITAL MEASURE

- Article 511(3)(f) of the CRR requires an analysis of whether using either total own funds or CET1 capital as the capital measure, instead of Tier 1 capital, would be more appropriate and, if so, what the proper calibration of the LR would be.

[15] Commission Delegation Regulation (EU) 2015/62.

- The analysis finds that the use of (going-concern) Tier 1 capital as a capital measure is generally consistent with the LR's forward-looking objectives, such as limiting the build-up of excessive leverage levels, and this has been corroborated by the agreement of the BCBS's oversight body, the GHOS.

- The quantitative impact of changes to the LR capital measure, as contemplated by the BCBS proposal for the GSIIs surcharge, such as a move to CET1 capital only or the capping of the recognition of AT1 instruments, appears to be relatively moderate at present. However, the quantified impact should be interpreted carefully, as it may underestimate additional challenges that could be caused in particular for those entities which still need to take adjustment actions for ensuring compliance with a future Pillar 1 LR requirement.

- In conclusion, there does not seem to be, at present, a strong rationale to depart from the BCBS current Tier 1 definition of capital. The final outcome of the BCBS consultation with regard to a potential capping of AT1 instruments will have to be monitored, given that, at this stage, this concerns the potential surcharge for GSIIs only, and there should be caution not to unduly complicate the overall regulatory framework.

TREATMENT OF OFF-BALANCE-SHEET EXPOSURES

- Article 511(3)(g) of the CRR requires the EBA to assess whether the 10% conversion factor applied to low-risk off-balance-sheet commitments is appropriate. The analysis performed in the report investigates the actual behaviour (i.e. volatility) of these lines in recent years.

- The results suggest that the volatility in the utilisation rates of these commitments is quite low (i.e. the fluctuation in the utilisation rate from one quarter to another of more than 10% was violated in only a relatively small number of cases during the observation period), suggesting that the 10% conversion factor applied to the low-risk off-balance-sheet commitments would be appropriate.

TREATMENT OF DERIVATIVES

- Article 511(3)(e) of the CRR requires the EBA to assess to what extent the LR exposure value determined by the OEM may differ from the LR exposure value determined by the Mark-to-Market Method.

- The quantitative results suggest that applying the OEM to derivatives tends to result in general in higher exposure amounts compared to the Mark-to-Market Method. However, the differences in the exposure amounts, as well as their impact on the total LR exposure, are generally quite small. It should be noted that, in a few cases, the exposure amounts obtained by using the OEM are smaller than those obtained by using the Mark-to-Market Method. This may call for vigilance by supervisory entities in terms of allowing the use of the OEM for institutions that perform more material derivatives-related activities.

- Preliminary results suggest that replacing the Mark-to-Market Method with one of the BCBS proposed variants of the SA-CCR would, on average, have a small impact on the LR (the average LR increases from 4.38% to 4.40% for the 56 institutions analysed). This is due to an offsetting effect between the replacement cost component (which tends to be higher under the SA-CCR than under the Mark-to-Market Method) and the potential future exposure component (which tends to be lower under the SA-CCR than under the Mark-to-Market Method).

IMPACT OF ACCOUNTING DIFFERENCES

- Article 511(4)(c) of the CRR requires the EBA to assess the impact of accounting differences on the comparability of the LR.

- The investigations conducted indicate that the application of n-GAAP does not seem to have a material impact on the calculation of the LR and on its comparability across countries.

- Among the accounting-related issues identified, two stand out as potentially most relevant. First, the recognition of pending settlement transactions, which for those institutions that apply trade date accounting would lead to an increased LR exposure between trade date and settlement date. Second, the potential future effects of a new provisioning regime under IFRS 9 which might lead to an increase in the level general provisions once implemented and to a potential decrease of the CET1 capital. This last aspect will be further investigated by the EBA via its ongoing impact assessment which has a wider scope than the LR only.

REPORTING REQUIREMENTS AND CONSIDERATIONS OF PROPORTIONALITY

- In its call for advice,[16] the Commission refers to the need to assess 'the possibility of introducing simplified reporting requirements (in terms of frequency or amount of data to be reported) for LR and NSFR based on criteria such as type of business model, risk profile, size etc.'.

- To address this, the analysis performed in this section looks at the changes in the LR and the LR exposures and tries to determine whether small banks tend to display higher or lower volatility compared to other banks. A lower volatility of the LR might argue for a relaxing of the LR reporting frequency for small banks.

- The analysis does not show a clear relationship between the size of a credit institution and the variation of its LR as well as its LR exposures. More specifically, on average, aggregating all the quarter-to-quarter deviations for the four size buckets from December 2012 to December 2014, small credit institutions display a slightly higher quarterly volatility in their LR exposures.

SUPERVISORY REVIEW OF REL WITHIN THE SREP AND NATIONAL APPLICATIONS OF THE LR

- Recital 18 of the CRR, as well as the measures of the CRD IV in relation to REL, provide Member States and supervisors with scope for discretion in their application of the LR to credit institutions. This has resulted in a range of practices across Member States which include binding ('Pillar 1') requirements, the expression of non-binding supervisory expectations towards credit institutions with regard to certain LR target levels and the consideration of the LR as one of a number of quantitative indicators in the course of the supervisory review and evaluation process. While the use of each of these measures appears to be reasoned and justified, considering the objectives of promoting coherence in the regulation of credit institutions through the EU in general, and the function of the LR to supplement risk-based own funds requirements with a simple backstop measure that ensures the maintenance of a minimum level of capital in particular, the introduction of harmonised minimum ('Pillar 1') requirements is deemed beneficial in terms of the consistency and effectiveness of the measure.

2.2 Motivations for introducing an LR requirement

2.2.1 Objectives and economic fundaments

Article 4(1)(93) of the CRR defines 'leverage' as 'the relative size of an institution's assets, off-balance-sheet obligations and contingent obligations to pay or to deliver or to provide collateral, including obligations from received funding, made commitments, derivatives or repurchase agreements, but excluding obligations which can only be enforced during the liquidation of an institution, compared to that institution's own funds.'

Financial institutions typically maintain capital structures with leverage levels that are significantly higher than those of other operating institutions. Although puzzling at first glance, a great deal of the academic literature argues that relatively high leverage helps financial institutions to create wealth for the wider economy.[17] Financial institutions' liabilities usually comprise large numbers of claims that are considered liquid from claimholders' perspectives – bank deposits are the most common example. In this way financial institutions provide liquidity to claimholders, which enables them to execute consumption and investment plans at any time. Also, financial institutions' assets, although typically risky by nature, are usually managed in a way that allows for risk reduction by exploiting portfolio diversification effects and hedging operations. As a result, financial institutions' risk of default is much lower than the default risks of individual assets which, in turn, increases institutions' abilities to meet obligations towards claimholders.

At the same time, high leverage of financial institutions may cause the financial fragility of individual institutions and of the financial system as well. In this regard, the relevant literature finds that there is a 'critical' level of leverage beyond which banks become more and more prone to (macroeconomic) shocks.[18] Leverage beyond the 'critical' level may then be interpreted as excessive from the perspective of regulators and will need to be addressed by adequate regulatory measures.

In the years preceding the financial crisis of 2007-2009, some financial institutions' leverage reached levels that may be considered excessive in the sense explained above, causing a high level of financial fragility among individual financial institutions as well as in the financial system as a whole. A large number of empirical analyses find that financial institutions around the world increased leverage to excessive levels in the early 2000s. Off-balance-sheet assets made up a big proportion of items used in this regard. Moreover, financial institutions' leverage showed a procyclical pattern, namely a significant increase in leverage in financial booms and strong deleveraging in periods of financial downturn.[19]

The crucial aspect that made regulators and supervisors of financial institutions think about implementing a LR restriction in addition to the traditional risk-based capital adequacy requirements, however, was not just the build-up of excessive pre-crisis leverage and tremendous deleveraging during the crisis. Rather, it was the observation that financial institutions that were severely affected showed strong risk-based capital ratios before the crisis. Thus, the overarching aim of the LR regulation

[17] See, for example, DeAngelo and Stulz (2015); Bruno et al. (2013); Diamond and Dybvig (1983).

[18] See Bruno et al. (2013).

[19] See, for example, Haldane (2015); Kalemi-Ozcan et al. (2011); Altunbas et al. (2015); Beltratti and Stulz (2012); Blundell-Wignal and Roulet (2012).

is to limit the build-up of leverage to the degree that financial institutions do not end up with excessive leverage while maintaining comfortable risk-based capital measures.[20] A regulatory LR requirement, in this context, provides a valuable measure to complement risk-based capital requirements by constituting a floor to a financial institution's default risk. As the crisis showed, risk-based capital requirements may be subject to shortcomings which limit their reliability in certain circumstances. Procyclical behaviour which results in risk assessments that are too optimistic and the build-up of leverage in financial booms may be an example. A regulatory LR requirement may then be valuable in providing a 'backstop' against these shortcomings. That is, the LR regulation limits financial institutions in building up leverage and defines a minimum amount of capital that any financial institution needs to maintain regardless of the riskiness of a financial institution's assets.

The regulatory LR, against this background, was introduced as a simple, transparent, non-risk-based measure to supplement existing risk-based capital adequacy requirements. The LR as a new regulatory measure was primarily intended to limit the build-up of leverage in the banking sector, avoiding destabilising deleveraging processes, and to reinforce the risk-based capital requirements by means of a simple, non-risk-based 'backstop' measure.[21] Consequently, risk-based capital requirements are still considered the primary instrument of banking regulation, but the LR is intended to provide an additional safeguard. In addition, the LR complements the LCR and the NSFR which represent further main measures within the post-crisis regulatory framework. It should be noted that the LR does not account for banks' non-capital funding structure and asset liquidity. These aspects are rather addressed by the NSFR and the LCR, respectively. Hence, the LR focuses on aspects which are not covered by other instruments of the post-crisis regulatory framework.

The key objectives and key features of the LR are, on the one hand, clearly driven by lessons learned from the financial crisis. On the other hand, there is a large body of academic literature that supports the lessons learned as well as regulators' conclusions regarding the design of the LR.

In general, there is ample evidence in the academic literature that a non-risk-based LR helps to reduce the financial fragility of individual financial institutions and the broader financial system as well. Jarrow (2013) shows that value at risk (VAR)-based methods and the LR basically control for the same risks. The LR, however, may be preferential due to simplicity. Moreover, Mayes and Stremmel (2014) find that the LR performs better in predicting the distress of financial institutions, in particular in cases in which any such distress is quite complex or opaque.

Nevertheless, the literature offers good reasons for implementing the LR as a 'backstop' measure to supplement risk-based regulations instead of a primary regulatory requirement.[22] By conception, a non-risk-based LR regulation may incentivise financial institutions with low-risk business to diversify asset portfolios into high-risk business.[23] This may not only increase the default risk of individual financial institutions but, from a financial system perspective, this kind of risk shifting also makes asset

[20] See, for example, recitals 90 and 91 of the CRR; paragraph 1 of the Basel III leverage ratio framework. Haldane (2015) argues that had the leverage ratio requirement been in place before the onset of the financial crisis there would have been fewer failures during the crisis.

[21] See recitals 92 and 93 of the CRR; paragraph 2 of the Basel III leverage ratio framework.

[22] See, for example, Andritzky et al. (2009).

[23] See, for example, Kiema and Jokivoulle (2013).

portfolios of all financial institutions more alike, which may increase systemic risk. Moreover, Mariathasan and Merrouche (2012) find that, whilst in principle, risk weights are informative about bank stability, they may also be subject to arbitrage, especially if they are not carefully supervised (including back-tests among other things), since financial institutions aim to look more stable under stress. As a result, a LR may be better at predicting financial stability in times of financial stress. Furthermore, there are limits to the accuracy and reliability of modelling financial risks which can affect both banks' internal models and regulatory models in the form of so-called 'Standardised Approaches'. Hence, the LR and risk-based capital requirements appear to function complementarily, with the LR defining a kind of minimum capital to asset requirement and the risk-based capital ratio limiting assets' riskiness.

Simplicity also results in transparency as a beneficial by-product because simple regulatory measures are more easily comparable across financial institutions and asset classes.[24] This kind of transparency is, in particular, valuable from the perspective of financial institutions' stakeholders. For instance, Dermine (2015) shows that depositors, when faced with imperfect information about the value of financial institutions' assets, may start disorderly bank runs. A relatively simple and transparent regulatory LR requirement may then create a floor on the equity-to-assets ratio and limit the risk of those bank runs. In addition, transparency may be also understood to create incentives for financial institutions to truthfully report on their financial status. Blum (2008) argues that supervisors with limited ability to identify or sanction financial institutions dishonestly reporting on their actual risk level benefit from a non-risk-based LR. A LR, in this context, may help to reduce financial institutions' potential capital savings from an understatement of actual risk which, in turn, reduces incentives for dishonest reporting and enhances transparency.

In addition, the LR may be considered an effective countercyclical metric that actually helps to avoid deleveraging processes in times of stress, which may destabilise the broader financial system.[25] The seminal papers of Adrian and Shin (2008, 2010 and 2013) show that financial institutions' leverage behaves cyclically. They argue that when faced with a risk-based capital adequacy regulation, financial institutions aim at holding constant the risk-based capital measure over the financial cycle. This behaviour, however, imposes cyclical fluctuations on financial institutions' leverage because risk weights tend to be low during a boom and increase in a downturn situation.[26] As a consequence, financial institutions will expand on- and off-balance-sheet assets, i.e. increase leverage during booms but deleverage in a financial downturn. A regulatory LR requirement mitigates these kinds of cyclical fluctuations. Recent analyses show that the LR behaves significantly more countercyclically than risk-based capital requirements. That is, the LR is a tighter constraint to financial institutions' leverage in booms and a looser constraint in recessions.[27] As a result, the build-up of leverage in a boom will slow down, and the pressure to deleverage in a recession will decrease. Moreover, this line of argument shows that the LR does also unfold macroeconomic effects. Because the LR is effective in reducing

[24] See Jarrow (2013).

[25] See, for example, Aymanns and Farmer (2014); Andritzky et al. (2009).

[26] The arguments of Adrian and Shin (2008, 2010, 2013) are particularly relevant for financial institutions that apply internal risk models to measure risk-based capital requirements.

[27] See, for example, Brei and Gambacorta (2014); Mimir (2010); Crawford et al. (2008). See also section 7 of this report.

pressure on financial institutions to deleverage in recessions, the risk of contagion of shocks in the financial system decreases.[28]

2.2.2 General principles of the calibration

From a supervisory perspective it remains important to have the risk-based ratio as a main driver and the LR as a 'backstop'. For this reason, the LR needs to be calibrated relative to the risk-based measures to ensure the complementarity of both approaches.

The relevant literature provides findings that support this view. As mentioned earlier, Bruno et al. (2013) and DeAngelo and Stulz (2015) show that financial institutions need to maintain some degree of leverage in order to create value for the broader economy. Setting the LR requirement too high may then reduce the economic value of financial intermediation, the direct contribution of which is very high in the EU, with 85% of the assets being bank financed. Moreover, the higher the LR requirement, the stronger the risk-shifting incentives of financial institutions will be, which may have a negative impact on the risk-level of individual financial institutions and the financial system as a whole.[29] Furthermore, high LR requirements may run contrary to their role as a 'backstop' to risk-based capital requirements. The higher the requirement, the greater the number of institutions that will be primarily constrained by the LR in a bank-financed economy it remains important that assets and risk selection is guided by a risk-based metrics available to banks. Hence, the LR needs to be calibrated carefully and in relation to risk-based capital requirements.

In this context, a differentiation of LR requirements according to financial institutions' business models may be valuable. The relevant literature tends to acknowledge the general concept[30] but does not provide unambiguous evidence that business-model-specific LRs would be useful. For instance, Altunbas et al. (2011) find that – based on pre-crisis data – levels of financial institution distress significantly depend on credit expansion, dependence on customer deposits, amount and quality of capital, volume of market funding, and lack of diversification of income sources. As a result, business-model features of financial institutions appear to determine the realised risk of financial institutions and levels of distress in a crisis. Ayadi et al. (2011, 2012) generally confirm the conclusions of Altunbas et al. (2011). However, they also observe that the performance and attributes of financial institutions' business models significantly vary over time. Hence, a business-model-specific LR that is effective at some point in time may turn out to be ineffective in the future. In sum, the literature indicates that business-model features should be considered carefully when calibrating the LR but not differentiating its definition.

From a supervisor's perspective, differentiating LR requirements by financial institutions' business models may be reasonable in two situations: for financial institutions with low-risk, high-volume business,[31] the LR may turn out to be the primary binding requirement creating incentives to risk

[28] For instance, market liquidity spirals as per the definition of Brunnermeier and Pedersen (2009) become less likely when the general pressure on financial institutions to deleverage in a recession is mitigated by the leverage ratio.

[29] See Kiema and Jokivoulle (2014).

[30] See, for example, Mergaerts and Vander Vennet (2015); Blundell-Wignal and Roulet (2014).

[31] This is typically measured by the RWA density ratio, which is the ratio of total RWA over total leverage ratio exposure. Data on the RWA density ratios of different types of credit institutions are provided in section 3 of this report.

shifting.[32] For large, complex and systemically relevant institutions, in contrast, the uniform LR requirement may turn out to be too low to function as an effective 'backstop'. Therefore, an in-depth analysis of financial institutions' business models with respect to potential reasons that may justify differentiated LR requirements appears appropriate.

[32] See recital 95 of the CRR.

2.3 The LR framework under CRR/CRD IV

2.3.1 LR definition under CRR and Basel III developments

a. Background

In 2013, following the conceptual design of the LR by the BCBS, an LR has been incorporated into the EU legislative framework via the CRR/CRD IV.

As a new supervisory measure, it was considered more appropriate to introduce the LR at first as an additional mechanism that could be applied to institutions at the discretion of the supervisory authorities. The EU regulation also included specific reporting and disclosure obligations for institutions related to the LR,[33] pending a potential migration to a binding (Pillar 1) measure in 2018.

Following this rationale, Article 4(1)(94) of the CRR introduced the concept of 'risk of excessive leverage' to allow supervisors to take measures to correct the undesired leverage. The LR is one of the indicators of this risk of excessive leverage (REL).

In order to allow regulators to monitor leverage and analyse the appropriateness of an institution's leverage position, in line with the Basel III framework, a specific definition of leverage is included in Articles 4(1)(94) and 429 of the CRR, as the total on- and off-balance-sheet items compared to the institution's own funds. Tier 1 is the capital to be used for the purpose of this calculation. This is expressed as the following percentage:

$$Leverage\ ratio = \frac{Capital\ measure}{Exposure\ measure}$$

The measurement of LR exposures generally follows the accounting standards without the recognition of any credit risk mitigation techniques as collaterals. This is consistent with the LR definition as a non-risk-sensitive measure and with its role as a backstop to the risk-based requirements. Exposures are included net of specific provisions and credit adjustment values. For derivatives, prudential netting rules stemming from BCBS standards are applied, and for SFTs[34] a specific set of netting rules apply and add-ons for counterparty credit risk are required to be included in the exposure measure.

b. BCBS LR January 2014

The Basel III monitoring (Basel QIS) started in 2012 and the supervisory reporting started in the EU in 2014. These data collections have been essential to identify differences in the LR calculation due to differences in the accounting rules among jurisdictions and due to diverging interpretations by institutions for the netting of SFTs and other shortcomings. As a consequence, a revision of the 2010 LR framework was published in January 2014 by the BCBS. The main changes, which were highlighted in

[33] The EU reporting period started in 2014 and the disclosure in 2015.

[34] SFTs include repurchase transactions, securities or commodities lending or borrowing transactions, long settlement transactions and margin lending transactions.

the EBA report of March 2014,[35] were incorporated into the EU regulation through the LR DA that modified Article 429 of the CRR.

A main area of change introduced by the January 2014 BCBS publication rules changes was that of derivatives, for which the Cash Variation Margin (CVA) associated with derivative exposures is allowed to reduce the LR exposures. The argument is that the exchange of daily CVA can be seen as a form of pre-settlement payment that reduces the derivative exposure and should not be seen as collateral. Written credit derivatives are now given equal treatment to guarantees by using the gross notional amount instead of a fair value, but some conditional offsetting between credit protection provided and received through credit derivatives is allowed. Finally, the impact on the central clearing of derivatives is reduced by allowing the exclusion of trade legs with the CCP where the clearing member bank is not guaranteeing the CCPs performance to the client.

Another area of change introduced was that of SFTs, which were included through a measure of related cash payables and cash receivables which can be netted under certain conditions, an add-on for counterparty credit risk and a specific treatment for SFT agent transactions.

For off-balance-sheet items, it was decided to align the CCFs with those in the Standardised Approach for credit risk subject to a floor of 10% CCF.

c. EU implementation

Following the amendments of the DA, the EU LR largely mirrors the Basel text, which changes the frequency of the calculation (end of quarter instead of monthly averages) and the scope of application (prudential instead of accounting), which reduces the operational burden for institutions and aligns the LR with the risk-based reporting. The largest changes in the DA are those to align the treatment of derivatives, SFTs and off-balance-sheet items with the Basel text, as mentioned above.

However, there are some specific differences compared to the Basel text, which are motivated on the basis of EU specificities, in particular taking into account that the EU regulation applies to all kinds of institutions, including very small entities.

Two technical specificities of the EU implementation of the LR, which give institutions and supervisors some flexibility, are the possibility of using the OEM[36] for the calculation of exposures values in derivatives contracts and the application of the Financial Collateral Simple Method to determine the counterparty credit risk add-on for SFTs. Furthermore, the EU implementation allows institutions to exempt certain deposits for funding public investment from the exposure measure as well as certain intragroup exposures at individual level subject to supervisory approval.

Regarding SFTs, a technical specificity of the EU implementation for SFTs is that recital 7 of the DA, which amended the CRR calculations rules of the LR, states that 'repurchase transactions that can be terminated at any date subject to an agreed recall notice period should be considered equivalent to

[35] https://www.eba.europa.eu/documents/10180/534414/EBA+-+Leverage+ratio+analytical+report.pdf.

[36] Basel III applies the Mark-to Market Method (CEM in the Basel framework) to all derivatives for the purpose of LR. The CRR, however, give banks the choice of applying the OEM for calculating derivative exposures when they also use this method to calculate their risk-based own funds requirements. The appropriateness of OEM will be part of the LR framework revision by the Commission by December 2016.

having an explicit maturity equal to the recall notice period and the 'same explicit final settlement date' should be deemed to be met so that such transactions are eligible for the netting of cash receivables and payables of repurchase transactions and reverse repurchase transactions with the same counterparty.' This deviates from the general requirement to have the same explicit settlement for the netting of SFT receivables and payables. The BCBS had clarified via its FAQ process that these types of transactions, also referred to as 'open repos', would not be eligible for netting for the Basel III LR.

Due to concerns about the undesired effects of the LR on the real economy, the EU legislators have, from the outset, included in the design of the LR the same beneficial treatment for trade finance-related off-balance-sheet items as available in the CRR for the Standardised Approach for credit risk (by way of a lower CCF).[37] This specific treatment of trade finance-related off-balance-sheet items is not explicitly present in the BCBS text on the Standardised Approach on credit risk and therefore represents a longer existing EU specificity.

d. Further developments internationally

Since the publication of the revised Basel III LR framework in January 2014, the BCBS continued its 'parallel run period' (i.e. time prior to the migration of the LR to Pillar 1) by collecting data on the LR definition and on alternative proposals to certain items that continued to cause issues. The BCBS published a CD[38] on 6 April 2016 with proposals for modifying the LR framework by introducing related changes. These include a new version of the SA-CCR to replace the current exposure method (CEM) as already determined by the BCBS for the risk-based capital framework.

A high-level overview of the proposed revisions to the Basel III LR framework and how these compare to the current EU implementation is provided in Table 5. Overall, it is not expected that the proposed revisions would materially affect the calibration of the LR levels, in light of the press release of 11 January 2016 following the agreement reached by the BCBS's oversight body, the GHOS, according to which the minimum level of the LR should be 3% and based on Tier 1 capital. In that regard, it is worth noting also that some of the proposed revisions can be expected to result in increases in the LR, while others will result in decreases in the LR. While the overall impact across institutions is expected to be moderate, the proposed revisions may lead to a more consistent and accurate measurement of leverage. Hence, related developments at the level of the BCBS should be monitored carefully. In particular, the rationale behind the abovementioned changes is to improve the definitions (calculation) that have proven to be inconsistent with other regulatory requirements. Also, there are some proposals that aim to address some of the market participants' concerns.

The changes also include a revised treatment of provisions. In this regard, the proposal aims at correcting the unequal treatment of provisions given that the 2014 LR framework permitted the deduction of specific provisions from the exposure values, whereas general provisions are not referred to and therefore shall not be deducted from the exposure. This difference between general and specific provisions appears unwarranted where both have reduced Tier 1 capital via the profit and loss account. Against this background, the CD proposes allowing general provisions to reduce the LR exposure measure.

[37] Second sentence of Article 111(1) of the CRR and Annex I of the CRR.

[38] http://www.bis.org/bcbs/publ/d365.pdf.

Another issue touched upon in the CD is that of the prohibition of netting of SFT receivables and payables in the case of open repos, which, as indicated above, has been determined by the Basel FAQ process. The issue of potential market impact of this prohibition of netting is discussed in the CD with a view to collecting further evidence from the industry.

Table 5: BCBS consultation on revisions to the Basel III LR and a comparison with current EU treatment

Topic	Proposed revision by BCBS	Current treatment as per CRR	Direction of impact
Derivatives	A modified version of SA-CCR to replace the CEM (referred to as the 'Mark-to-Market Method' in the CRR). Modifications to the SA-CCR are intended to ensure that collateral is not recognised as exposure reducing. However, the cash variation margin may offset the current replacement cost portion of exposure if relevant eligibility criteria are met. These also include newly proposed haircuts to the cash variation margin where there are currency mismatches.	The baseline approach is the application of the Mark-to-Market Method. Generally, there is no recognition of collateral but the eligible cash variation margin may offset the current replacement cost portion. No haircuts on currency mismatches are applied.	Institution-specific: Proposed changes may result in either a decrease or an increase in derivatives exposures. See also section 2.3.4.
Specific treatment of written credit derivatives	A new criterion limits the recognition of credit protection bought for offsetting credit protection sold to prevent wrong way risk.	The additional criterion does not currently exist in the CRR.	Increase of exposure (lower LR) in case wrong way risk exists.
Offsetting of cash payables and receivables arising from unsettled regular-way purchases and sales of financial assets	Two options proposed in relation to the treatment of cash payables and receivables arising from regular-way purchase and sales of financial assets. Option 1: no offsetting of cash payables and receivables. For example, entities applying settlement date accounting should gross up the exposures by recognising an off-balance-sheet item subject to a CCF of 100%). Option 2: allowing offsetting of cash payables and receivables under certain conditions.	The specifications proposed by the BCBS do not currently exist in the CRR. However, a related EBA Q&A has clarified that off-balance-sheet positions arising from pending settlements under settlement date accounting have to be included in the LR.	Institution-specific. BCBS is consulting on two options (depending on the current accounting practices followed by institutions).
Accounting provisions	Proposal to broaden the spectrum of provisions which may be deducted from the LR exposure measure to general provisions as well as prudential value adjustments if these have decreased Tier 1 capital.	General provisions must not be deducted from the LR exposure measure. Certain value adjustments that are not specific provisions but referred to in Article 111(1) of the CRR can be deducted from the LR exposure measure.	Decrease in exposure (higher LR).
Credit conversion factors	The BCBS is consulting on changes to the credit conversion factors (CCFs) as part of revisions to the Standardised Approach to credit risk. Upon finalisation, the BCBS proposes also to incorporate the changes into the LR.	The CRR applies the CCFs of the current Standardised Approach to credit risk subject to a floor of 10%.	Uncertain.

Cash pooling transactions	Proposed clarification according to which notional (or virtual) cash pooling transactions are not eligible for netting, whereas physical cash pooling transactions may be reported on a net basis subject to certain conditions being met.	Not explicitly mentioned in the CRR other than the general rule that loans and deposits cannot be netted.	Uncertain.
Other issues	The BCBS is seeking additional feedback on the treatment of traditional securitisations as well as repurchase agreements without a final settlement date ('open repos') for the LR.	The CRR does not contain a specific LR treatment for traditional securitisations. With respect to repurchase agreements without a final settlement date, recital 7 of Commission Delegated Regulation (EU) 2015/62 considers the settlement date to be equivalent to the recall notice period.	Uncertain.

2.3.2 Alternative capital measures

The capital measure to be used in the calculation of the LR is currently Tier 1 capital, as prescribed by Article 429(3) of the CRR. Article 511(3)(f) of the CRR requires an analysis of whether using total own funds or CET1 capital as the capital measure, instead of Tier 1 capital, would be more appropriate and, if so, what the proper calibration of the LR would be.

As outlined in section 2.1.1, the supervisory objectives of the LR are primarily forward-looking. From this perspective it can be argued that the LR should prevent institutions from taking on excessive leverage by requiring sufficiently high amounts of going-concern capital. According to the Basel III Accord, CET1 and AT1 capital are the two elements of total own funds which qualify as going-concern capital while Tier 2 is gone-concern capital .

Therefore, the current definition of the capital measure to be included in the capital ratio is Tier 1 capital, which is also the current definition upheld by the BCBS and by the CRR.

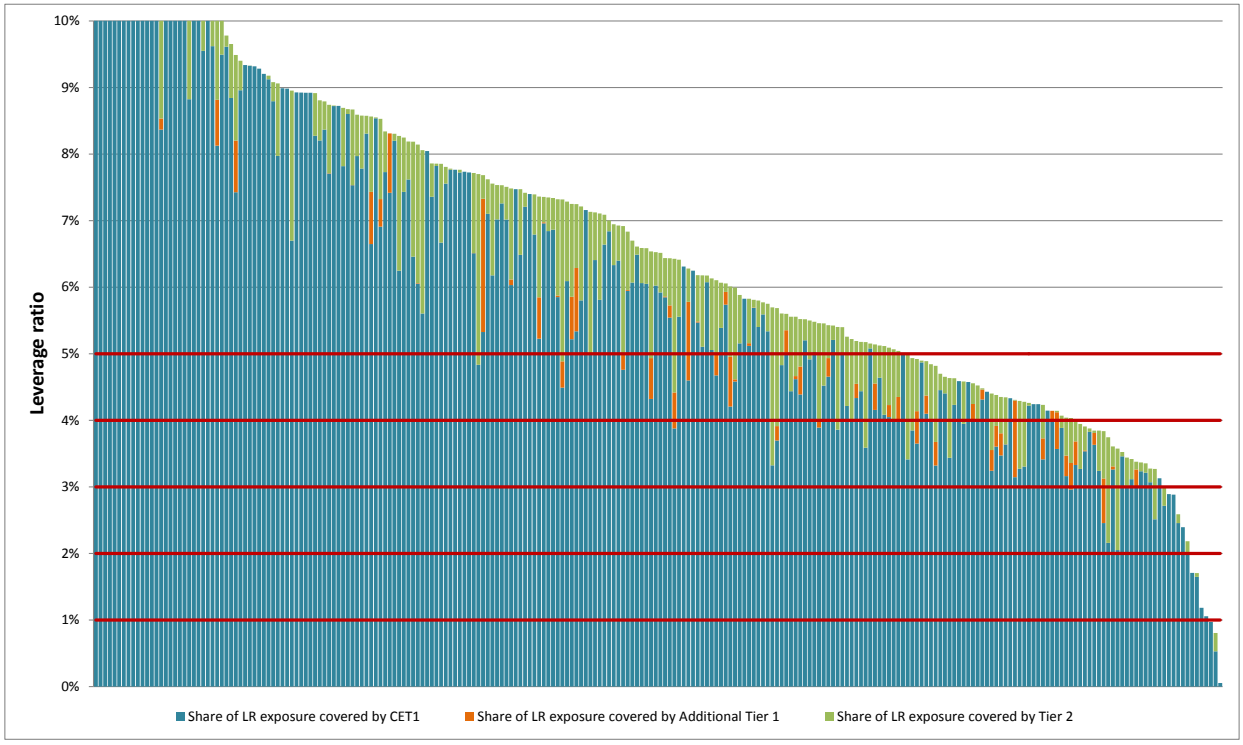
Possible reasons for applying CET1 as the capital measure of the LR could be that AT1 instruments have triggers for conversion into CET1 or write-down of principal which are linked to the level of the risk-based CET1 ratio. This creates a link between the LR and the risk-based framework. In particular, it is possible that an institution still meets its risk-based requirements comfortably (i.e. no conversion of AT1 instruments into CET1 is triggered), while the LR requirement is already breached.

Figure 1 shows the distribution of LRs using total own funds as the capital measure (numerator of the LR). The 242 institutions taken into account in this analysis are ranked from highest (left) to lowest (right) total own funds LRs.[39] Each bar represents an institution's total own funds LR and includes a breakdown of the numerator between CET1 capital (blue), AT1 capital (orange) and Tier 2 capital (green). As can be seen, a very large fraction of total own funds is currently composed of CET1, and the use of AT1 instruments remains rather limited. Therefore, considering a 3% LR level, the definition of the capital measure appears to have a very small impact on the number of institutions below this level. Of the 16 institutions which do not meet a 3% Tier 1 LR level, only three would move to a level of 3% or

[39] The *y*-axis has been capped at 10%. Larger leverage ratios are taken into account in computations but not fully displayed in the graph.

higher if Tier 2 capital was recognised in the LR. Conversely, 19 out of 242 institutions would not meet an LR level of 3% if only CET1 capital was recognised in the LR. Gaps between these three definitions of the capital measure widen when considering a 4% or higher LR level as a requirement.

Figure 1: Distribution of the LR with a breakdown of the capital measure



Source: EBA QIS (June 2015)

Table 6: Impact of alternative capital measures on LR compliance

Alternative definition of capital measure	Number of entities bound by a LR requirement of				
	1%	2%	3%	4%	5%
CET 1 only	3 / 242	7 / 242	19 / 242	61 / 242	101 / 242
Tier 1 (CET1 + AT1)	3 / 242	7 / 242	16 / 242	53 / 242	99 / 242
Total own funds (Tier 1 + Tier 2)	3 / 242	7 / 242	13 / 242	31 / 242	69 / 242

Source: EBA QIS (June 2015)

Figure 2 shows the percentage of institutions that are relatively more constrained by a hypothetical LR requirement than by the corresponding risk-based requirement for the alternative capital measures. For instance, a 3% Tier 1 LR requirement would require more Tier 1 capital than the 8.5% risk-based requirement[40] for 33% of institutions in the sample. Similarly, a 3% CET1 LR requirement would require

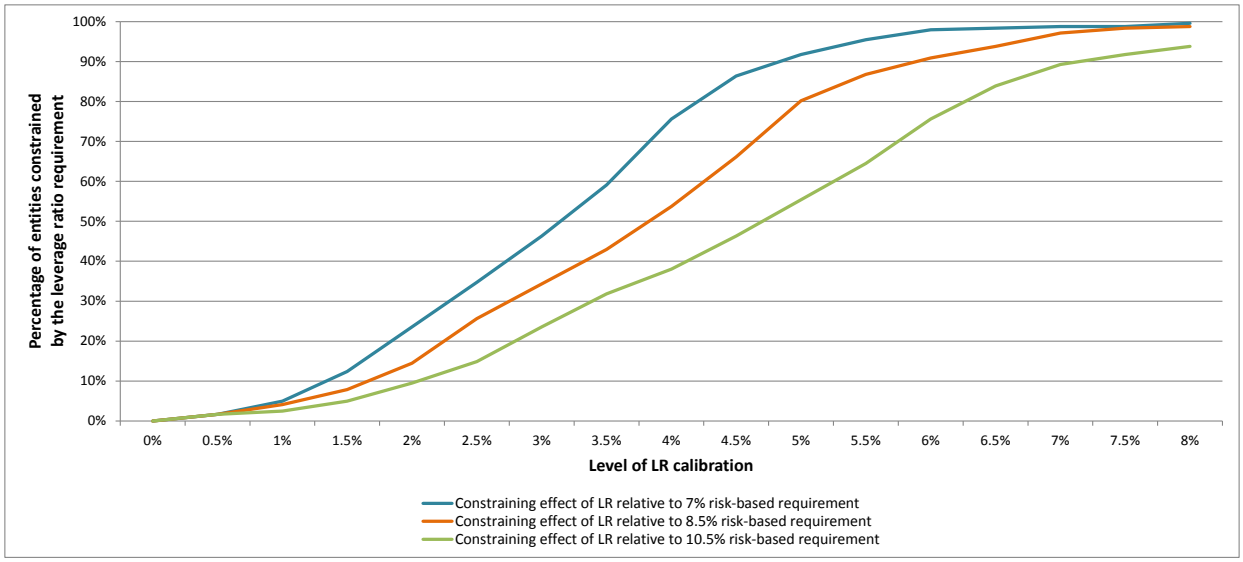
[40] This 8.5% risk-based requirement comes from a 4.5% minimum CET1 requirement, plus a 1.5% minimum AT1 requirement and a 2.5% CET1 capital conservation buffer.

more CET1 capital than the 7% risk-based requirement[41] for 45% of the sample, while a 3% total own funds LR requirement would require more total capital than the 10.5% risk-based requirement[42] for 23% of institutions. It should be noted, however, that the constraining effect of the LR is overstated in this figure, as the risk-based requirements do not take into account Pillar 2 requirements or any buffer requirements other than the capital conservation buffer.

Table 6 shows that the majority of institutions in the sample hold the required level of CET1 or Tier 1 capital to meet a 3% Tier 1 LR.

As indicated in Table 7, the aggregate Tier 1 capital shortfall triggered by a LR requirement of 3% for this sample of 242 institutions would be EUR 15.1 billion. Under a CET1 requirement this aggregated capital shortfall would be EUR 15.6 billion. This difference between capital measures widens for larger LR requirements.

Figure 2: Constraining effect of the LR relative to risk-based requirements for alternative capital measures CET1, Tier 1 and total own funds



Source: *EBA QIS (June 2015)*

[41] This 7% risk-based requirement comes from a 4.5% minimum CET1 requirement, plus a CET1 capital conservation buffer.

[42] This 10.5% risk-based requirement comes from a 4.5% minimum CET1 requirement, plus a 1.5% minimum AT1 requirement, plus a 2% Tier 2 requirement and a 2.5% CET1 capital conservation buffer.

Table 7: LR summary statistics and capital shortfalls

Figures in % and €bn		Capital measure		
		CET1	**Tier 1**	**Total own funds**
Leverage ratio levels	Mean	6.6%	6.6%	7.2%
	Min	0.1%	0.1%	0.1%
	Q1	4.0%	4.2%	4.7%
	Median	5.6%	5.8%	6.5%
	Q3	7.8%	7.8%	8.5%
	Max	48.0%	48.6%	49.4%
	Weighted average	4.3%	4.5%	5.3%
Total capital shortfall triggered by a leverage ratio requirement of	**2%**	7.6	7.6	7.5
	3%	15.6	15.1	14.1
	4%	111.3	82.9	35.8
	5%	333.5	268.3	129.8

Source: EBA QIS (June 2015)

As outlined above, CET1 and AT1 are both elements of going-concern capital. Their recognition in the capital measure of the LR can therefore be regarded as consistent with the LR's forward-looking objectives. Nevertheless, a high reliance on AT1 instruments may be of concern in the context of the LR due to their relative complexity and interactions with risk-based requirements through the triggers. A potential middle way of mitigating these issues could be to limit the recognition of AT1 instruments in the LR in order to prevent a high reliance on these instruments for the purpose of meeting the LR requirements, e.g. by imposing a limit on their recognition. Such a limit, which determines a maximum recognition of AT1 instruments in the capital measure of the LR, could be defined as a percentage of the LR total exposure.

Figure 3 and Table 2 illustrate the quantitative impact of imposing such limits on the recognition of AT1 to an LR which is still based on Tier 1 capital. Institutions' Tier 1 LRs are ranked from highest to lowest. The blue horizontal bars represent the level of the LR after applying a limit on AT1 equal to 1% of total leverage exposure. Three institutions (out of 242) would have their LR reduced by such a limit and this would lead to an exclusion of 0.7% of the overall amount of AT1 capital of the institutions in the sample. A limit on AT1 equal to 0.5% of total leverage exposure, as illustrated by the black horizontal bars, would affect 16 institutions and exclude 7.7% of the overall AT1 capital of institutions in the sample. Finally, a more stringent limit on AT1 recognition of 0.25% of total leverage exposure (red horizontal bars in the graph) would affect 36 institutions and exclude 32.6% of the overall AT1 capital of institutions in the sample. In this case, the weighted average LR of the full sample would be reduced from 4.50% to 4.43%.

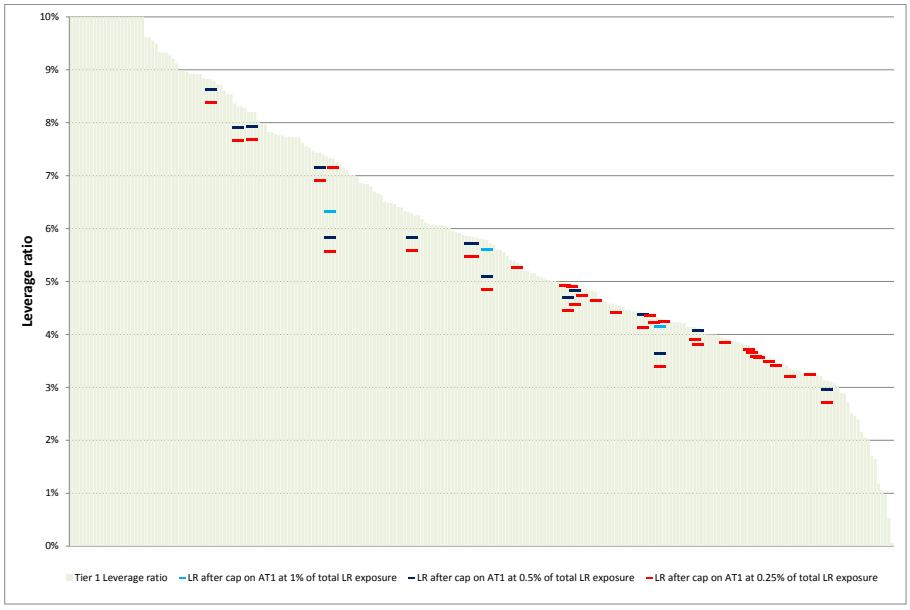
It follows that limiting the recognition of AT1 capital with a moderate limit would generally not have a very strong impact on the LRs of the institutions in the sample at the current stage. This also implies that institutions' reliance on AT1 instruments for the LR is currently quite limited. Imposing a limit on the recognition of AT1 instruments in the LR would therefore primarily affect those credit institutions which intend to raise additional capital in order to improve their LR. For these credit institutions, the imposition of a limit would restrict the option of resorting to AT1 instruments.

It is worth mentioning that the full picture is not yet available, as some institutions are likely to wait for more certainty on the final calibration of the LR requirements before issuing AT1 instruments. This means that the shortfalls observed may be underestimated.

In addition, the imposition of a limit on the recognition of AT1 instruments could also prolong and complicate the transition to higher LRs, in particular for institutions without the possibility or limited possibility of issuing CET1 capital to investors. This may be particularly relevant for some business models for which the issuance of AT1 instruments would be relatively attractive and where shareholders would be unwilling or unable to provide additional equity and capital build-up through organic profit growth could be insufficient (case of public development banks for example). This aspect may become more relevant once the final calibration of the LR is fully determined.

Finally, applying a different definition of the capital measure for the LR would complicate the overall regulatory framework, while there is certainly merit in maintaining consistency and simplicity between the different regulatory pieces. While there does not seem to be an obvious rationale at this stage to be stricter than the Basel framework, any future evolution on the definition of the capital measure would need to be considered in light of international discussions and in light of the outcome of the ongoing consultation at the level of the BCBS and of its final proposals.

Figure 3: Distribution of Tier 1 LR with limits on recognitions of AT1



Source: EBA QIS (June 2015)

Table 8: Summary statistics on limited recognition of AT1

	Number of entities affected by cap	Weighted average Tier 1 LR before cap on AT1 (full sample)	Weighted average Tier 1 LR after cap on AT1 (full sample)	Aggregated amount of AT1 in €bn (full sample)	*of which excluded AT1 in €bn (full sample)*	*% excluded AT1*
Applying a limited recognition of AT1 to 1% of total leverage exposure	3	4.50%	4.50%	73.3	0.5	0.7%
Applying a limited recognition of AT1 to 0.5% of total leverage exposure	16	4.50%	4.48%	73.3	5.6	7.7%
Applying a limited recognition of AT1 to 0.25% of total leverage exposure	36	4.50%	4.43%	73.3	23.9	32.6%

Source: EBA QIS (June 2015)

2.3.3 Treatment of low-risk off-balance-sheet items

In accordance with Article 511(3)(g) of the CRR it has been assessed 'whether the conversion factor referred to in point (a) of Article 429(10) for undrawn credit facilities, which may be cancelled unconditionally at any time without notice, is appropriately conservative based on the evidence collected during the observation period'. This refers to a category of credit facilities that receives a 10% (applied to the notional) conversion factor on the undrawn part of the limit, which is lower than the conversion factors for most other types of lines (20%, 50% and 100%).[43]

A reason for the different treatment – also considered in Basel – is that in cases of adverse circumstances (e.g. heightened exposure to excessive leverage or reductions in own funds) these lines could be cancelled unconditionally, whereas other lines could not. For example, in periods of financial distress it has been observed by industry participants that banks actively cancelled or reduced credit card lines so that the vast majority of commitments were not converted into drawn exposures. Also it could be argued that the lines are unlikely to be drawn simultaneously. On the other hand, the BCBS did not consider that the 0% CCF from the Standardised Spproach for credit risk would be appropriate for application within the LR framework, as the LR in its capacity as a backstop measure should provide for some additional conservatism in this respect. Therefore, the CCF for these lines has been set at 10% CCF.

As a quantitative test of the 10% CCF factor, an analysis has been performed that investigates the actual behaviour of these lines in recent years. The focus of the analysis is on the volatility in the utilisation rate as a relevant measure for analysing the adequacy of the 10% factor, which is based on the understanding that the conversion factor is designed to represent future drawings of the facilities. For example, in the case of a EUR 1.2 million credit line commitment, of which EUR 0.2 million is

[43] Note that the exact categorisation as to which type of line would fall into the 10%, 20%, 50% or 100% conversion factor treatment has been amended with the LR DA act (amending Article 429(10) of the CRR). Also, the 10% category has been broadened somewhat. On these added lines – which are outside the mandate of Article 511(3)(g) of the CRR – the EBA does not have data available and will therefore be beyond the scope of the report. For these reasons the report only covers the appropriateness of the treatment for the lines that received a 10% CCF in the version of the CRR as it was before the adoption of the LR DA.

already drawn by the client, [44] the expectation embedded in the 10% conversion factor is that the client would, at most, draw an additional 10% of the EUR 1.0 million undrawn commitment (i.e. an additional EUR 0.1 million). If in a substantial number of cases such increases in the amount drawn would exceed 10% of undrawn commitments then the (assumption embedded in the) 10% conversion factor could be seen as too low.

The analysis is based on data gathered via the regular CoRep framework (the data is not available in the EU voluntary QIS exercise) and indicates that, within the period Q1 of 2014 to Q2 of 2015 (comprising six quarters of reference dates), the quarter-to-quarter increases of amounts drawn of undrawn amounts tend to be below 10% of undrawn commitments in a significant majority of cases.

As shown below (Table 9 and Table 10), the volatility of drawings on unconditionally cancellable credit cards and on unconditionally cancellable non-revolving credit lines has been tested separately. Within the first category (Table 9), of the 83 quarter-to-quarter observations, only in two of them has a bank had a higher amount of drawings than anticipated in the previous quarter (by way of the 10% CCF on the undrawn part). For the second category (Table 10), this is slightly higher at 13 of 204 quarter-to-quarter observations.[45]

Table 9: Volatility test results for credit card UCC lines

Simulation summary				
Jun. 14	Sep. 14	Dec. 14	Mar. 15	Jun. 15
17 obs. *of w. 16 Ok* *of w. 1 No*	17 obs. *of w. 17 Ok* *of w. 0 No*	17 obs. *of w. 16 Ok* *of w. 1 No*	17 obs. *of w. 17 Ok* *of w. 0 No*	15 obs. *of w. 15 Ok* *of w. 0 No*
Overall				
83 obs. *of which 81 Ok* *of which 2 No*				
10% CCF hypothesis failure rate: 2.4%				

Source: CoRep

[44] Note that this amount already drawn is on balance sheet and therewith is fully reflected in the leverage ratio exposure measure (i.e. EUR 0.2 million in the example).

[45] Note that observations in which an institution has increased or decreased its portfolio of total commitments by more than 20% have been dismissed (in Tables 1 and 2 these deletions are clarified). This is to ensure that the test would not be affected by extraordinary changes in business model.

Table 10: Volatility test results for non-revolving UCC lines

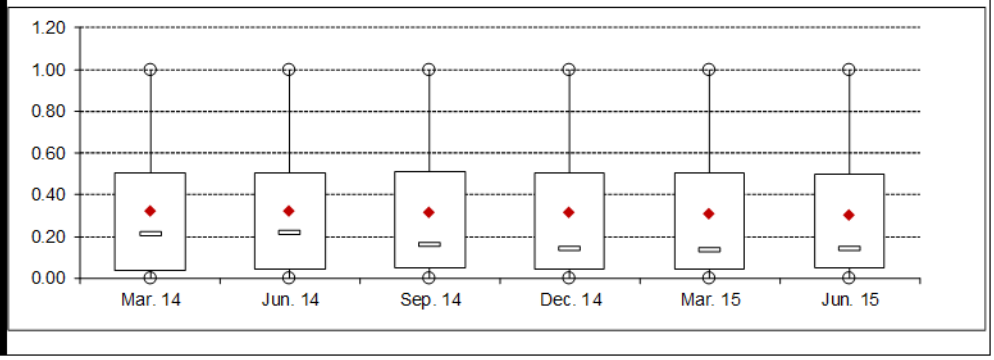
Simulation summary				
Jun. 14	Sep. 14	Dec. 14	Mar. 15	Jun. 15
41 obs.	43 obs.	42 obs.	39 obs.	39 obs.
of w. 39 Ok	of w. 40 Ok	of w. 37 Ok	of w. 36 Ok	of w. 39 Ok
of w. 2 No	of w. 3 No	of w. 5 No	of w. 3 No	of w. 0 No
Overall				
204 obs.				
of which 191 Ok				
of which 13 No				
10% CCF hypothesis failure rate: 6.4%				

Source: CoRep

The observation that the volatility is limited is further corroborated by Table 11 and Table 12, which show that the distributions of drawn amounts (in terms of percentage of the limit) are stable for six subsequent reporting dates. For example, for the credit card UCC lines, the 90th percentile observation moves between 76% and 81% of drawings compared to the limit, whereas for the non-revolving UCC lines this figure varies between 75% and 78%.

Table 11: Utilisation rates credit card UCC lines

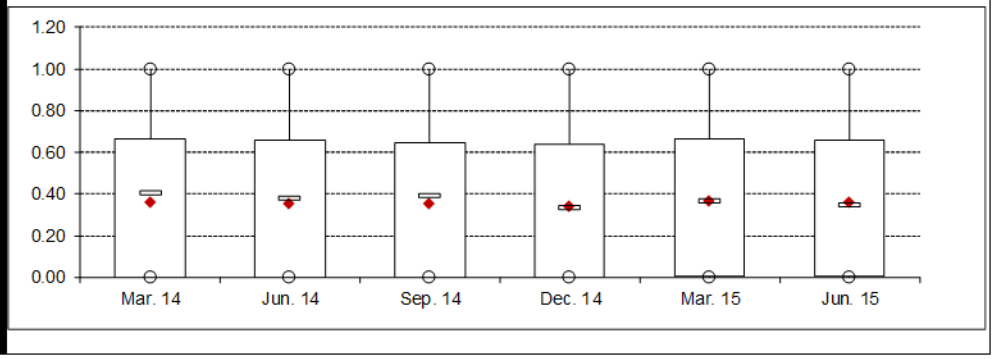
	31/03/2014	30/06/2014	30/09/2014	31/12/2014	31/03/2015	30/06/2015
Available observations	17	17	17	17	17	15
Min	0.00	0.00	0.00	0.00	0.00	0.00
10th perc.	0.02	0.02	0.02	0.02	0.02	0.04
Q1	0.04	0.04	0.05	0.05	0.04	0.05
Mean	0.32	0.32	0.31	0.31	0.30	0.30
Median	0.21	0.22	0.16	0.14	0.13	0.14
Q3	0.50	0.50	0.51	0.50	0.50	0.50
90th perc.	0.78	0.79	0.79	0.81	0.79	0.76
Max	1.00	1.00	1.00	1.00	1.00	1.00



Source: CoRep

Table 12: Utilisation rates non-revolving UCC lines

	31/03/2014	30/06/2014	30/09/2014	31/12/2014	31/03/2015	30/06/2015
Available observations	41	43	43	42	42	39
Min	0.00	0.00	0.00	0.00	0.00	0.00
10th perc.	0.00	0.00	0.00	0.00	0.00	0.00
Q1	0.00	0.00	0.00	0.00	0.00	0.00
Mean	0.36	0.35	0.35	0.34	0.36	0.35
Median	0.40	0.37	0.39	0.33	0.36	0.35
Q3	0.67	0.66	0.65	0.64	0.67	0.66
90th perc.	0.75	0.75	0.75	0.77	0.76	0.78
Max	1.00	1.00	1.00	1.00	1.00	1.00



Source: CoRep

2.3.4 Treatment of derivatives

According to Commission Delegated Regulation (EU) 2015/62, aligning the European LR with the Basel definition, the exposure value of contracts listed in Annex II of the CRR and of credit derivatives, including those that are off-balance sheet, shall be determined in accordance with new Article 429(a).

Equivalent to the LR calculation of the BCBS published in January 2014, the common approach for derivatives in the CRR LR calculation is the **Mark-to-Market Method** set out in Article 274 of the CRR. Therefore, the derivative exposure comprises two components, namely the current replacement costs and the potential future credit exposure. The current replacement cost of all contracts with positive values is determined by their current market values (cf. Article 274(1) of the CRR). The potential future credit exposure is calculated by multiplying the notional amounts or underlying values of the derivatives with percentages depending on asset class and the residual maturity of the contract (cf. Table 1 and 2 of Article 274(2) and (3) of the CRR). Moreover, the potential future credit exposure for all credit derivatives is measured in a similar way by applying paragraph 2(a) of Article 299 of the CRR. Furthermore, the effects of contracts for novation and other netting agreements in accordance with Article 295 of the CRR may be taken into account. While cross-product netting is not applicable, netting within the product category is permitted.

By way of derogation, the OEM as set out in Article 275 of the CRR may be used instead of the Mark-to-Market Method. However, this method may be applied to contracts listed in points 1 and 2 of Annex II of the CRR only (i.e. interest-rate contracts and contracts concerning foreign-exchange rates and gold, respectively). In addition, this method has to be used for the purposes of meeting the own funds

requirements according to Article 92 of the CRR (i.e. the risk-based ratios). For determining the exposure value, the notional amount of each instrument is multiplied by percentages displayed in Table 3 of Article 275 of the CRR. These factors are defined by asset class and original maturity. Furthermore, for interest-rate contracts either the original or residual maturity might be chosen. According to paragraph 3 of Article 429a, a cash variation margin fulfilling certain criteria may reduce the current replacement cost calculated pursuant to the Mark-to-Market Method. This deduction is not permitted under the Original Exposure Method (as the OEM does not have a separate replacement cost component, it would also not be straightforward to apply it). Regardless of the method applied, there is an additional treatment for written credit derivatives specified in paragraphs 5 to 7 of Article 429a. Finally, depending on the method in use, the exposure value of derivatives may differ.

As the BCBS published a new version of the SA-CCR that is expected to replace the CEM (cf. Mark-to-Market Method) and the Standardised Method in the risk-based capital framework as well as in the large exposures framework in January 2017, the implementation of the SA-CCR is considered for determining derivative exposure in the Basel III LR.[46]

The exposure value of derivatives under the SA-CCR also includes the two components: current replacement costs and potential future exposure. Regarding the latter, the SA-CCR applies a more risk-sensitive treatment of netting through the use of hedging sets.

The BCBS is consulting on adopting the SA-CCR with modifications in order to reflect the benefits of the new approach while maintaining LR-specific principles (hereafter **modified SA-CCR**). Therefore, the exposure-reducing effect of collateral other than eligible cash variation margin is removed in the calculation set out by the SA-CCR. That is, the current replacement costs in accordance with the Mark-to-Market Method are used, [47] not applying the specific SA-CCR formula for margined transactions. The potential future exposure is modified by setting the SA-CCR-multiplier to the add-on component to one. This modification disallows recognition of over-collateralisation or negative net market values in the potential future exposure. Nevertheless, potentially shorter time horizons for margined trades in the calculation of maturity factors are still allowed (cf. paragraph 164 of the SA-CCR document).

Moreover, derivatives dealers have raised several concerns over the treatment of client initial margins in centrally cleared derivative transactions in the LR.[48] In particular, they have argued that not allowing the initial margin, received from clients and properly segregated from their own cash, to reduce the potential future exposure on the client leg could result in a disproportionate increase in capital requirements for this low-margin business. This could adversely affect the provision of clearing services to clients which is contrary to the G20 objective of promoting central clearing. The BCBS is considering this issue carefully and seeking further evidence on the potential impact of the Basel III LR on clearing members' business models during the consultation period. At this stage, it is too early to draw firm conclusions in this regard.

[46] See also footnote 5 of the Basel III leverage ratio framework.

[47] The eligible cash variation margin received is deducted and the CCP-leg of client-cleared trade exposure is exempted according to paragraph 27 of the Basel III leverage ratio framework.

[48] See, for example, the November 2014 letter to the BCBS from global trade associations and CCPs. The same points were reiterated in a joint letter from the Commodity Markets Council (CMC) and Managed Funds Association (MFA) on 2 November 2015, available at www.commoditymkts.org.

One possible way to take these concerns into account is through the combination of modified and unmodified SA-CCR (hereafter **combined SA-CCR**). The Mark-to-Market Method, as well as the modified SA-CCR, apply the same uniform treatment to bilaterally and centrally cleared derivatives. In contrast, the combined SA-CCR refers to the modified SA-CCR but allows the client initial margin to reduce the potential future exposure for client derivative trades cleared through a qualifying central counterparty clearing house (QCCP). The latter results in the SA-CCR-multiplier as set out in paragraph 149 of the SA-CCR document being lower than one and therefore reducing the potential future exposure (i.e. unmodified SA-CCR) for cleared client derivative trades only. The replacement costs are equal in both SA-CCR methods.

Based on the voluntary data collection as of June 2015, a sample comprising 56 institutions has been analysed. Only institutions which reported data of sufficient quality on derivatives have been included. Table 13 displays the sample sizes for institutions with derivative exposures that also submitted SA-CCR data. It follows that those 138 institutions which reported derivative exposures under the CEM did not report their derivative positions using the SA-CCR (with modifications). As a result of consistency and plausibility checks regarding the application of the SA-CCR, additional 23 institutions were excluded from the analysis. The remaining 56 institutions represent 25.8% of banks with derivative exposures and 28.6% of the derivative exposures themselves.

Table 13: Decomposition of samples in terms of totals and materiality

	Population		Derivative exposure in EUR billions			Derivative exposure in per cent		
	# Banks	% Banks	RC	PFE	Total	RC	PFE	Total
Institutions with derivative exposures	217	100.0	592.8	1,530.4	2,123.2	100.0	100.0	100.0
Institutions with derivative exposures and SA-CCR data reported	79	36.4	208.3	590.8	799.1	35.1	38.6	37.6
Institutions with derivative exposures and valid SA-CCR data reported	56	25.8	155.3	451.8	607.1	26.2	29.5	28.6

Source: EBA QIS (June 2015)

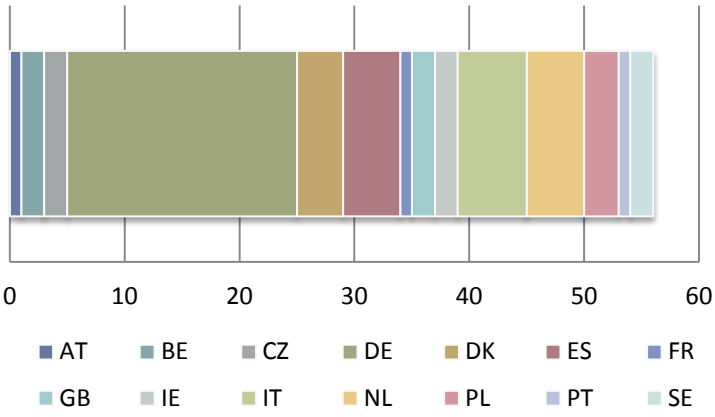
These 56 institutions are domiciled in 14 different jurisdictions, although most are in Germany. Among the 56 institutions, 8 out of the 13 business models[49] are represented, while nearly a third are 'local universal banks' and 'locally active savings and loan associations, cooperative banks'. In terms of absolute size measured by total assets, the majority of the institutions are 'medium' and 'small' banks. The composition of the sample analysed is displayed in Figure 4.

[49] Section 0 provides a list with definitions of the business models used for the purposes of this report.

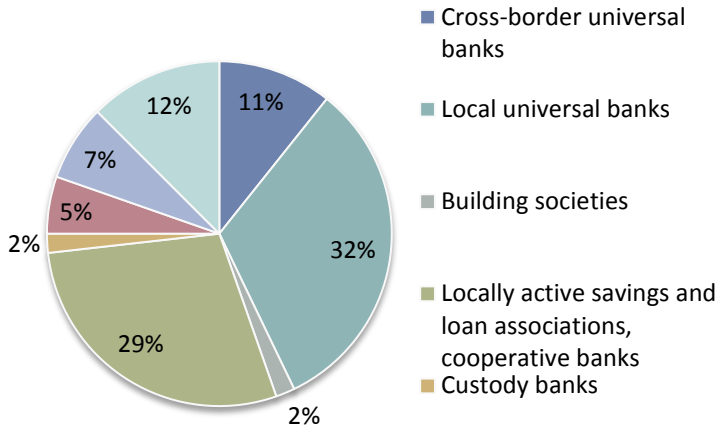
Figure 4: Decomposition of sample by jurisdiction, business model and absolute size

Sample composition by

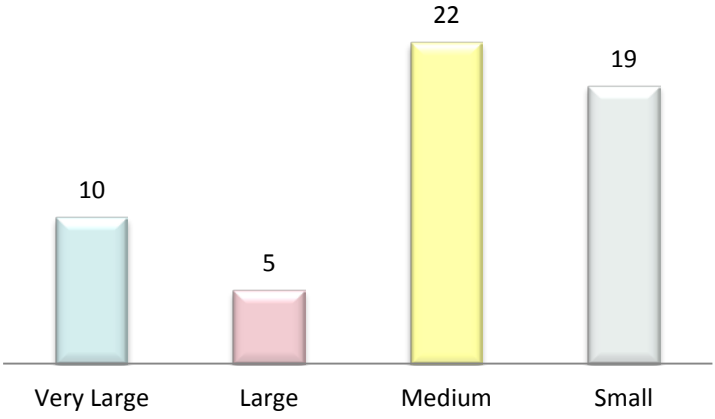
Jurisdiction



Business model



Absolute size



Source: EBA QIS (June 2015)

Table 14 shows the derivative exposure and weighted average LRs calculated under the Mark-to-Market Method (the current baseline), the modified SA-CCR and the combined SA-CCR. The derivative exposure therefore focuses on the replacement costs (RC) and the potential future exposure (PFE) only. The additional treatment for written credit derivatives and any adjustments to accounting other assets referring to derivatives are not included, as they are equal throughout the different methods. The components of derivative exposure displayed in the table are expressed as a percentage of the total LR exposure measure calculated by applying the current treatment (based on the Mark-to-Market Method).

Table 14: Decomposition of derivative exposure as percentage of total LR exposure measure and LR under different methods for all institutions, broken down by business model

	Mark-to-Market Method				Modified SA-CCR				Combined SA-CCR			
	RC	PFE	Total RC+PFE	LR	RC	PFE	Total RC+PFE	LR	RC	PFE	Total RC+PFE	LR
All institutions [56]	**1.5**	**4.5**	**6.0**	**4.4**	**2.2**	**3.9**	**6.1**	**4.4**	**2.2**	**3.9**	**6.0**	**4.4**
Cross-border universal banks [6]	1.7	5.9	7.6	4.5	2.4	5.1	7.4	4.5	2.4	5.0	7.4	4.5
Local universal banks [18]	1.2	0.8	2.0	4.7	1.7	0.9	2.6	4.7	1.7	0.9	2.6	4.7
Building societies [1]	1.8	0.3	2.1	3.1	2.6	0.1	2.6	3.1	2.6	0.1	2.6	3.1
Locally active savings and loan associations, cooperative banks [16]	0.6	0.4	1.0	4.8	0.9	0.3	1.2	4.8	0.9	0.3	1.2	4.8
Custody banks [1]	0.4	0.5	0.9	4.7	0.6	0.8	1.3	4.7	0.6	0.8	1.3	4.7
Public development banks [3]	0.3	0.6	0.9	2.3	0.5	1.2	1.7	2.3	0.5	1.2	1.7	2.3
Mortgage banks including pass-through financing mortgage banks [4]	0.6	0.3	0.9	4.5	0.9	0.3	1.2	4.5	0.9	0.3	1.2	4.5
Other specialised banks [7]	2.1	1.8	4.0	3.9	3.0	2.5	5.5	3.9	3.0	2.5	5.5	3.9

Source: EBA QIS (June 2015)

For all 56 institutions, the average RC component under both SA-CCR options amounts to 2.2% of the total LR exposure measure, i.e. 0.7 percentage points above the value according to the Mark-to-Market Method. This is due to the application of the alpha factor of 1.4 set out in the SA-CCR. The PFE component is reduced by 0.6 percentage points (from 4.5% to 3.9%) when applying the modified SA-CCR instead of the Mark-to-Market Method and further decreased by barely 0.1 percentage point when allowing the unmodified SA-CCR for centrally cleared client trades (combined SA-CCR). The highest impact is assigned to 'cross-border universal banks', for which the modified SA-CCR results in a PFE reduction of 0.9 percentage points. However, there are also business models showing a reverse effect. For example, for 'public development banks' and 'other specialised banks' using the modified SA-CCR instead of the Mark-to-Market Method an average increase of the PFE component of 0.6 and 0.7 percentage points, respectively, can be seen. In terms of the total derivative exposure for all banks, on average, both SA-CCR options result in slight changes only (a 0.04 percentage points increase due to modified SA-CCR and a 0.02 percentage points decrease for combined SA-CCR). This shows that the more risk-sensitive treatment of the PFE component is at least partially offset by the replacement costs increased due to the alpha factor.[50] Therefore, the weighted average LR remains relatively stable throughout the different methods. The results by business models show that the application of the SA-CCR leads to a reduction of total derivative exposure for 'cross-border universal banks' (by 0.2 and 0.3 percentage points for modified and combined SA-CCR, respectively), while the other business models represented in the sample express an increase due to the incorporation of the SA-CCR (from 0.2 to 1.5 percentage points).

Focussing on institutions which perform client-clearing as clearing members, the subsample consists of five 'cross-border universal banks', five 'local universal banks' and one 'other specialised banks' (Table 15). These institutions are affected by the option under consultation to use client initial margin to reduce the PFE component for centrally cleared client derivative trades by means of the SA-CCR-multiplier. However, the PFEs of centrally cleared client trades (i.e. 0.4% and 0.3%, respectively) represent only a small fraction of the total derivative transactions. Therefore, the total derivative exposure is decreased by 0.5 percentage points on average, ranging from a 5.3 percentage point decrease to a 2.6 percentage points increase at the level of individual institutions. The average numbers are driven by the one cross-border universal bank showing a reduction in derivative exposure due to the SA-CCR of more than 5 percentage points, while the other institutions display a modest increase or are nearly unaffected. For all institutions, the weighted average LR of clearing member institutions remains almost unaffected. Individual LR changes range from a 0.2 percentage point increase for the one 'cross-border universal bank' to a 0.2 percentage point decrease.

[50] However, the alpha factor is applied to both replacement costs and potential future exposure.

Table 15: Decomposition of derivative exposure as percentage of total LR exposure measure and LR under different methods for 11 clearing member institutions

		CEM	Modified SA-CCR	Combined SA-CCR
Member institutions [11]	RC	1.80	2.52	2.52
	PFE	6.17	5.03	4.94
	Of which: PFE of centrally cleared client trades	-	0.40	0.31
	Total RC + PFE	7.97	7.55	7.46
	LR	4.38	4.40	4.40

Source: EBA QIS (June 2015)

While the effects differ on an entity-by-entity basis, the overall quantitative results indicate no material impact of a change in the method applied to derivatives for the LR. This is expected given that client clearing is relatively new and mandatory clearing requirements are just being rolled out.

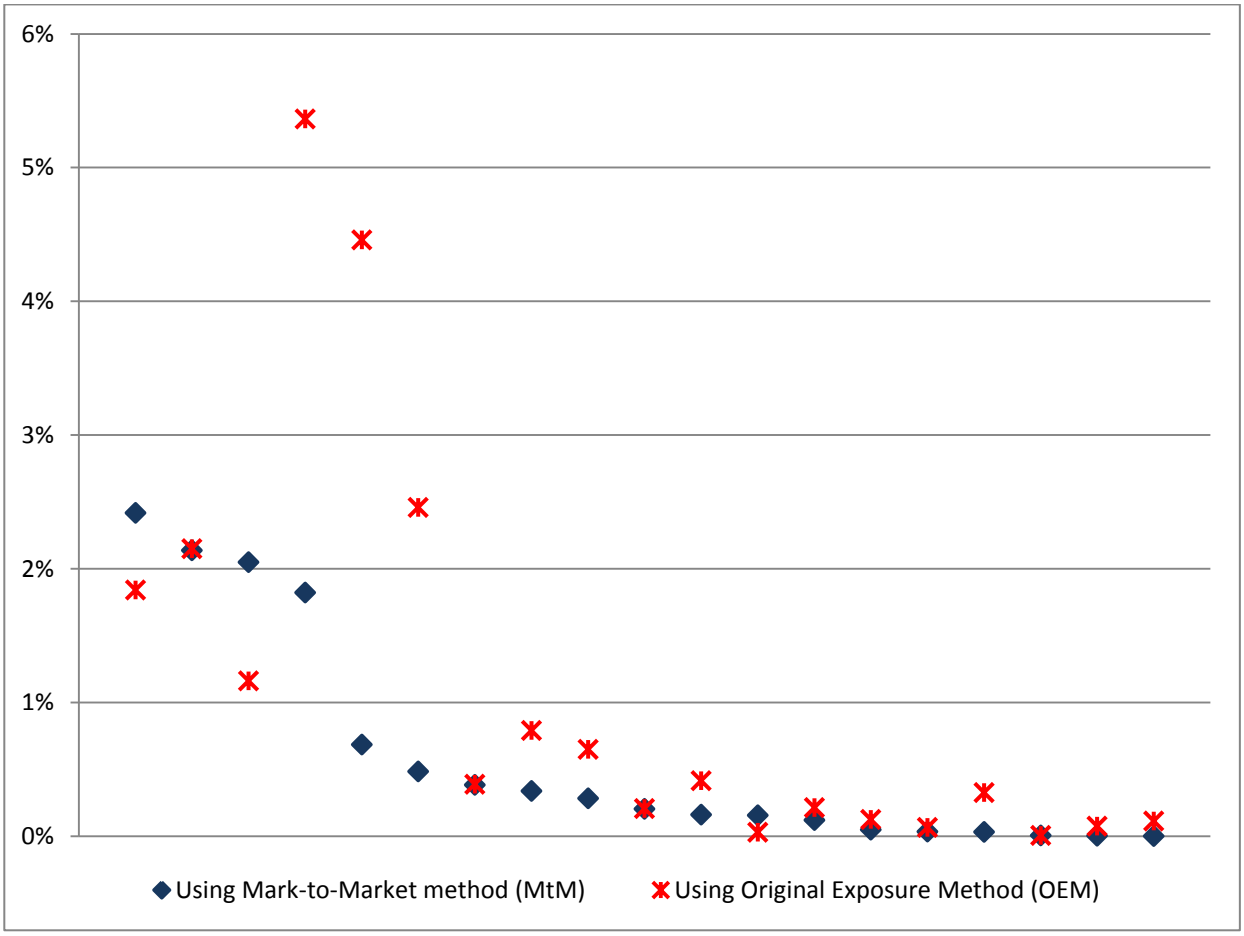
Concerning implementation burden, while the SA-CCR replaces the CEM/Mark-to-Market Method in the risk-based framework, it has to be taken into account that the SA-CCR requires relatively complex calculation schemes on a portfolio basis. Furthermore, the SA-CCR is likely to be incorporated with certain modifications for the purpose of the LR. This may create some additional computational burdens for small institutions and large institutions using the Internal Model Method (IMM).

A comparative analysis of the share of derivatives exposure in the LR total exposure measure has been performed under both alternative methods for a small sample of 19 institutions which were requested to perform both calculations simultaneously.[51] The results are displayed in Figure 5. They suggest that the OEM would usually tend to result in higher exposure amounts than the Mark-to-Market Method (this is observed for 15 out of 19 institutions). The difference in the exposure amounts and the impact on the total LR exposure of the institutions is generally quite small. However, there are a few instances in which the difference between the OEM exposure amounts and the Mark-to-Market Method exposure amounts are more pronounced, and this seems to be the case mostly for institutions for which derivatives exposures are somewhat more material in the context of total LR exposure generally (these entities are plotted on the left-hand side of Figure 7). Furthermore, in four cases the exposure

[51] As the OEM is the simplest method provided by the CRR for determining derivatives exposures, it is generally applied by relatively small institutions with limited derivatives transactions. This is also reflected by the sample, with total LR exposures of the institutions included ranging from EUR 687 million to EUR 217 billion and shares of derivatives exposures in the total LR exposures (determined using the Mark-to-Market Method ranging from 0.005% to 2.4%).

amounts obtained from using OEM are reported as being smaller than those obtained using the Mark-to-Market Method. While it is difficult to draw firm conclusions from this comparative analysis, which draws on a small sample, the results may call for vigilance by supervisory authorities in terms of allowing the use of the OEM at institutions that perform more material derivatives-related activities. At the same time, the differences between the OEM and the Mark-to-Market Method appear rather immaterial for institutions with very limited derivatives-related activities.

Figure 5: Share of derivatives exposures in the total LR exposure when using the OEM instead of the Mark-to-Market Method



Source: EBA QIS (June 2015)

2.3.5 Impact of accounting differences

Article 511(4)(c) of the CRR sets out that the report shall take account of 'the impact of accounting differences between accounting standards applicable under Regulation (EC) No 1606/2002, accounting standards applicable under Directive 86/635/EEC and other applicable accounting framework and other relevant accounting frameworks on the comparability of the LR'. On the basis of the EBA mandate mentioned above and the objective of BCBS to neutralise the impact of any accounting differences on the calculation of the LR at the international level (for example IFRS compared to US GAAP), the analysis below is focused on the impact on the calculation of the LR due to accounting differences between IFRS and n-GAAP. However, the findings of this analysis are consistent with the discussions which are currently taking place at the BCBS.

An EBA survey, involving competent authorities from 27 jurisdictions and the SSM, has indicated that most large institutions across the EU report the LR at the consolidated level on the basis of the IFRS accounting rules. However, half of the jurisdictions indicated that n-GAAP can also be applied, mostly at the individual level.[52] A main finding of the survey is that the application of n-GAAP does not have a material impact on the calculation of the LR and its comparability across countries.

Most of the indicated differences are due to the application of different valuation rules and provisioning regimes.

Regarding differences stemming from valuation rules, a few respondents indicated that their n-GAAP can have a higher degree of amortised cost valuation compared to IFRS, which sometimes leads to the non-recognition of fair value gains. This potential difference, which by some was indicated to be relatively modest, would in the first instance affect the Tier 1 amount (numerator) of the LR (as an increase of the own funds does not occur). Regarding the denominator, the exposure for the LR would be lower as a result of the non-recognition of gains. Notably, the main effect, which is on the numerator of the LR, would equally rise with the risk-based Tier 1 ratio.

Besides the use of different valuation methods of items recognised on the balance sheet, a few respondents mentioned that under n-GAAP, derivatives are recognised off-balance sheet, in contrast to IFRS, under which these exposures will be recognised on the balance sheet. However, to the extent that the transactions which remain off-balance sheet are included in the measurement of the LR, there will be no impact on the LR.[53] An impact on the LR due to accounting differences could exist if a transaction is recorded neither on nor off the balance sheet under n-GAAP and is therefore not included in the measurement of the LR. Another point with regard to the valuation rules is the existence of potential differences in the capture of pending settlement transactions. The timing and method for recognising regular-way purchases or sales of financial assets that have not yet been settled differ across and within accounting frameworks. Under the IFRS, these transactions may be accounted for on the trade date (*trade date accounting*) or on the settlement date (*settlement date accounting*), while ,under n-GAAP, for example, only the trade date may be permitted. As a result,

[52] IFRS is mandatory for the consolidated financial statements of listed entities in the EU.

[53] In particular, in accordance with Article 429(9) of the CRR, institutions have to determine the leverage ratio exposure for derivatives that are off-balance sheet as if they were on balance sheet, and in accordance with Article 429(10) of the CRR, institutions have to apply conversion factors up to 100% to off-balance-sheet items.

there can be a difference in the balance sheet (for purchased assets, a higher number of exposures recognised on the balance sheet in the case of trade date accounting compared to settlement date accounting). This issue, which seems to affect the denominator of both the LR and the risk-based ratio, is currently being looked into by the BCBS and is mentioned in the CD published on 6 April 2016.[54] The objective of the approach taken in this CD is to ensure the consistent implementation of the Basel III LR framework to make the exposures comparable across institutions. In this regard, the consultation document discusses two options: one option under which banks using settlement date accounting will have to apply a 100% CCF to unsettled assets, and banks using trade date accounting will have to reverse out any offsetting between cash receivables and payables for unsettled transactions, and an alternative option with a form of offsetting for pending settlement transactions.[55]

It has been indicated by some respondents that a different LR between accounting frameworks can also result from a n-GAAP that has a more conservative provisioning regime compared to IFRS (this is due to the recognition of general provisions (GP) under certain n-GAAP which are not recognised in accordance with IFRS), leading to a lower Tier 1 due to a reduction of the bank's profits and hence a lower numerator in both the LR and the Tier 1 risk-based ratio. In this regard, the new provisioning regime of IFRS 9 would, in general, constitute a shift to a more conservative provisioning regime for IFRS institutions, which would reduce, or possibly eliminate, the difference between the level of provisions of institutions under IFRS and certain n-GAAP, present under the current impairment model (International Accounting Standard 39 or IAS 39). However, this impact will equally arise at the risk-based ratio.

However, the exact magnitude of the impact of the change is difficult to estimate at the current stage of preparation for the application of IFRS 9. Overall, the impact can be driven by the business model of a bank or the types and sizes of financial instruments. The EBA impact assessment on IFRS 9, which is currently ongoing, should provide additional insights on this aspect. In particular, the impact on the provisioning levels and on CET1 capital will be investigated.

To the extent that differences in the level of provisions remain, it is to be noted that general provisions (which are not currently subtracted from the LR exposure) have been proposed to become eligible for subtraction from the LR exposure by the BCBS CD. With this, all accounting provisions that reduce Tier 1 capital would be recognised also in the denominator of the LR via the reduction of the exposure value.[56]

Further issues mentioned are those of minor differences in the netting rules, as mentioned by a few respondents, as well as minor differences between the treatment of finance leases under n-GAAP and IFRS. Specifically, under n-GAAP, financial leases may be treated as operational leases, leading to a smaller on-balance-sheet amount compared to IFRS, where these leases will be treated as finance leases under IAS 17 and will be recognised on the balance sheet. For neither issue has it yet been indicated if there would be an impact of any size. Also, some respondents raised the point of how future changes to IFRS may change the comparison between IFRS and n-GAAP. For example, next to provisioning, the classification and measurement rules under IFRS 9 may lead to changes in the

[54] http://www.bis.org/bcbs/publ/d365.htm.

[55] To be adjusted following publication of the CD.

[56] To be adjusted following publication of the CD.

measurement basis of some financial instruments (for instance, more financial instruments may be measured at fair value under IFRS 9 compared to IAS 39). As with provisioning, it is not possible to estimate accurately the impact of these changes at the current stage.

Another future change is that of the new IFRS 16 for leases which may also affect the LR since more exposures will be recognised on the balance sheet, hence increasing the amount of exposure of the LR. However, the estimated impact of this change will depend on the size of the newly recognised assets (previously recorded off the balance sheet, since they were considered operational leases under IAS 17). Regarding the estimated impact of IFRS 16 on regulatory capital, according to the International Accounting Standards Board (IASB) effect analysis, [57] the impact of these changes on the regulatory capital of financial institutions is not expected to be significant. In addition, the EBA will assess whether there is any need to provide guidance with regard to the prudential treatment of the lease assets.

[57] http://www.ifrs.org/Current-Projects/IASB-Projects/Leases/Documents/IFRS_16_effects_analysis.pdf (page 61).

2.4 Reporting/disclosure requirements and considerations on compliance cost

On 15 June 2015 the EBA published draft Implementing Technical Standards (ITS) to amend Commission Implementing Regulation (EU) No 680/2014 (ITS on supervisory reporting) with regard to the LR following the LR DA, aligning the European LR with the definition of the BCBS. It encapsulates the changed LR calculation that the LR DA has brought, among other aspects, in regard of SFTs, the calculation of the exposure value of derivatives with a recognition for cash variation margin, an additional treatment of credit derivatives, alignment of the conversion factors for off-balance-sheet items with the risk-based framework, and specific exemptions for client cleared transactions.

Most of the revised cells and cell descriptions (including 25 cells which are new) of these final draft ITS No 680/2014 (ITS on supervisory reporting)[58] represent components introduced by the LR DA. As a result of some simplifications, especially regarding investments outside the scope of prudential consolidation, as well as regarding the former requirement to calculate a 3-month average, the new set of templates will have 228 cells, which is 84 fewer than the 312 cells of the current set of templates (i.e. the required number of cells was reduced by nearly 27%). The administrative burden will therefore be reduced for EU institutions[59] once the new reporting framework comes into force from September 2016. The possibility of allowing a reduced frequency and/or granularity of reporting requirements in the case of smaller credit institutions will be further explored by the EBA on the basis of the relevant mandates in the context of the future update of the ITS on reporting on the LR. The cost-benefit analysis will explore the operating costs caused by the reporting requirements for smaller credit institutions in particular, depending on the granularity and the frequency of these requirements.

Nonetheless, in light of the EBA's commitment to proportionality, the EBA seeks to further assess, by way of this report, the proportionality of the reporting framework. In particular, the focus is on smaller, less complex institutions. This is also underlined in the recent call for advice[60] in which the Commission refers to the need to assess 'the possibility of introducing simplified reporting requirements (in terms of frequency or amount of data to be reported) for LR and NSFR based on criteria such as type of business model, risk profile, size etc.'.

In order to assess this issue, the EBA has performed a time series analysis which assesses the volatility of the LR exposure measure for institutions of different size buckets, which could inform the appropriateness of the frequency of reporting. In particular, if a subset of credit institutions (e.g. those falling into the size bucket for small credit institutions) would display a more stable (i.e. less volatile) LR denominator over time, it could be argued that, for reasons of proportionality, the frequency of the LR reporting requirement for these credit institutions could be decreased. For this reason, on the basis of quarterly observations on the LR of institutions as reported in the EU QIS exercise, an analysis has been performed. The sample for this analysis consists of the 107 EU institutions which participated in all the

[58] https://www.eba.europa.eu/documents/10180/1113844/EBA-ITS-2015-03+Final+Draft+ITS+amending+ITS+on+LR+Reporting.pdf.

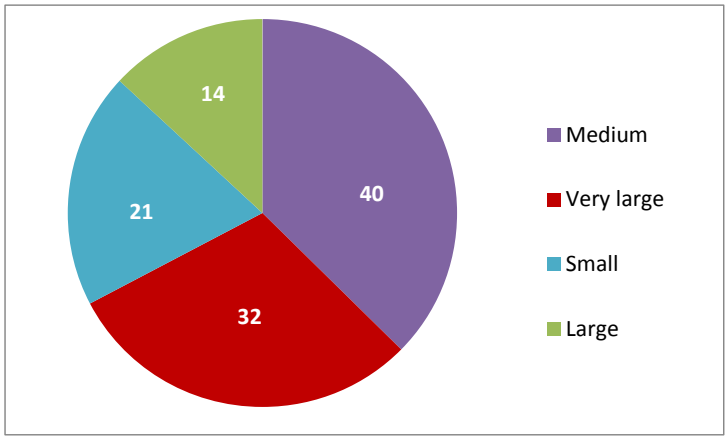
[59] LR reporting generally applies on a solo and consolidated level.

[61] Allocation on the basis of the size buckets (which have also been applied in the NSFR impact assessment report) has been based on the December 2012 round of the EU voluntary exercise.

LR data collections from December 2012 to December 2014. For the purpose of the analysis, the sample has been subdivided into the following four size buckets:[61] very large credit institutions (LR exposure > EUR 200 billion), large credit institutions (LR exposure ≤ EUR 200 billion but > EUR 100 billion), medium-sized credit institutions (LR exposure ≤ EUR 100 billion but > EUR 10 billion) and small credit institutions (LR exposure ≤ EUR 10 billion).

Based on the abovementioned definitions, the sample comprises 21 small banks, 40 medium banks, 14 large banks and 32 very large banks (Figure 6).

Figure 6: Composition of the sample

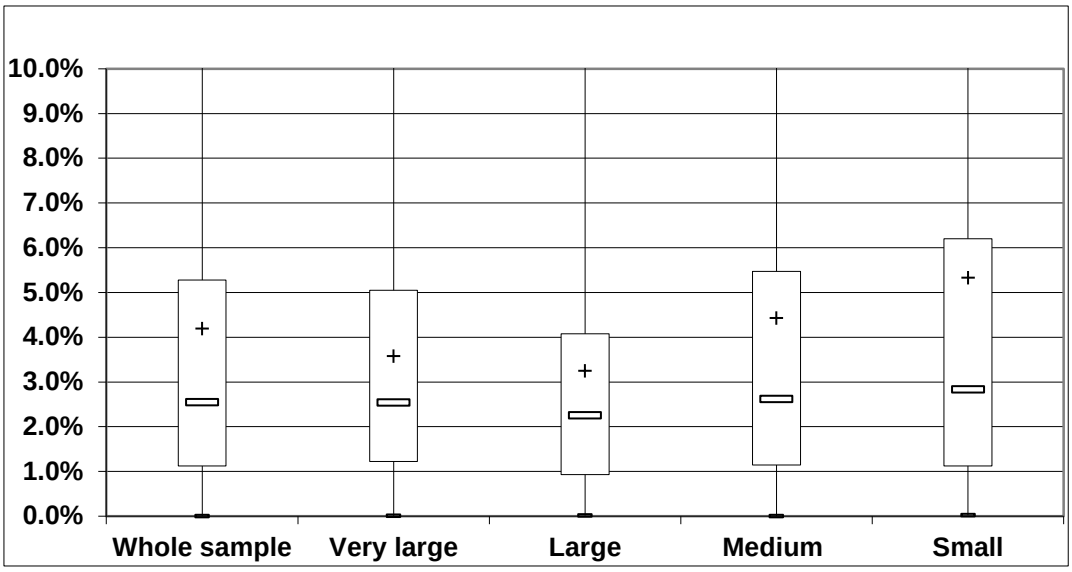


Source: EBA QIS (Dec. 2014)

As can be observed in Figure 7, the analysis does not show a clear relationship between the size and the variation of the LR and of the LR exposures. More specifically, on average, aggregating all the quarter-to-quarter deviations for the four size buckets from December 2012 to December 2014, small banks had a slightly increased volatility in their LR exposures from one quarter to another.

[61] Allocation on the basis of the size buckets (which have also been applied in the NSFR impact assessment report) has been based on the December 2012 round of the EU voluntary exercise.

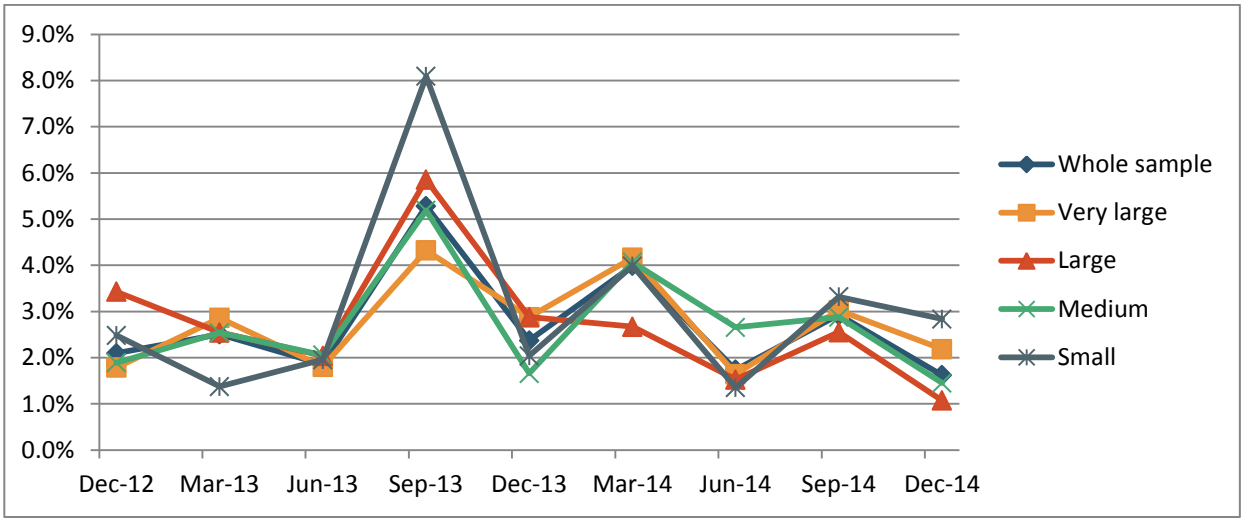
Figure 7: LR exposures absolute quarterly variation from December 2012 to December 2014



Source: EBA QIS (Dec. 2014)

In Figure 8, the average quarter-to-quarter deviations for the different groups for the period December 2012 to December 2014 can be observed. It also seems that the variation in LR exposures for small banks was globally similar to that observed for other size buckets.[62]

Figure 8: Quarterly absolute variation of LR exposures (median)

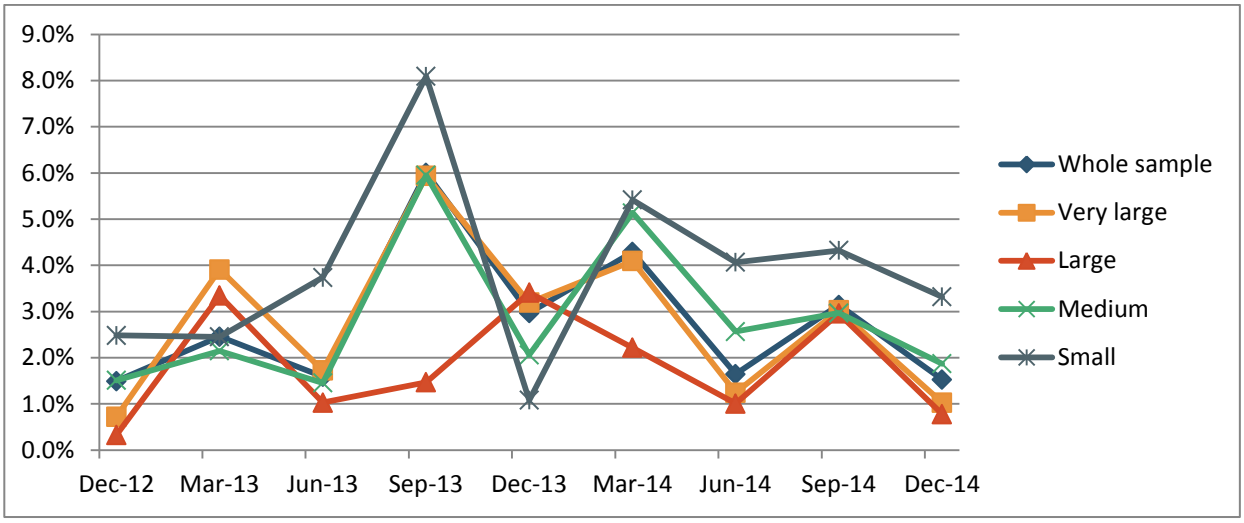


Source: EBA QIS (December 2014)

[62] The increased volatility observed in quarterly data points (March, September) compared with the half-year data points (June, December) is not something that has been further investigated. It applies to all size groups and, therefore, should not affect the relative results.

In conclusion, the analysis results provide no sound basis for applying a lower reporting frequency to small banks. In this regard, it is also to be noted that the robustness of this conclusion has been underpinned by another version of the above analysis to be found in Figure 32, which focused on only the quarter-to-quarter increases in the LR denominator (disregarding decreases in the denominator).

Figure 9: Quarterly positive variation of LR exposures (median)



Source: EBA QIS (December 2014)

2.5 Supervisory review of the LR within SREP

Article 511(3)(a) of the CRR sets out that the EBA shall also include in the report to the Commission 'whether the LR framework provided by this Regulation and Articles 87 and 98 of Directive 2013/…/EU is the appropriate tool to suppress the risk of excessive leverage on the part of the institutions in a satisfactory manner and degree' and 'whether the requirements laid out in Articles 76 and 87 of Directive 2013/…/EU * in accordance with Articles 73 and 97 of Directive 2013/…./EU for addressing the risk of excessive leverage are sufficient to ensure sound management of this risk by institutions and, if not, which further enhancements are needed in order to ensure these objectives'.

An EBA survey, involving competent authorities from 27 jurisdictions and the SSM, has indicated that in a few countries, affecting 14 institutions, the competent authorities have taken measures towards particular institutions related with REL. One competent authority answered that it intended to require institutions to take into account an indicator for REL that is different from LR. Besides this, two other competent authorities indicated that the assessment of REL within the SREP has led to the imposition of additional own funds requirements; however, no formal methodology has been developed.

Two competent authorities also apply indicators other than LR within the SREP, namely capital over total assets and Pillar 1 requirement as a decreasing percentage of liabilities.

Regarding business models, only three competent authorities have indicated that they differentiate treatment of REL within the SREP based on business models. One competent authority uses business-model definitions that are similar to those developed by the EBA for the purposes of this report.

Finally, most competent authorities indicated that they have started to adjust their processes to a stronger or lesser extent to ensure the coverage of REL.

2.6 National requirements and guidance of the ESRB

2.6.1 National LR requirement

The concept of LR existed in some countries before the introduction of the Basel LR by way of the Basel III framework in 2010. For example, the USA has a LR assessed as a minimum ratio of Tier 1 capital to total average adjusted assets (not including off-balance-sheet items). The Canadian 'assets to capital multiple' is a more comprehensive LR, as it also includes some off-balance-sheet items. In 2008 the Swiss regulator FINMA introduced a minimum LR under Pillar 2 solely for Credit Suisse and UBS. The Swiss LR is based on Tier 1 capital as a proportion of total adjusted assets. The accounting balance sheet is adjusted for a number of factors (domestic assets are excluded and cash variation margin is allowed to reduce exposures).[63]

The Basel III LR was introduced in EU legislation via the CRR (575/2013). Recital 18 of the CRR states that 'Until the harmonisation of […] a LR in 2018, Member States should be able to apply such measures as they consider appropriate, including measures to mitigate macroprudential or systemic risk in a specific Member State'.

The following table provides an overview of the different national approaches to leverage-related requirements introduced after the Basel III framework.

EU Member State	Basel/CRR LR
Denmark	Expert group recommendation of December 2015 is 3% minimum, with some differentiation for Danish mortgage banks.[64]
Netherlands	In August 2013, the Finance Ministry recommended at least a 4% LR for systemically important banks.[65] Following these recommendations De Nederlandsche Bank has imposed an expectation on four systemically important banks that they meet a minimum 4% LR by 2018. The LR is expected to be met with CRD IV end-point Tier 1 capital and uses the BCBS 2014 definition of the leverage exposure measure.[66]
Sweden	In May 2014, the Financial Stability Council decided that the need to introduce a LR ahead of EU standards to serve as a complement to risk-weighted ratios should be investigated. The Riksbank proposed in December 2014 to apply a 4% LR for the systemically important banks 'as soon as possible' (in the form of a 3% minimum and a 1% buffer), and that the LR should be increased to 5% (3% + 2% buffer) by January 2018.[67] The Swedish FSA does not wish to front run the EU implementation by 2018, but expressed in 2014 that the LR should be met primarily with CET1 capital.[68]
UK	In November 2013, the UK PRA set a 3% LR supervisory expectation for major UK institutions. These institutions were also asked by the UK FPC to publicly disclose their LR information from 2014. Small institutions are not subject to a LR expectation. From January 2016, the PRA's supervisory expectation on major UK institutions was

[63] http://www.worldbank.org/financialcrisis/pdf/levrage-ratio-web.pdf.

[64] http://evm.dk/nyheder/2015/15-12-07-eksperter-om-gearingskrav (available in Danish only).

[65] Kabinetsvisie Nederlandse Bankensector, Dutch Finance Ministry, 23 August 2013.

[66] Hebbink et al. (2014). http://www.dnb.nl/en/binaries/414634_DX0_DNB_OS_12-03_eng_web_tcm47-306789.pdf.

[67] http://www.riksbank.se/Documents/Rapporter/FSR/2015/FSR_2/rap_fsr2_151125_eng.pdf.

[68] http://www.fi.se/upload/90_English/20_Publications/20_Miscellanous/2015/Bruttosoliditet_eng_20150123ny.pdf.

replaced by a rule-based LR framework, which includes a 3% minimum LR requirement and a countercyclical LR buffer, to be set to 35% of the corresponding risk-weighted countercyclical capital buffer rate. The framework also introduced an additional LR buffer for UK GSIIs and SRB institutions, calibrated at 35% of the corresponding risk-weighted buffer rate, to be phased in following the same transitional path. The minimum has to be met by 75% CET1 and both buffers have to be met with CET1 capital only. Under this LR framework, institutions are also required to calculate an averaged LR, to be reported to supervisors from 2017 and disclosed publicly from 2018.

The UK FPC has indicated its intention to broaden the scope of the existing UK LR framework to include all institutions, subject to a review in 2017 of progress on international LR standards.

Non-EU countries	Basel LR
Canada	3% minimum as of 1 January 2015.
Switzerland	Switzerland recently increased its Tier 1 LR requirement from 3.1% to 5%. The Swiss authorities do not rule out higher LR requirements if their GSIBs become more systemically important. At least 3.5pp must be met with CET1 (i.e. 70%).[69]
USA	In the USA, a 3% Tier 1 capital minimum requirement applies, with a 2% buffer leading to a 5% requirement for GSIIs from 2018. US insured depository institutions (IDIs), however, will be subject to a 3% buffer, giving them a total requirement of 6%.
Australia	In Australia, the Government's 'Financial System Inquiry' recommended a LR of between 3 and 5%.[70]

2.6.2 ESRB guidance on macroprudential use of the LR

In June 2015, the ESRB published an addendum to the *ESRB Handbook on Operationalizing Macroprudential Policy in the Banking Sector* (the handbook) entitled 'Macroprudential Leverage Ratios', which focuses on the possible macroprudential use of this regulatory tool.[71]

The ESRB's handbook 'provides detailed guidance to macroprudential authorities in the European Union (EU) on how to design and implement macroprudential policy for the banking sector. It is not binding on macroprudential authorities and does not prejudice the competence of the responsible authorities to determine their own policy stance, recognizing the need for national flexibility'.

The ESRB considers that the analysis in the addendum chapter is relevant to the development of a harmonised minimum requirement, since the minimum requirement and the flexibility for any potential macroprudential add-ons would form part of the same overall framework. The chapter recognised the ongoing work in Europe and by the BCBS on the LR framework, as well as on the risk-weighting framework; the analysis included in the chapter is robust to different choices about the precise definition and calibration of the microprudential LR.

[69] https://www.finma.ch/en/news/2015/10/mm-tbtf-20151021/.

[70] http://www.federalreserve.gov/newsevents/press/bcreg/20140408a.htm.

[71] ESRB 2014a.

Moreover, the ESRB addendum on macroprudential use of the LR is expected to be reviewed in 2017, after work on the microprudential requirement is completed. The following part provides a factual description of the selected sections of the ESRB addendum chapter.

a. Leverage in a system-wide perspective

While the microprudential LR requirement relates to individual institutions, limiting the size of the balance sheet for a given capital endowment, leverage can also be considered in a system-wide perspective, in particular, since bank leverage has often presented a procyclical pattern, with consequences for financial (in)stability, as a rapidly growing theoretical and empirical literature underlines.[72]

In essence, when market asset prices rise and aggregate perception of risk is low, financing conditions are favourable and banks may have strong incentives to expand their balance sheets, particularly with recourse to debt. Hence, the individual balance-sheet management of financial intermediaries can translate into credit growth (as more borrowers get credit when the banks' balance sheets expand) and sometimes in credit crunches (when financial intermediaries need to reduce their balance-sheet size).[73] The latter may be regarded as negative externalities from individual profit-maximising behaviour.

Moreover, if capital requirements are determined exclusively according to risk-weighted capital requirements, in the expansionary phase of the economic and financial cycle when volatility and risk weights are low, banks are able to increase their balance-sheet size for a given level of capital; the reverse occurs in the downturn.[19] Hence, if banks try to maintain a constant risk-weighted capital ratio through the cycle, bank leverage will vary with the cycle. In this context, a regulatory LR requirement may limit the cyclicality of bank leverage. Moreover, creating a countercyclical automatic stabiliser will reduce the economic costs associated with aggressive deleveraging in the downturn, which typically follows the excessive growth of leverage in periods of economic expansion.

b. Structural and cyclical use of the LR – macroprudential buffers

Macroprudential policy should address differences in institutions' systemic relevance as well as fluctuations in aggregate risk over the financial cycle. Hence, both a structural and a cyclical perspective are adopted regarding the implementation of macroprudential measures.

The structural motivation for a higher LR requirement focuses on the role of the LR in tackling systemic risks arising from misaligned incentives and 'too big to fail' issues. From this perspective, the LR may increase the resilience of large, complex and interconnected institutions against risks arising from the limitations of risk weighting ('model risk') and related uncertainties. Given that large and complex institutions are more likely to rely on internal ratings-based approaches to set

[72] A detailed literature review on the procyclicality of bank leverage is presented in section 8.3 of this report.

[73] Adrian and Shin (2008).

risk-weighted capital requirements, as well as internal trading book models, they may be even more exposed to model risk than banks under the Standardised Approach for risk-weighted assets (RWA). This argument is corroborated by data showing that SIIs have, on average, lower risk weights and LRs than other types of banks. Given that SIIs should be more resilient than non-systemically important institutions – and given that they can reduce systemic risks by reducing their probability of failure – consideration should be given to supporting increases in risk-weighted capital buffers for those institutions with increases in their LR requirements.

The *cyclical perspective* in the ESRB's addendum on LR focuses on the role of the LR in tackling systemic risks from excessive credit growth and financed through leverage. A higher level of capital may help to mitigate deleveraging in a downturn, thus stabilising the flow of credit to the economy. As aggregate risk fluctuates over time, the ESRB considers that capital requirements could also be varied over the cycle to ensure that banks remain sufficiently capitalised.

With regard to the cyclical perspective, the ESRB's addendum on LR also considers that, while a static LR goes some way towards addressing procyclicality during an upturn by operating as an automatic stabiliser which ensures that capital moves in proportion with total exposure, aggregate risk varies over time. It concludes that a static LR could, in principle, be supported by active countercyclical use, whereby a buffer that is built up could help both to build resilience and to mitigate exuberance, with subsequent release when risks recede, or to help prevent harmful deleveraging when banks incur losses.

c. Rules and discretion in the definition of macroprudential leverage buffers

The ESRB addendum on LR discusses various approaches that could be employed for the setting of macroprudential LR buffers. It notes that, as with risk-weighted buffers, any macroprudential use of the LR should reflect national specificities and circumstances, including national credit cycles and structural differences across financial systems and institutions.

However, the ESRB addendum on LR notes that, from a technical design perspective, there is a relationship between risk-weighted capital requirements and the LR which offers the possibility of deploying a guide rule linking the two the relationship which can be summarised by the 'Critical Average Risk Weight' (CARW). If either the risk-weighted capital requirement or the LR requirement is changed, the implied CARW also changes and the relative stringency of the two requirements is altered.[74] Thus, when varying the calibration of either the risk-weighted or LR requirement, it would be necessary to vary the other requirement in proportion to the CARW in order to preserve the same relative stringency of the two requirements. It could be feasible to design a rules-based approach to calibrating LR buffers by using the implied CARW as a 'conversion factor' for risk-weighted buffers to determine LR buffers; an institution's LR requirement would be a fixed scalar of its risk-weighted requirement at all times.

[74] For example, under a 3% Tier 1 static leverage ratio requirement and a 6% Tier 1 risk-weighted minimum requirement, the leverage ratio will be more constraining than the minimum risk-weighted requirement if a bank's average risk weight across its balance sheet is below the 'critical' average risk weight of 50% (= 3/6). However, taking into account the capital conservation buffer, the total Tier 1 capital requirements before macroprudential add-ons will amount to 8.5% and the conversion factor from a 3% leverage ratio would be viewed as 35% (= 3/8.5).

In its assessment of the advantages and drawbacks of a rules-based versus discretionary approach to the calibration of LR buffers, the ESRB addendum chapter states that, on the one hand, setting a rule may be simpler, may provide more certainty and transparency (including to banks) and may provide greater coherence in the overall approach towards the capital framework. On the other hand, discretion allows for more flexibility and may make it easier for authorities to pursue different objectives using macroprudential LR requirements.

d. Transmission mechanism, unintended consequences and spill-over effects

Transmission mechanism

If the LR is binding for a bank, it would be required to improve its capital level and/or to lower its total exposures. Higher capital levels enhance banks' capacity to absorb losses and mitigate agency conflicts as banks gain fewer benefits from distortive implicit debt guarantees. Thus, their investment decisions are less biased and incentives for excessive borrowing and risk taking are lower. The realignment of incentives contributes to a more stable flow of credit to the economy. In periods of stress, higher levels of capital reduce the risk of contagion between financial institutions, acting as a kind of 'circuit breaker', and avoid procyclical deleveraging.

The backstop role of the LR arises from its distinct exposure measure. Because assets are not risk weighted, a bank cannot adjust to a leverage requirement by rebalancing its exposure in favour of assets with low risk weights (backstop against risk weights being too low). In addition, due to the more comprehensive exposure measure, the LR ensures that banks are capitalised for off-balance-sheet exposures such as commitments (backstop against off-balance-sheet risks).

Unintended consequences

Any regulation faces the potential unintended consequence of pushing risks outside the regulatory perimeter, but the incremental effect of a LR framework including buffers over the risk-weighted requirements may be limited. Furthermore, risk-shifting may arise when leverage-constrained banks are incentivised to restore profit margins by taking greater portfolio risks. However, complementary risk-weighted requirements limit such incentives as higher risks should be reflected in higher risk weights. Indeed, theoretical and empirical evidence suggests that the higher resilience and incentives from increased 'skin in the game' reduce incentives to maximise short-term returns by incurring higher risk.[75] Recent empirical research by Grill et al. (2015) suggest that up to a LR requirement of 5%, the marginal benefit from increased loss-absorbing capacity would outweigh any negative impact from additional risk-taking.

Regarding links to other regulatory policies, the ESRB chapter on LR highlights broader perspectives on excessive leverage in the economy and the complementary nature of different measures. It concludes that macroprudential LRs are unlikely to conflict with other regulatory requirements, monetary policy or fiscal policy.

[75] Hellman et al. (2000).

3. REL – differences across types of credit institutions

3.1 Summary section

OBJECTIVES OF THE SECTION

Pursuant to Article 511(3)(b), (i) and (l) of the CRR, the purpose of this section is to analyse the risk profile of different categories of credit institutions and their respective exposure to REL in order to identify potential rationales and criteria that would allow for some differentiation in the calibration of the LR requirements within the EU banking sector.

METHODOLOGY

METHODOLOGY USED FOR THE BENCHMARKING ANALYSIS

- The methodology relies on a quantitative benchmarking analysis which compares the exposures to REL between different categories of credit institutions in relative terms.

- For the purpose of the analysis the REL is analysed along four different risk dimensions, each of which is characterised by some specific indicators, including:
    - the level and stability of profitability;
    - the stability of funding;
    - the stability of the business activity;
    - the degree of concentration.
- The institutions were classified by their national competent authorities into 12 different business-model categories, taking into account their (legal and geographical) setup, activities and funding profile:
    - cross-border universal banks;
    - local universal banks;
    - automotive, consumer credit banks;
    - building societies;
    - locally active savings banks and loan associations;
    - private banks;
    - custody banks;
    - merchant banks;
    - leasing and factoring banks;
    - public development banks;
    - mortgage banks;
    - other specialised banks.

- The four dimensions and risk indicators have been applied across the board for the whole

sample in order to be able to benchmark banks in the sample, while completing the analysis with more qualitative description where needed.

- The analysis is completed by a size-bucket approach (i.e. very large, large, medium and small institutions) and by an assessment of the globally systemic relevance (GSIIs and non-GSIIs).

- As a guiding rule, a category of credit institutions is only considered to be more or less exposed to REL than other entities if at least three of the four risk dimensions point in this direction.

DATA SOURCE AND SAMPLE COVERAGE

The analysis is based on the June 2015 EU QIS data and includes 246 EU credit institutions which submitted the required data.

KEY FINDINGS

LR POSITION OF EU CREDIT INSTITUTIONS

- The median LR, assuming a fully phased-in definition of capital (i.e. excluding the effects of transitional arrangements), is 5.5% and the weighted average is 4.4%, which indicates that larger credit institutions are, on average, more leveraged than smaller ones. The median LR varies considerably across different categories of business models, ranging from 2.8% in the case of 'public development banks' to 8.7% in the case of 'automotive & consumer credit banks'. On this basis, the results suggest that introducing a flat level LR which would apply to all credit institutions would impact business models in profoundly different ways. At a calibration of 3%, and assuming a fully phased-in definition of Tier 1 capital, the aggregate capital shortfall is EUR 6.4 billion, caused by 21 entities that reported their LR below the 3% level. The aggregate Tier 1 capital shortfall increases quite substantially for levels above 3.5% (shortfall at 3.5% EUR 25.4 billion, shortfall at 4% EUR 84.9 billion, shortfall at 4.5% EUR 166.7 billion and shortfall at 5% EUR 281.6 billion).

REL BY BUSINESS MODELS

- Overall, the quantitative benchmarking results suggest a well spread-out REL with a general tendency for a higher exposure to REL for 'cross-border universal banks' and a lower exposure for 'custody banks' exhibiting the highest risk and 'locally active savings and loan associations and cooperative banks':

    - In the case of 'cross-border universal banks' the results are driven by elevated levels of volatility in the risk dimensions profitability, funding and business activity.

    - For 'custody banks', key drivers are elevated levels of volatility in funding, business activity and a high degree of concentration in specific asset classes and income sources. Caution is, however, warranted as it may be argued that these risk indicators are of a lower relevance for custody banks compared to most other business-model types given their very specific activity profile. This may particularly be the case for banks that are CSDs. It is to be noted that no

institution in this business model reported an LR below 3%.

- The results for 'locally active savings and loan associations and cooperative banks' are influenced by comparatively stable levels of profitability, funding and business activity. However, while a lower exposure to REL may be suggested in the case of 'locally active savings and loan associations and cooperative banks' which are non-GSIIs, this would not be fully corroborated according to the benchmarking results by size bucket because 'locally active savings and loan associations and cooperative banks' are spread across the four size buckets and even entities in the smallest size bucket do not appear to be less exposed to REL than other entities. It should also be noted that no institution in this business model reported an LR below 3% with a median LR of 6.7%.

- For other types of business models, the benchmarking results are quite mixed, perhaps reflecting the diversity of the EU banking landscape. For these categories, the observed tendencies are not deemed strong enough to conclude a higher or lower exposure to REL.

- Public development banks and mortgage banks:

  In terms of business models, the institutions in the sample that reported an LR below the level of 3% as of 30 June 2015 are mainly categorised in the business models of 'public development banks' and 'mortgage banks'.

  In addition to the quantitative benchmarking, the EBA has carefully considered the common features of public development banks which remain the same in a diversified landscape across the EU, as no single model has been set up on a national, regional or more local level. The EBA has also considered the current applicable framework in other parts of the regulatory framework and has investigated possible technical criteria that could be used to operate a potential differentiation for this business model if deemed justified, in particular, the existence of a binding legal/mandate imposing a public mission to the public development bank while restricting its activities to very specific business areas, as well as the use of some 'pass-through' systems.

  The main challenge faced by the EBA was to ensure that the definition of some criteria for a potential differentiation for public development banks would not create possibilities of regulatory arbitrage, i.e. would avoid that a given proposed beneficial treatment is not then used by entities for which it is not originally designed.

  For mortgage banks, the EBA quantitative benchmarking outcome indicated that mortgage banks would not be exposed to more or less REL in total, as there is an underperformance on only two dimensions. Additional considerations, which put the benchmarking outcome into a broader context, are that they have some common features such as a specialisation in directly originating or servicing mortgage loans, and that they are predominantly funded through the issuance of covered bonds. Therefore, these banks often do not maintain a network of regional branches which would give them broad access to retail deposits but mortgage banks may compensate for this through 'match-funding' their long-term loans by long-term bond

issuances.

It should also be considered that risk estimates and collateral values of the mortgages can fluctuate through the economic cycle and that conditions in wholesale funding markets, on which mortgage banks often rely, can change, which may speak against lowering the LR requirements for mortgage banks.

- CCPs:

  While the business of operating a CCP generally does not fall under the CRR definition of credit institutions, there are a few CCPs in the EU which hold a banking licence, mainly due to national laws and in order to gain access to central bank refinancing operations in specific monetary regimes. In addition, CCPs in the EU are subject to the requirements of EMIR.[76]

  In particular, EMIR prevents CCPs from carrying out usual banking activities, including most forms of maturity transformation and build-up of typical bank leverage by funding (risky) assets with liabilities such as (wholesale or retail) deposits. As far as CCPs take deposits (typically in the form of margins) from clearing members, this occurs mainly for the purposes of risk management rather than funding investment activities. In this regard, the amounts as well as the kinds (cash vs. securities) of received collateral are somewhat exogenous to CCPs and need to be determined in relation to volume and risk of a clearing member transaction.

  Other considerations are the aspect of level playing field (most CCPs around the globe will not be subject to an LR in any case) as well as to broader financial stability considerations (if CCPs surrendered their banking licences in order to escape an LR requirement they would lose access to central bank liquidity in certain monetary regimes which could have adverse repercussions during crisis situations).

- CSDs:

  Similarly to CCPs, CSDs are considered market infrastructures and subject to specific EU legislations which significantly narrow the scope of their activities. Scoping out CSDs, similar to CCPs, could be based on the requirements of the CSDR, which include a restriction of banking services to the settlement activities which are provided only to the participants in the settlement system. Other restrictions from the CSDR on CSDs include the holding of additional capital requirements for intraday credit lines as well as stringent requirements concerning the use of bank guarantees on credit exposures. As with CCPs, due to the performance of a market infrastructure function, the balance sheets of CSDs are somewhat exogenous to them.

REL BY SIZE BUCKETS

- In terms of categorisation by size, there seems to be a tendency for higher exposure to REL in the case of the largest credit institutions.

RISK OF EXCESSIVE LEVERAGE BY SYSTEMIC RELEVANCE

[76] Regulation (EU) No 648/2012.

- The benchmarking analysis for GSIIs generally displays the same results as for very large banks: the GIIs are more exposed to REL than non-GSIIs (i.e. more exposed when considering the level and the stability of profitability, the stability of funding and the stability business activity but less exposed to the risk of concentration).

3.2 Methodology

3.2.1 General approach

In accordance with its mandate stemming from the CRR, the EBA has performed an assessment of the risk profiles of different types of business models used by EU credit institutions with a particular focus on leverage-related risks in order to inform a potential differentiation of the prudential LR level requirements.

A key component is a quantitative benchmarking to assess potential differences in the exposure to the REL across different types of credit institutions. In particular, the benchmarking is a relative concept to gauge the types of credit institutions that tend to be more or less exposed to REL which is analysed along the following four risk dimensions: level and stability of profitability, stability of funding, stability of the business activity and degree of concentration. The benchmarking facilitates a ranked categorisation by business model, size and systemic relevance, which eventually informs the recommendations about calibrating the LR requirements above or below the baseline (benchmark) calibration level of 3%. Sections 3.4, 3.5 and 3.6 contain detailed descriptions of the results for each category of credit institution.

3.2.2 Measurement of REL

The calibration of adequate LR levels is one of the key focus points for the EBA report, as can be derived from Article 511(3)(b), (i) and (l) of the CRR. In this respect, recital 95 of the CRR stipulates that: 'When reviewing the impact of the LR on different business models, particular attention should be paid to business models which are considered to entail low risk, such as mortgage lending and specialised lending with regional governments, local authorities or PSEs. The EBA, on the basis of data received and the findings of the supervisory review during an observation period, should in cooperation with competent authorities develop a classification of business models and risks. Based on appropriate analysis, and also taking into account historical data or stress scenarios, there should be an assessment of the appropriate levels of the LR that safeguard the resilience of the respective business models and whether the levels of the LR should be set as thresholds or ranges […].'

A classification of risks requires a concrete understanding of the risk that the LR is supposed to address while taking into consideration that the measure itself is not risky. A classification of institutions into business models requires detailed knowledge of their activities and has been informed by the extensive experience of competent authorities. Eventually, in order to reach conclusions in terms of LR calibration, appropriate indicators of riskiness will provide the necessary basis for benchmarking the risk profiles of institutions of each business-model category against those from other categories.

In addition to recital 95 of the CRR, Article 511(3)(l) of the CRR indicates that the risk profile of business models and the 'risk of excessive leverage' need to be examined in the context of calibrating adequate levels for the LR. Article 4(1)(94) of the CRR defines REL as 'the risk resulting

from an institution's vulnerability due to leverage or contingent leverage that may require unintended corrective measures to its business plan, including distressed selling of assets which might result in losses or in valuation adjustments to its remaining assets'.

More broadly, the CRR introduced the LR with the aim of containing the build-up of leverage in the banking system (recital 1 of the CRR). This build-up of leverage can cause problems, as illustrated in the recent financial crisis and explained in recital 90 of the CRR, when 'losses and the shortage of funding forced institutions to significantly reduce their leverage in a short period of time. This amplified downward pressures on asset prices, causing further losses for institutions which in turn led to further declines in their own funds […]'.

Furthermore, the BCBS has designed the LR as a non-risk-based backstop measure for the risk-based capital framework. As such, the fact that an institution has, for example, a relatively high credit risk or market risk RWA should not be a reason to require a higher LR, and vice versa, as this is already reflected by the risk-based requirements. Making the level of the LR dependent on the measured risk profile of a bank, as measured by the risk-based framework, would make the LR obsolete.

Considering these notions, and given the need to benchmark the vulnerability of business models in terms of excessive leverage for the LR calibration report, the following risk dimensions have been developed by the EBA in close coordination with the competent authorities to assess institutions' exposure to REL:

- Level and stability of profitability: low and/or volatile profitability levels may adversely impact own funds and may therefore increase the likelihood that an institution will have to engage in corrective measures in periods of financial distress, especially when combined with low levels of own funds (i.e. high leverage). Such corrective measures may well include deleveraging actions in order to reduce capital requirements and to sustain regulatory compliance and to meet expectations of investors with regard to capital ratios. Moreover, low and/or volatile profitability levels may also complicate dealing with unforeseen and rare shocks whose ramifications may not be fully reflected in the regulatory or internal models which form the basis for risk-based capital requirements. It is one objective of the LR to 'backstop' risk-based capital requirements against such risks. *The following risk indicators are applied in the benchmarking of the risk dimensions: return on assets (Sharpe ratio), peak loss and Z-score.*

- Stability of funding: empirical findings suggest that institutions might use (collateralised) short-term funding sources to increase leverage in benign market conditions and vice versa. High reliance on short-term funding sources may therefore increase leverage-related risks, especially when combined with a relatively illiquid asset composition. Also, an unstable funding position may increase the likelihood that an institution will have to engage in deleveraging (including distressed selling of assets) during a crisis situation. *The following risk indicators are applied in the benchmarking of the risk dimensions: high-quality liquid assets (HQLA) as defined for the liquidity coverage ratio (LCR)-to-assets ratio*

(mean), available stable funding (ASF) as defined for the net stable funding ratio (NSFR)-to-assets ratio (mean), deposits-to-assets ratio (mean).

- Stability of the business activity: high volatility in business activity may be indicative of an unstable (and possibly less sustainable) business plan. In particular, rapid expansions and contractions of the balance sheet and individual core components (such as loans) may be of concern if they are accompanied by high levels of leverage. *The following risk indicators are applied in the benchmarking of the risk dimensions: standard deviation of growth rate of loans and standard deviation of growth rate of assets.*

- Degree of concentration: where the business of an institution is highly dependent on a small set of asset classes, it may be more vulnerable to specific episodes of stress, as well as tail risks, yielding a higher relevance to the LR as a backstop measure. Institutions mainly relying on a single or few business lines benefit less from risk-mitigation than more diversified banks. *The following risk indicators are applied in the benchmarking of the risk dimensions: primary asset class (mean) and primary source of income (mean).*

The risk indicators are computed over a time period of 11 years, starting in 2004, and are employed in statistical tests which assess exposure to REL in relative terms (i.e. assess what types of credit institutions tend to be more or less exposed to RELthan others).[77] This facilitates a ranked categorisation (referred to as 'benchmarking') according to business model, size and systemic relevance, which informs the recommendations on LR requirements above or below the baseline calibration level of 3%.

The benchmarking results at the level of the four risk dimensions and 10 risk indicators are displayed on the second page of the 'dashboards' for each category of credit institutions in chapters below. For the risk indicators, this includes charts displaying their distribution across all entities in the sample. In each of these charts, the observations at the left-hand side of the distribution represent the most positive indicator scores, while the observations on the right-hand side represent the most negative indicator scores. Where the statistical test results suggest that the credit institutions of a certain type (i.e. business model, size bucket or classification into GSII or non-GSII) outperform the remaining credit institutions in the sample, the chart is shaded green (or red in the case of underperformance). Finally, the boxplot charts displayed to the right

[77] In order to test whether credit institutions of a certain category tend to outperform or underperform the rest of the sample on the basis of a given indicator, the Mann–Whitney *U*-test, testing that a particular population tends to have larger values than the other, is applied. This statistical test is considered most suited considering the properties of the underlying data which include unequal sample sizes. Moreover, and as an additional safeguard against heterogeneity of the indicator values, a 'tail rule test' is applied in a second step. The practical application is that where the Mann–Whitney *U*-test concludes that a certain category of credit institutions generally outperforms or underperforms the rest of the population but more than 10% of related credit institutions display indicator values in the opposite quartile of the distribution (i.e. contradicting the general trend), the Mann–Whitney *U*-test result is not considered sufficiently reliable, as the underlying indicator values are deemed to be 'too heterogeneous'. In conclusion, the indicator level results of a certain category of credit institutions are considered to suggest more or less exposure to REL only when both the Mann–Whitney *U*-test points to significant outperformance or underperformance relative to the rest of the sample and the tail rule test is not violated.

of the distributions compare the summary statistics (minimum value, maximum value, 25th percentile value, 75th percentile value, mean value, median value) of the relevant type of institution (first boxplot) with the summary statistics of the remaining entities in the sample (second boxplot).

The aggregation of the benchmarking results from the granular level of individual risk indicators to the higher level of the four risk dimensions involves some judgement. To guide this judgement, the following decision rules were applied:

- The entities of a category are considered to be more or less exposed to REL where the majority of the underlying risk indicators point in this direction (e.g. two out of three risk indicators for the risk dimensions level and stability of profitability and stability of funding, or one risk indicator for the risk dimensions stability of business activity and degree of concentration if not contradicted by the respective other indicator). Risk indicator results that are based on too heterogeneous a distribution of underlying observations are not taken into account in the assessment.[77]

- Another step of aggregation is needed in order to reach overall outcomes with regard to the exposure to REL on the basis of the results at risk dimension level. As a general rule, a category of credit institutions is only considered to be more or less exposed to REL than other entities if at least three of the four risk dimensions point in this direction.

The concept of benchmarking implies that different types of credit institutions are assessed based on a common methodology with a homogeneous set of risk indicators. Particular consideration has been given to the process of selecting indicators which are (a) reflective of the respective risk dimension, (b) computable based on the available data for the entities in the sample and (c) meaningful for different categories of business models. In particular, the process of indicator selection involved detailed discussions with competent authorities, careful data reviews and discussions with a wide range of EU banking industry representatives. Globally, the process has corroborated the appropriateness of the methodology.

Nevertheless, the quantitative benchmarking results are subject to a number of caveats and therefore require careful interpretation from a more qualitative perspective. In particular, while all risk indicators are generally considered relevant, their significance may vary across business models, the quantitative results do not directly consider legal or other national specificities, the aggregation of results to the level of the four risk dimensions and overall benchmarking outcomes involves elements of judgement (in the form of the referred decisions rules) and the sample coverage varies across countries and business models.

Annex 1 contains detailed descriptions of the 10 risk indicators applied in the quantitative benchmarking.

3.2.3 Classification by business model, size and systemic relevance

a. Classification by business models

Consistent with recital 95 of the CRR, the EBA performed a classification of credit institutions by business model in cooperation with the competent authorities. In particular, as indicated in Table 16, a set of 12 different business-model categories has been defined, taking into account business activities (e.g. the main asset and funding types), legal aspects (e.g. specific statutory constraints), ownership (e.g. privately owned versus publicly owned) and geographic profile (internationally active versus domestically active).

Table 16: Description of the business models used

Full name	Description
Cross-border universal banks	**Activity**: - Engaged in several banking activities including retail, corporate and capital market operations. - Major cross-border operations. **Funding**: - Diversified source of funding including deposits from clients, wholesale funding and derivatives liabilities. - Significant part of the funding can come from foreign investors. **Ownership/Statute:** no specification (can be cooperative banks)
Local universal banks	**Activity**: - Specialised in originating and/or servicing consumer loans to retail clients and SMEs. **Funding:** no specification **Ownership/Statute:** no specification (may be owned in a form of 'captive bank' by the corporate company that provides the consumer good for which the loan is granted).
Consumer credit banks (including automotive banks)	**Activity**: - Specialised in originating and/or servicing consumer loans to retail clients and SMEs. **Funding:** no specification **Ownership/Statute:** no specification (may be owned in a form of 'captive bank' by the corporate company that provides the consumer good for which the loan is granted).
Building societies	**Activity:** - Mainly specialised in the provision of residential loans to retail clients. **Funding:** - Mainly funded through deposits. **Ownership/Statute:** - Subject to specific statutory requirement with respect to activities and purpose.
Locally active savings and loan associations/cooperative	**Activity:** - Focused on retail banking and SMEs (payments, savings products, lending and insurance)

banks (including mortgage banks)	- Operates locally through a decentralised distribution network. **Funding:** - Mainly funded through deposits **Ownership/Statute:** no specification (can be cooperative banks)
Private banks	**Activity:** - Provides predominantly wealth management services to high net worth individuals and families. **Funding:** - No specifications **Ownership/Statute:** no specification (can be cooperative banks)
Custody banks	**Activity:** - Offers predominantly custodian services (i.e. hold customers' securities in electronic or physical form for safekeeping so as to minimise the risk of loss). - May also provide other services including account administration, transaction settlements, collection of dividends and interest payments, tax support and foreign exchange. **Funding**: no specification. **Ownership/Statute:** no specification
CCPs	**Activity:** - Specialised in settling trading accounts, clearing trades, collecting and maintaining margin monies, regulating delivery and reporting trading data. - Provides a guarantee for the obligations under the contract agreed between two counterparties, ensuring the future performance of open contracts **Funding:** no specification **Ownership/Statute:** no specification Statute: authorised under EMIR
Merchant banks	**Activity:** - Financing domestically and in international trade - Specialised in products such as letters of credit, bank guarantees and the collection and discounting of bills. **Funding:** no specification **Ownership/Statute:** no specification
Leasing and factoring banks	**Activity:** - Specialised in leasing (asset-based financing) and/or factoring activities (i.e. financing method in which the bank pays a company the value of the receivables (invoices) less a discount for commissions and fees). **Funding:** no specification **Ownership/Statute:** no specification
Public development banks	**Activity:** - Specialised in financing public sector projects and/or the provision of promotional credit or municipal loans. **Funding:** no specification **Ownership/Statute:** - Majority-owned by the state/public sector - Subject to specific statutory requirements with respect to the purpose and/or principal activity of the entity.
Mortgage banks including pass-through	**Activity:** - Specialised in directly originating and/or servicing mortgage

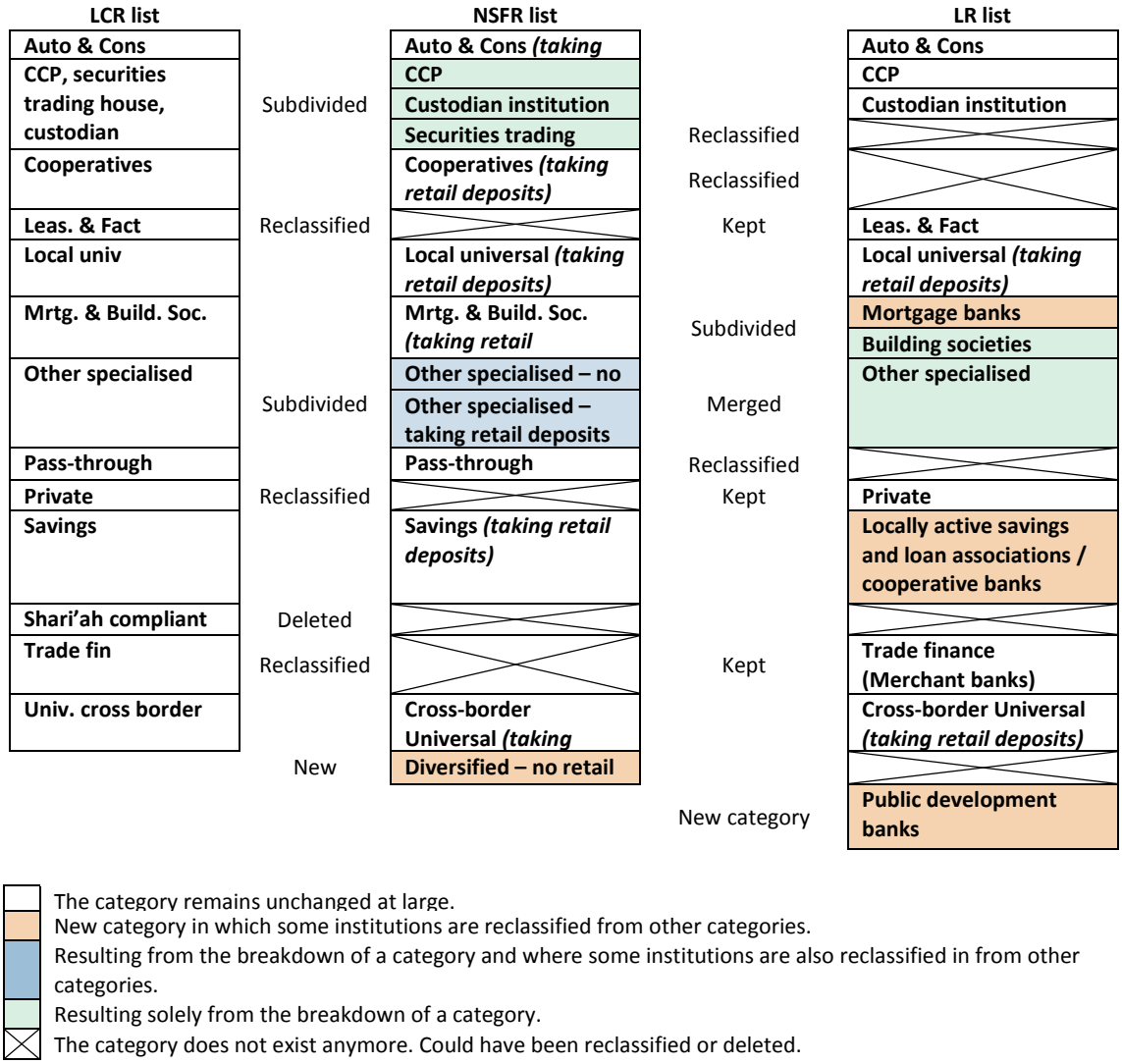
financing mortgage banks	loans. **Funding:** - Predominantly funded through the issuance of covered bonds. **Ownership/Statute:** no specification
Other specialised banks	**Activity:** - Banks not included in the above categories including shari'ah-compliant banks and pass-through financing model (not specialised in mortgage lending). **Funding:** no specification **Ownership/Statute:** no specification

The definition of the business-model categories has also benefited from previous information gathered by the EBA when producing similar reports on the LCR[78] and NSFR[79]. In Table 17 the business-model categories are compared between the EBA LCR, NSFR and LR reports.

[78] https://www.eba.europa.eu/documents/10180/16145/EBA+BS+2013+415+Report+regarding+LCR+impact.pdf.

[79] https://www.eba.europa.eu/documents/10180/983359/EBA-Op-2015-22+NSFR+Report.pdf.

Table 17: Comparison of business models between LCR, NSFR and LR purposes



The category remains unchanged at large.
New category in which some institutions are reclassified from other categories.
Resulting from the breakdown of a category and where some institutions are also reclassified in from other categories.
Resulting solely from the breakdown of a category.
The category does not exist anymore. Could have been reclassified or deleted.

b. Classification by size

In addition to business models, credit institutions have also been classified by size as suggested in Article 511(3)(l) of the CRR and a call for advice to the EBA by the Commission. Consistent with the EBA's report on the NSFR, credit institutions were classified into the following four size buckets: very large credit institutions (LR exposure > EUR 200 billion), large credit institutions (LR exposure ≤ EUR 200 billion but > EUR 100 billion), medium-sized credit institutions (LR exposure ≤ EUR 100 billion but > EUR 10 billion) and small credit institutions (LR exposure ≤ EUR 10 billion).

c. Classification by systemic importance

The analysis also classifies institutions according to systemic relevance. Institutions in the sample identified by FSB as GSIIs in its last published list are separated from the sample and compared to all other non-systemically important firms.

3.3 Overarching results

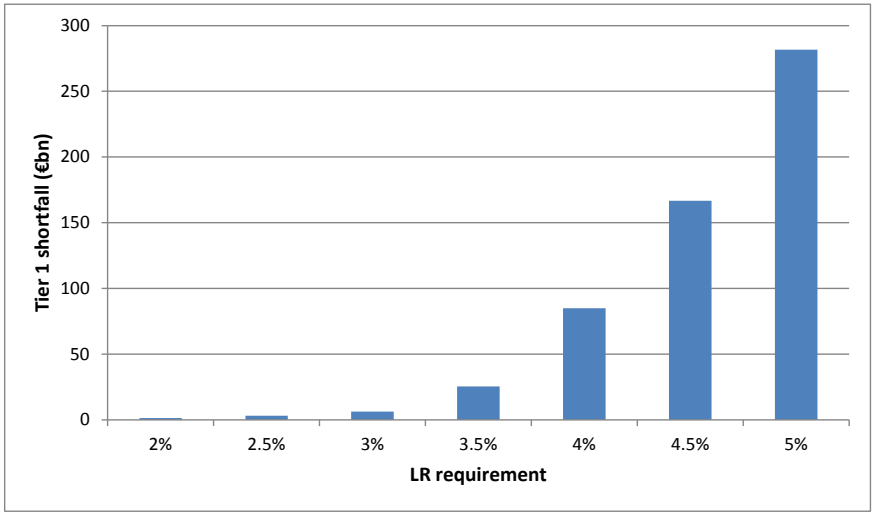
Table 22 displays key results and statistics for each category of credit institution in a summary form.

3.3.1 Overview for the business models

a. LR level

For the full sample consisting of 246 entities, at a calibration of 3%, and assuming a fully phased-in definition of Tier 1 capital (i.e. excluding the effects of transitional arrangements), the aggregate capital shortfall is EUR 6.4 billion, which is caused by the 21 entities (8.5% of the total sample) that reported their LR below the 3% level. As illustrated in Figure 10, the aggregate Tier 1 capital shortfall increases quite substantially, especially for levels above 3.5% (shortfall at 3.5% EUR 25.4 billion, shortfall at 4% EUR 84.9 billion, shortfall at 4.5% EUR 166.7 billion and shortfall at 5% EUR 281.6 billion). The median LR (assuming a fully phased-in definition of capital) is 5.5% and the weighted average is 4.4%, which indicates that larger credit institutions are, on average, more leveraged than smaller ones. The median LR varies considerably across different categories of business models, ranging from 2.8% in the case of 'public development' banks to 8.7% in the case of 'automotive & consumer credit banks'. On this basis, the results suggest that introducing a flat level of the LR which would apply to all credit institutions would impact business models in profoundly different ways.

Figure 10: Aggregate Tier 1 capital shortfall for difference levels of LR requirements



Source: EBA QIS (June 2015)

This finding is confirmed by the number of credit institutions bound (i.e. those that report an LR below a certain level, such as 3%) and constrained (i.e. those for which the LR would constitute a higher capital requirement than a risk-based requirement of 8.5%).[80] For example, 6 out of 12 public

[80] 'entities constrained' refers to the number of credit institutions in the sample for which the LR calibrated at a certain level would constitute a higher Tier 1 capital requirement than the corresponding risk-based requirements. In this context, the

development banks report an LR below 3%, and this level of calibration would imply a higher capital requirement than risk-based requirements for all of these credit institutions (due to the fact that public development banks have a high concentration in exposure with low risk weights). The findings for 'mortgage banks including pass-through financing mortgage banks', 'leasing and factoring banks' as well as 'building societies' appear to be somewhat similar; however, only one of the six building societies in the sample reported an LR below the level of 3% (while 5 out of 12 mortgage banks and 2 out of 4 leasing and factoring banks in the sample reported an LR below 3%).

With regard to the more diversified business models of 'cross-border universal banks' and 'local universal banks', the results indicate a generally lower, but more dispersed, impact of an LR calibrated at 3%. Only 1 out of 34 cross-border universal banks reported an LR below 3% (3 out of 71 in the case of local universal banks) and such a level would be constraining compared to risk-based capital requirements for 14 of these entities (14 out of 71 in the case of local universal banks). With regard to 'automotive & consumer credit banks', 'locally active savings and loan associations and cooperative banks', 'private banks', 'custody banks' and 'merchant banks' the results suggest a comparatively low impact of an LR at a level of 3%, as none of the respective credit institutions in the sample reported an LR below this.

b. Exposures to REL

Overall, the quantitative benchmarking results can be seen to suggest a general tendency of a higher exposure to REL for 'cross-border universal banks' and for 'custody banks', while 'locally active savings and loan associations and cooperative banks' tend to be less exposed. In the case of 'cross-border universal banks' the results are driven by elevated levels of volatility in the risk dimensions profitability, funding and business activity. For 'custody banks', key drivers are elevated levels of volatility in funding, business activity and a high degree of concentration in specific asset classes and income sources. The results for 'locally active savings and loan associations and cooperative banks' are influenced by comparatively stable levels of profitability, funding and business activity. For other types of business models, the benchmarking results are quite mixed, perhaps reflecting the diversity of the EU banking landscape. However, the observed tendencies are not deemed strong enough to conclude a higher or lower exposure to REL for these business-model categories.

following risk-based requirements are taken into account: a minimum level of 6%, a capital conservation buffer of 2.5% and (if applicable) the fully loaded GSII buffer requirement.

Table 18: Benchmarking results by business model

Business model	*Dimension 1* Level and stability of profitability			*Dimension 2* Stability of funding			*Dimension 3* Stability of business activity		*Dimension 4* Concentration		# entities
	ROA (Sharpe ratio)	Peak loss	Z-score	HQLA to assets (mean)	ASF to assets (mean)	Deposits to assets (mean)	Growth rate of loans (sdt dev)	Growth rate of assets (sdt dev)	Primary class of assets (mean)	Primary source of income (mean)	
Cross-border universal banks	More exposed to R.E.L			More exposed to R.E.L			More exposed to R.E.L		Less exposed to R.E.L		34
	Too heterogeneous	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Too heterogeneous	Significantly less exposed to R.E.L	
Local universal banks	More exposed to R.E.L			Neutral			Neutral		Neutral		71
	Too heterogeneous	Significantly more exposed to R.E.L	Too heterogeneous	Neutral	Neutral	Significantly less exposed to R.E.L	Too heterogeneous	Too heterogeneous	Neutral	Too heterogeneous	
Automotive, consumer credit banks	Neutral			More exposed to R.E.L			Neutral		More exposed to R.E.L		8
	Neutral	Neutral	Neutral	Significantly more exposed to R.E.L	Neutral	Too heterogeneous	Neutral	Neutral	Significantly more exposed to R.E.L	Neutral	
Building societies	Neutral			Neutral			Neutral		More exposed to R.E.L		7
	Neutral	Neutral	Neutral	Neutral	Significantly less exposed to R.E.L	Neutral	Neutral	Neutral	Neutral	Significantly more exposed to R.E.L	
Locally active savings and loan associations, cooperative banks	Less exposed to R.E.L			Less exposed to R.E.L			Less exposed to R.E.L		More exposed to R.E.L		68
	Too heterogeneous	Significantly less exposed to R.E.L	Too heterogeneous	Too heterogeneous	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	Too heterogeneous	Significantly less exposed to R.E.L	Neutral	Significantly more exposed to R.E.L	
Private banks	Neutral			Neutral			More exposed to R.E.L		Neutral		3
	Neutral	Significantly less exposed to R.E.L	Neutral	Significantly less exposed to R.E.L	Neutral	Neutral	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	
Custody banks	Neutral			More exposed to R.E.L			More exposed to R.E.L		More exposed to R.E.L		5
	Neutral	Neutral	Neutral	Neutral	Significantly more exposed to R.E.L	Too heterogeneous	Significantly more exposed to R.E.L	Neutral	Neutral	Significantly more exposed to R.E.L	
Merchant banks	Neutral			Neutral			More exposed to R.E.L		Neutral		3
	Neutral	Neutral	Neutral	Neutral	Neutral	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Neutral	
Leasing and factoring banks	Neutral			Neutral			Less exposed to R.E.L		Neutral		4
	Neutral	Neutral	Neutral	Neutral	Neutral	Significantly more exposed to R.E.L	Neutral	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	
Public development banks	Neutral			Neutral			Neutral		Neutral		12
	Neutral	Neutral	Neutral	Neutral	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Neutral	Neutral	Neutral	
Mortgage banks including passthrough financing mortgage banks	Neutral			More exposed to R.E.L			Neutral		More exposed to R.E.L		12
	Neutral	Neutral	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Significantly more exposed to R.E.L	Too heterogeneous	Neutral	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	
Other specialised banks	Neutral			Neutral			More exposed to R.E.L		Neutral		19
	Neutral	Neutral	Neutral	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Too heterogeneous	Neutral	Significantly more exposed to R.E.L	Too heterogeneous	Neutral	

Source: EBA QIS (June 2015

3.3.2 Overview for the size buckets

a. LR level

With regard to the categorisation of credit institutions by size bucket, the results seem to indicate that differences are less pronounced than categorisation by business models. At a level of 3%, a number of bound and constrained entities can be found in each size bucket, with the exception that all credit institutions classified into the size bucket 'large' reported LRs above that level. Median and weighted

average LRs are somewhat similar for the 'medium', 'large' and 'very large' size buckets but there are greater differences in the 'small' size bucket (median 6.6% and weighted average 3.8%).

b. Exposures to REL

In terms of categorisation by size, there seems to be a tendency for higher exposure to REL in the case of the largest credit institutions. This is corroborated by the finding that GSIIs tend to be more exposed to REL than non-GSIIs.

Table 19: Benchmarking results by size

Size bucket	*Dimension 1* Level and stability of profitability			*Dimension 2* Stability of funding			*Dimension 3* Stability of business activity		*Dimension 4* Concentration		# entities
	ROA_optA_sharp	Peak_Loss	Z_score	HQLA_to_Asset_mean	ASF_to_Asset_mean	Dep_to_Assets_mean	GrowthRate_Loans_std	GrowthRate_Assets_std	Prim_Asset_Class_mean	Prim_Income_Source_mean	
Small	Less exposed to R.E.L			Neutral			Neutral		Neutral		**92**
	Too heterogeneous	Too heterogeneous	Significantly less exposed to R.E.L	Too heterogeneous	Too heterogeneous	Too heterogeneous	Too heterogeneous	Too heterogeneous	Neutral	Too heterogeneous	
Medium	More exposed to R.E.L			Neutral			Neutral		Neutral		**97**
	Too heterogeneous	Significantly more exposed to R.E.L	Too heterogeneous	Neutral	Neutral	Too heterogeneous	Too heterogeneous	Too heterogeneous	Too heterogeneous	Neutral	
Large	More exposed to R.E.L			More exposed to R.E.L			Neutral		Neutral		**19**
	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Too heterogeneous	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Neutral	Neutral	Neutral	
Very large	More exposed to R.E.L			More exposed to R.E.L			More exposed to R.E.L		Less exposed to R.E.L		**38**
	Too heterogeneous	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	Too heterogeneous	

Source: EBA QIS (June 2015

3.3.3 Overview for the GSIIs versus the non-GSIIs

a. LR level

The categorisation of credit institutions into GSIIs and non-GSIIs reveals some interesting trends. On average, the 14 GSIIs in the sample appear to be slightly more leveraged than non-GSIIs, as both the median and the weighted average LRs of the former are lower. All 14 GSIIs already report an LR above 3% but six out of the 14 are below a level of 4%. Lifting the LR to a level of 4% for all GSIIs would require a total increase of capital of EUR 50.6 billion if the exposure amounts were unchanged.[81] The LR

[81] Data reference date 30 June 2015.

would be the constraining requirement for eight of the 14 GSIIs if calibrated at a level of 3% and for 13 if calibrated at a level of 4%.[82]

b. Exposures to REL

The benchmarking analysis for GSIIs displays globally the same results as for very large banks: the GIIs are more exposed to REL than non-GSIIs institutions. (i.e. more exposed when considering the level and the stability of profitability, the stability of funding and the stability business activity but less exposed to the risk of concentration). This finding is consistent with the rationale for the BCBS's April 2016 consultation on a possible LR surcharge for GSIIs.

Table 20: Benchmarking results by systemic relevance

	Dimension 1 Level and stability of profitability			*Dimension 2* Stability of funding			*Dimension 3* Stability of business activity		*Dimension 4* Concentration		# entities
	ROA_optA_sharp	Peak_Loss	Z_score	HQLA_to_Asset_mean	ASF_to_Asset_mean	Dep_to_Assets_mean	GrowthRate_Loans_std	GrowthRate_Assets_std	Prim_Asset_Class_mean	Prim_Income_Source_mean	
GSII	More exposed to R.E.L			More exposed to R.E.L			More exposed to R.E.L		Less exposed to R.E.L		**14**
	Neutral	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Neutral	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	
Non-GSII	Less exposed to R.E.L			Less exposed to R.E.L			Less exposed to R.E.L		More exposed to R.E.L		**232**
	Neutral	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	Neutral	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	Significantly less exposed to R.E.L	Significantly more exposed to R.E.L	Significantly more exposed to R.E.L	

Source: EBA QIS (June 2015

[82] As outlined, the risk-based requirements which serve as a point of reference in this calculation do not include the Pillar 2 requirements or any GSII buffer and also assume a countercyclical buffer rate of 0%. The constraining effect of the LR will be lower if a GSII is subject to additional Pillar 2 and/or GSII buffer and/or countercyclical buffer requirements above 0%.

3.3.4 Conclusion

The high-level assessment outcome of the quantitative benchmarking in terms of exposure to the REL is displayed in Table 21 and Table 22 for the three types of categorisation applied to the credit institutions in the sample: business model, size buckets and global systemic importance. Cross-cutting the results of the benchmarking along these three categorisations leads to the outcome displayed in Table 21.

Specifically, taking into account the benchmarking results in all three categorisations simultaneously adds more significance to those groups for which a tendency for a higher (or lower) exposure to REL is found. This is particularly the case for the 14 GSIIs which operate the business model of a 'cross-border universal bank' and fall into the size bucket of 'very large' entities.

While a lower exposure to REL may be suggested in the case of 'locally active savings and loan associations and cooperative banks' which are non-GSIIs, this would not be fully corroborated according to the benchmarking results by size bucket because 'locally active savings and loan associations and cooperative banks' are spread across the four size buckets. Also, as mentioned below, for none of the size buckets is there evidence for lower exposure to REL.

In light of these findings, a recommendation on the differentiation of prudential LR level requirements from a supervisory perspective would support a higher LR level requirement in the specific case of GSIIs. Specifically, GSII credit institutions could be subjected to a prudential LR level requirement above the general minimum of 3% in order to mitigate elevated leverage-related risks. The benchmarking results would not strongly suggest a deviation from the general minimum level of 3% for other types of credit institutions.

In terms of the design of an additional requirement for GSIIs, the BCBS has not yet determined whether any potential surcharge should be a flat (i.e. the same for all GSIIs) or flexible (i.e. the size of the surcharge will be based on the bucket of systemic importance). It should be noted that the discussion about higher requirements at the Basel level is limited to GSIIs; for this reason additional requirements for OSIIs could be an area for further investigation at the EU level. Also, any interaction with the (risk-based) 'Maximum Distributable Amount' (MDA) regime should be carefully considered when contemplating additional requirements for the LR. In particular, potential additional requirements for the LR should avoid adding further complexity to, and interferences with, the MDA regime.

Table 21: Benchmarking results by business model, size and systemic relevance

	Size buckets					G-SII / Non G-SII		
Business Models	Small	Medium	Large	Very large	**TOTAL**	G-SII	Non G-SII	**TOTAL**
Cross-border universal banks	5	15	3	11	**34**	14	20	**34**
Local universal banks	17	32	8	14	**71**	0	71	**71**
Automotive, consumer credit banks	2	3	1	2	**8**	0	8	**8**
Building societies	1	4	0	2	**7**	0	7	**7**
Locally active savings and loan associations, cooperative banks	51	14	1	2	**68**	0	68	**68**
Private banks	3	0	0	0	**3**	0	3	**3**
Custody banks	1	3	1	0	**5**	0	5	**5**
Merchant banks	0	3	0	0	**3**	0	3	**3**
Leasing and factoring banks	2	1	0	1	**4**	0	4	**4**
Public development banks	7	4	1	0	**12**	0	12	**12**
Mortgage banks including passthrough financing mortgage banks	3	7	1	1	**12**	0	12	**12**
Other specialised banks	4	9	3	3	**19**	0	19	**19**
TOTAL	**96**	**95**	**19**	**36**	**246**	**14**	**232**	**246**

Legend

Benchmarking result indicates higher exposure to risk of excessive leverage (R.E.L.)

Benchmarking result indicates lower exposure to risk of excessive leverage (R.E.L.)

Source: EBA QIS (June 2015)

Table 22: Aggregate LRs, Tier 1 shortfalls and overall benchmarking outcomes by business model, size buckets and systemic relevance

		Full sample	Business Models												Size buckets				G-SII / Non G-SII	
			Cross-border universal banks	Local universal banks	Automotive, consumer credit banks	Building societies	Locally active savings and loan associations, cooperative banks	Private banks	Custody banks	Merchant banks	Leasing and factoring banks	Public development banks	Mortgage banks including passthrough financing mortgage banks	Other specialised banks	Small	Medium	Large	Very large	G-SII	Non G-SII
Number of entities in the sample		246	34	71	8	7	68	3	5	3	4	12	12	19	96	95	19	36	14	232
of which number of subsidiaries		*44*	*5*	*15*	*3*	*1*	*4*	*0*	*3*	*2*	*3*	*0*	*5*	*3*	*11*	*25*	*3*	*5*	*0*	*44*
Leverage ratio	Weighted average	4.4%	4.2%	4.9%	8.0%	4.1%	5.3%	6.4%	8.4%	8.3%	7.4%	4.6%	3.7%	3.8%	3.8%	4.6%	5.5%	4.3%	4.1%	4.8%
	Median	5.5%	4.5%	5.5%	8.7%	4.0%	6.6%	4.8%	5.2%	8.5%	4.1%	2.8%	3.9%	5.3%	6.6%	5.0%	4.9%	5.2%	4.2%	5.5%
2% LR requirement	# entities bound	7	0	0	0	0	0	0	0	0	1	3	3	0	4	2	0	1	0	7
	# entities constrained	35	3	2	0	4	6	1	1	1	1	9	6	1	17	14	1	3	0	35
	Tier 1 shortfall (€bn)	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.9	0.5	0.0	0.0	0.0	1.4
3% LR requirement	# entities bound	21	1	3	0	1	0	0	0	0	2	6	5	3	9	10	0	2	0	21
	# entities constrained	82	14	14	0	6	10	1	2	1	1	12	11	10	25	36	9	12	8	74
	Tier 1 shortfall (€bn)	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	2.1	0.8	3.5	2.6	0.0	0.3	0.0	6.4
4% LR requirement	# entities bound	53	11	13	0	3	3	0	0	0	2	9	6	6	13	25	5	10	6	47
	# entities constrained	134	23	33	1	7	26	2	2	2	2	12	11	13	49	51	11	23	13	121
	Tier 1 shortfall (€bn)	84.9	57.5	6.1	0.0	0.4	0.8	0.0	0.0	0.0	0.0	7.5	4.8	7.8	26.1	35.3	2.2	21.3	50.6	34.4
5% LR requirement	# entities bound	106	22	27	1	7	14	2	2	0	2	10	10	9	30	49	10	17	13	93
	# entities constrained	194	33	52	2	7	52	2	2	2	2	12	11	17	73	77	16	28	14	180
	Tier 1 shortfall (€bn)	281.6	204.7	31.1	0.2	3.8	2.9	0.0	0.1	0.0	0.1	12.6	10.1	16.0	69.4	113.9	11.0	87.3	172.0	109.7
Benchmarking outcome			More exposed to R.E.L.	Neutral	Neutral	Neutral	Less exposed to R.E.L.	Neutral	More exposed to R.E.L.	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	More exposed to R.E.L.	More exposed to R.E.L.	Less exposed to R.E.L.

In order to avoid potential double counting of capital shortfalls, entities that are subsidiaries of other EU institutions are not included for the capital shortfall calculations.
The benchmarking is performed separately for the three alternative categorisations, i.e. by business model, size bucket and systemic relevance (GSII versus non-GSIIs).
Definition of the size buckets: very large credit institutions (LR exposure > EUR 200 billion), large credit institutions (LR exposure ≤ EUR 200 billion but > EUR 100 billion) medium-sized credit institutions (LR exposure ≤ EUR 100 billion but EUR 10 billion) and small credit institutions (LR exposure ≤ EUR 10 billion).

source: EBA QIS (June 2015)

3.4 Detailed assessment results

3.4.1 For each business model

a. Cross-border universal banks

Cross-border universal banks are credit institutions that engage in a wide range of banking activities which include the provision of loans and financial services to retail and corporate customers and operations in capital markets. Funding is obtained through different channels including deposits from retail and corporate customers as well as wholesale capital markets. They are internationally active in that they have significant cross-border operations.

The analysis of the exposure to REL based on the risk indicators benchmarking suggests that cross-border universal banks tend to be more exposed to REL than other banks when considering three out of the four risk dimensions (level and stability of profitability, stability of funding and stability of business activity). More specifically, cross-border universal banks seem to significantly underperform, compared to other banks, for a number of risk indicators: they experienced higher peak losses (scaled by total assets) over the period 2004-2014, they show a lower Z-score and have relatively fewer deposits and ASF in their balance sheet. They also display a less stable growth rate both for their total assets and their loans portfolio. However, due to their diversified activities, they tend to be less exposed to REL in the dimension of concentration risk (in particular, their income sources tend to be more diversified than those of other institutions).

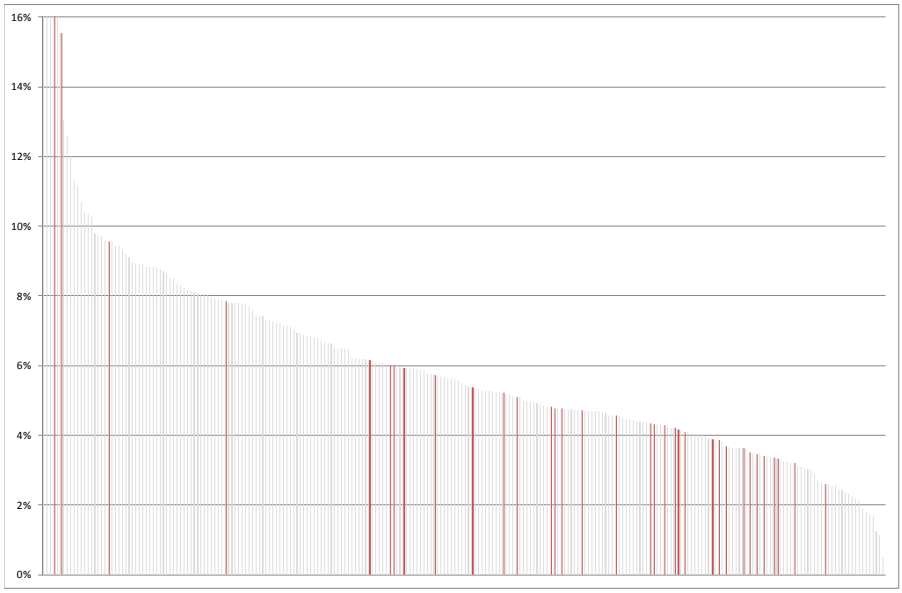
Cross-border universal banks display comparatively low LRs. The median (fully loaded) LR is 4.5% (compared to 5.5% for the total sample), with 1 out of 34 institutions displaying an LR below 3%, 11 institutions displaying an LR below 4% and 22 institutions displaying an LR below 5%.

Average risk weights or RWA densities of cross-border universal banks are comparatively low but vary widely across individual entities (weighted average level of 35.6%). At a level of 3%, the LR would not be binding for any cross-border universal bank, once an 8.5% risk-based Tier 1 capital requirement is fulfilled. Tier 1 capital shortfalls, above an 8.5% risk-based Tier 1 requirement, would only be triggered by the LR at requirement levels of 3.5% and above. Due to the large size of cross-border universal banks, these capital shortfalls are rather substantial amounts, in particular for LR requirement levels of 4% and above.

Aggregate total exposures of cross-border universal banks (EUR 22.485 billion) account for 70% of the overall sample (by far the highest among all business models analysed). This share is especially high for derivatives and SFTs, where cross-border universal banks account for more than 80% of the total sample. The overall exposure composition is diversified, with no single exposure class accounting for more than 19% of the total exposure.

Figure 11: Cross-border universal banks

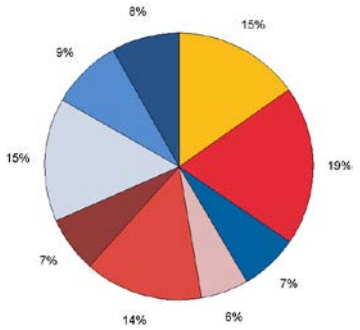
Distribution of fully loaded LRs and key statistics



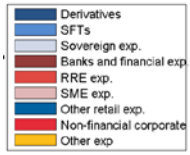
Number of entities in the sample	**34**	Total leverage exposure (billion EUR)	**22 485**
of which below the 3% threshold	***1***	Median LR	***4.5%***
of which below the 4% threshold	***11***	Median Tier 1 ratio	***11.7%***
of which below the 5% threshold	***22***	RWA density (weighted average)	***35.6%***

LR exposure composition

Breakdown by exposure classes

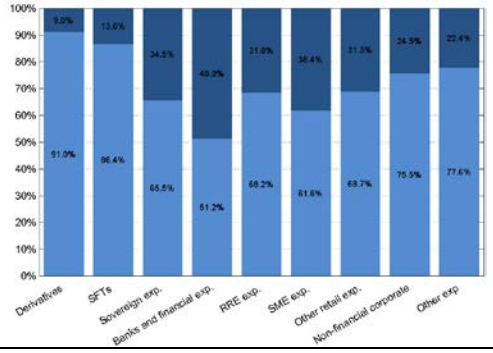


Legend pie chart (left)



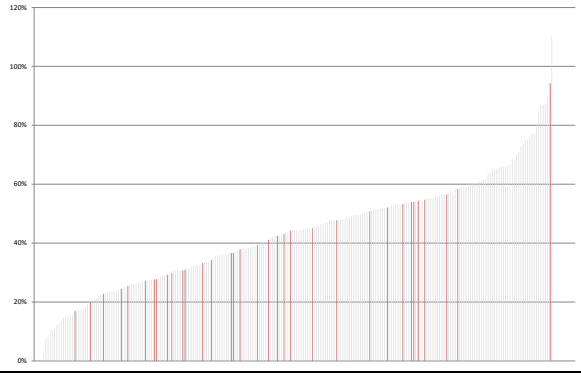
Legend bar chart (right)

Shares of this business model's exposures of the total sample

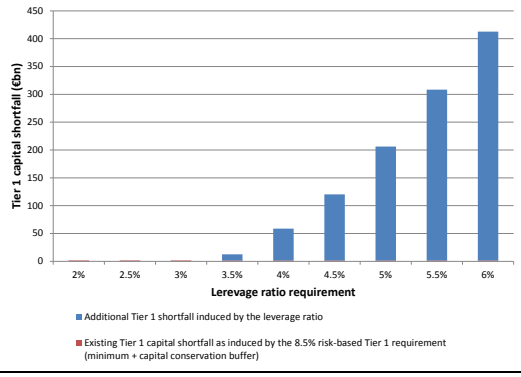


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

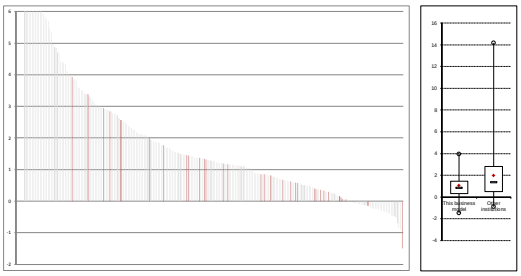


REL conclusions

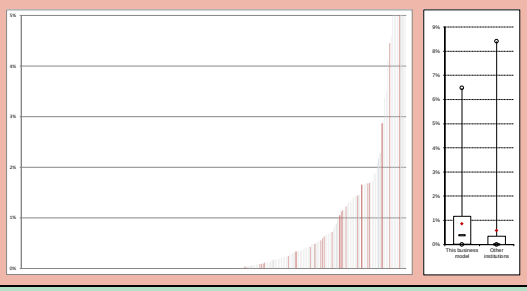
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	More exposed to R.E.L.	More exposed to R.E.L.	Less exposed to R.E.L.

Risk indicators

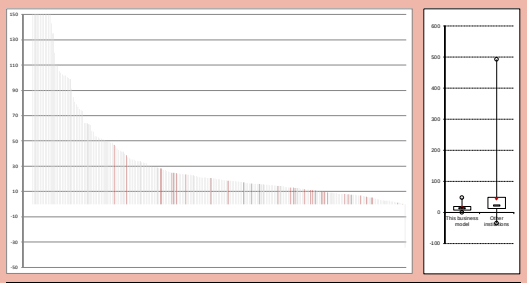
ROA (Sharpe ratio)



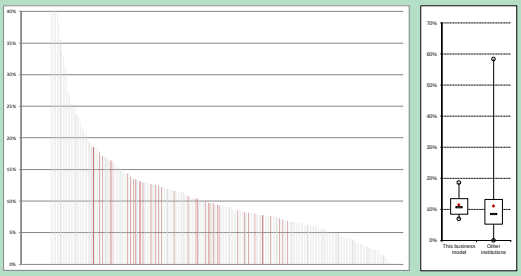
Peak loss



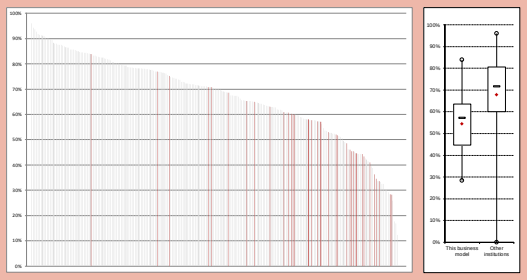
Z-score



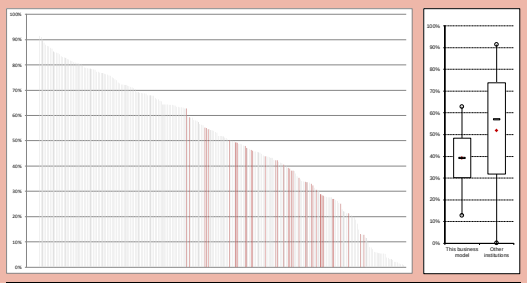
HQLA to assets (mean)



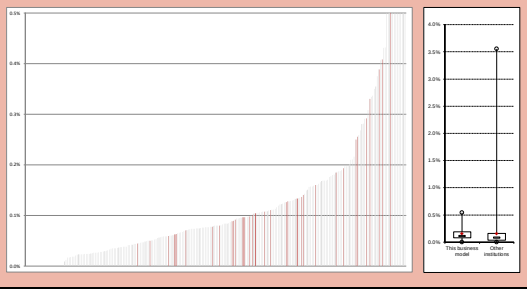
ASF to asset (mean)



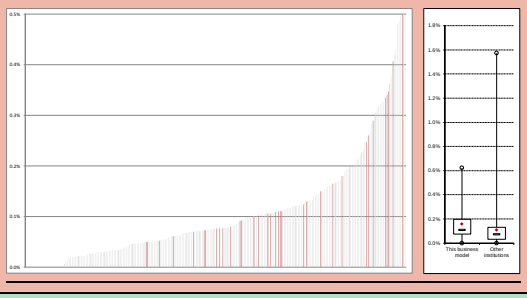
Deposit to asset (mean)



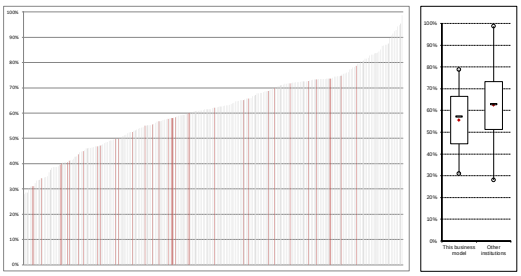
Growth rate of loans (std dev)



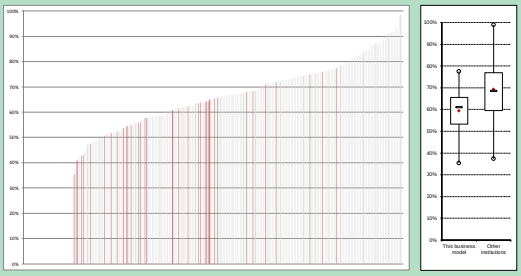
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

b. Local universal banks

Local universal banks are credit institutions that operate predominantly in the domestic market and are engaged in diversified banking activities which include the provision of loans and financial services to retail and corporate customers and operations in capital markets. Funding is diversified, including deposits from retail clients and wholesale funding.

The analysis of the exposure to the REL indicates that local universal banks tend to be more exposed to the REL than other banks (i.e. those not classified as local universal banks) when considering the level and stability of profitability, as they appear to have relatively higher peak losses compared to the rest of the sample. Despite having a relatively high deposits-to-assets ratio, the overall assessment of the REL for the three other dimensions (stability of funding, stability of business activity and concentration) remains neutral compared to the rest of the European banking sector. Most risk indicators show a particularly high dispersion within this business model, indicating a large variety of situations.

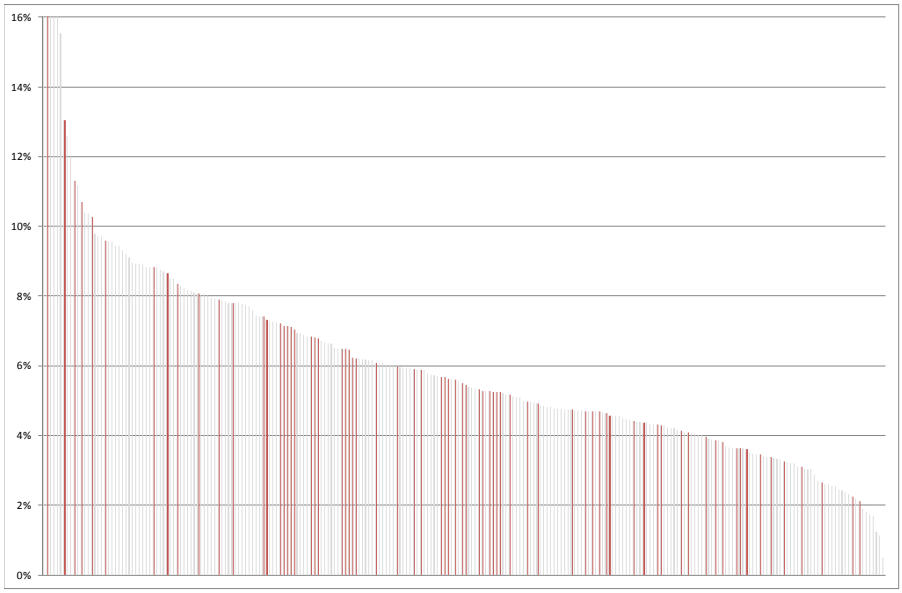
The level of the LR for local universal banks is, on average, higher than that of cross-border universal banks and seems to be closer to the average of the total sample. The median (fully loaded) LR is 5.5%, which is exactly the same as for the full sample of banks. While 3 institutions out of 71 local universal banks are below the 3% threshold, these institutions are also below the 8.5% risk-based Tier 1 ratio.

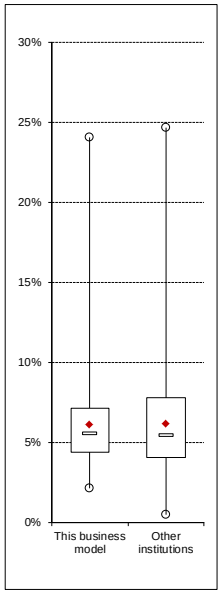
Capital shortfalls are only induced by the LR, above an 8.5% risk-based Tier 1 requirement, at LR requirement levels starting at 4%. RWA densities of local universal banks are relatively high (average level of 40.7%) but also show a wide dispersion.

Aggregate total exposures of local universal banks (EUR 5.912 billion) account for 18.4% of the overall sample, with the largest share in SME exposures (27.8%), while SME exposures only account for 12% of total exposures of local universal banks. Local universal banks also hold relatively large shares in residential real estate (19.4%) and sovereign exposures (18.9%) of the overall sample. These exposures also constitute the largest exposure classes within local universal banks. Local universal banks especially appear to have relatively low SFT and derivative exposures (a share of 4% and 2% of exposures of the overall sample, respectively).

Figure 12: Local universal banks

Distribution of fully loaded LRs and key statistics

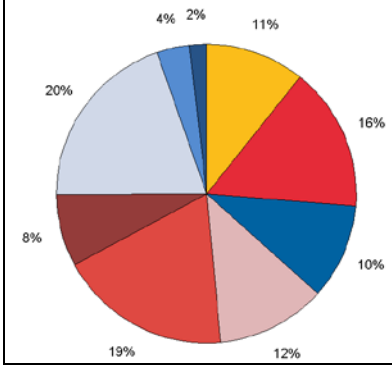




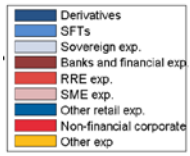
Number of entities in the sample	**71**	Total leverage exposure (billion EUR)	**5 912**
of which below the 3% threshold	***3***	Median LR	***5.5%***
of which below the 4% threshold	***13***	Median Tier 1 ratio	***11.8%***
of which below the 5% threshold	***27***	RWA density (weighted average)	***40.7%***

LR exposure composition

Breakdown by exposure classes

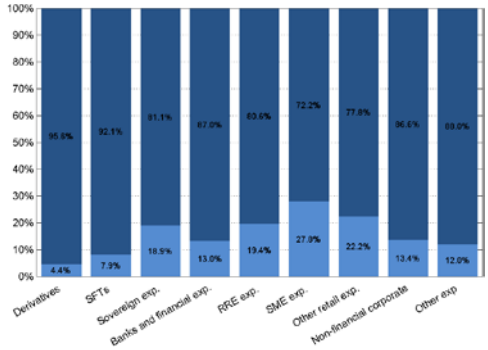


Legend pie chart (left)



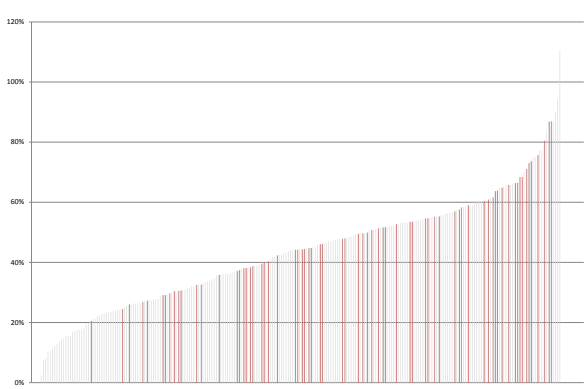
Legend bar chart (right)

Shares of this business model's exposures of the total sample

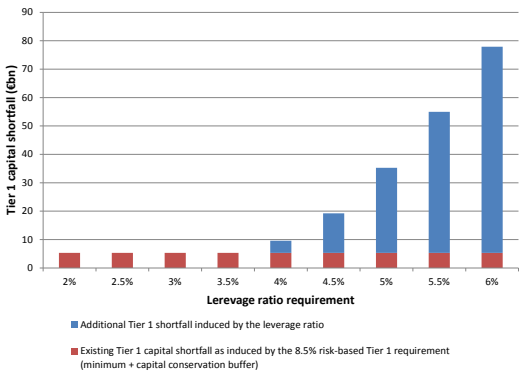


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

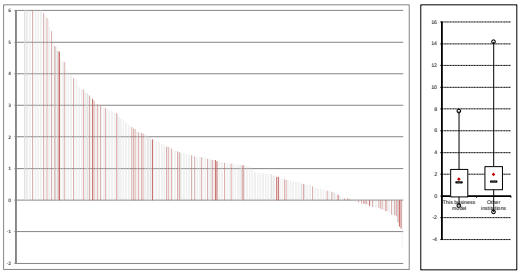


REL conclusions

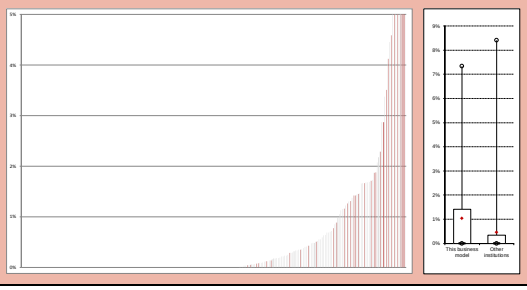
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	Neutral	Neutral	Neutral

Risk indicators

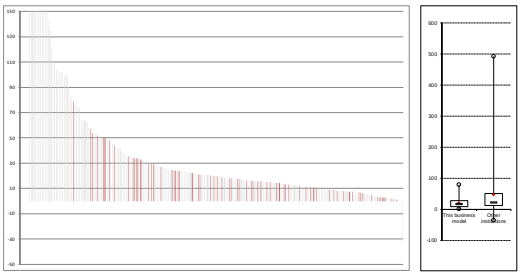
ROA (Sharpe ratio)



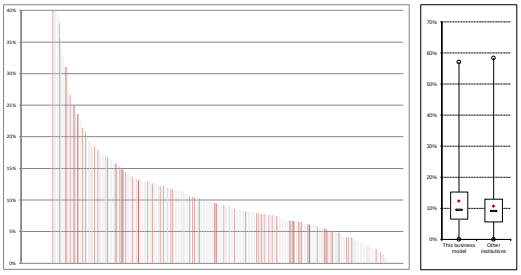
Peak loss



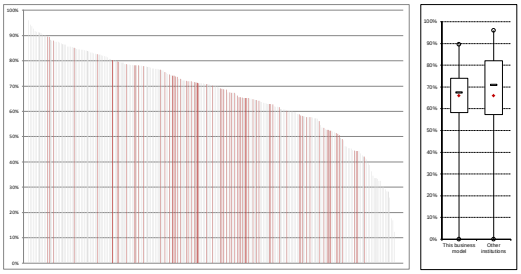
Z-score



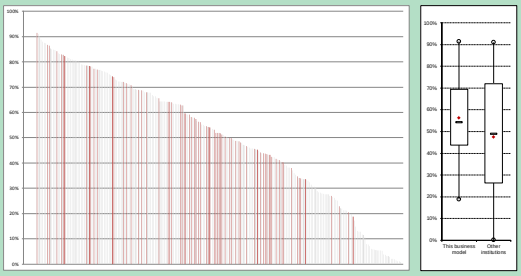
HQLA to assets (mean)



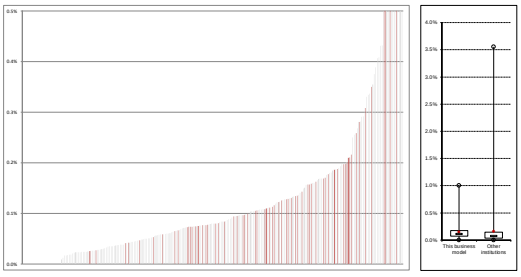
ASF to asset (mean)



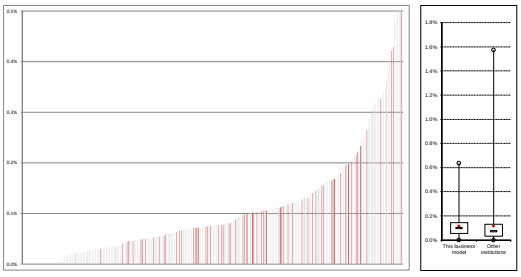
Deposit to asset (mean)



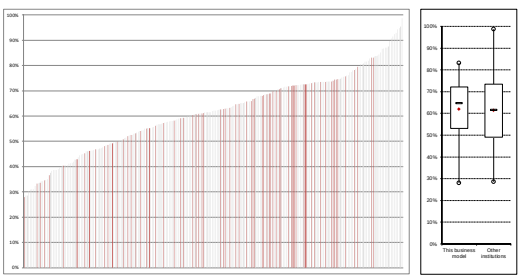
Growth rate of loans (std dev)



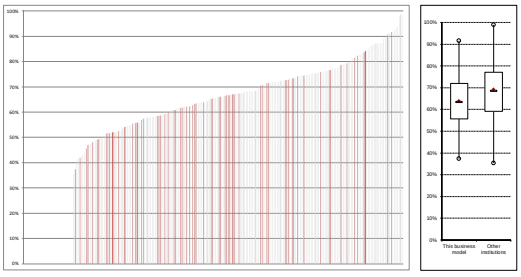
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

c. Automotive, consumer credit banks

Consumer credit banks (including automotive banks) are credit institutions that specialise in originating and/or servicing consumer loans to retail clients and SMEs. With a total of eight entities, the number of consumer credit banks in the sample is relatively low.

The analysis of the exposure to the REL indicates that consumer credit banks are more exposed to the REL than other banks when considering the stability of funding and concentration risk, as they have lower HQLA-to-total assets ratios and a larger asset concentration. Regarding the two other dimensions of the benchmark (level and stability of profitability and stability of business activity), consumer credit banks do not show any significant difference compared to the rest of the European banking sector.

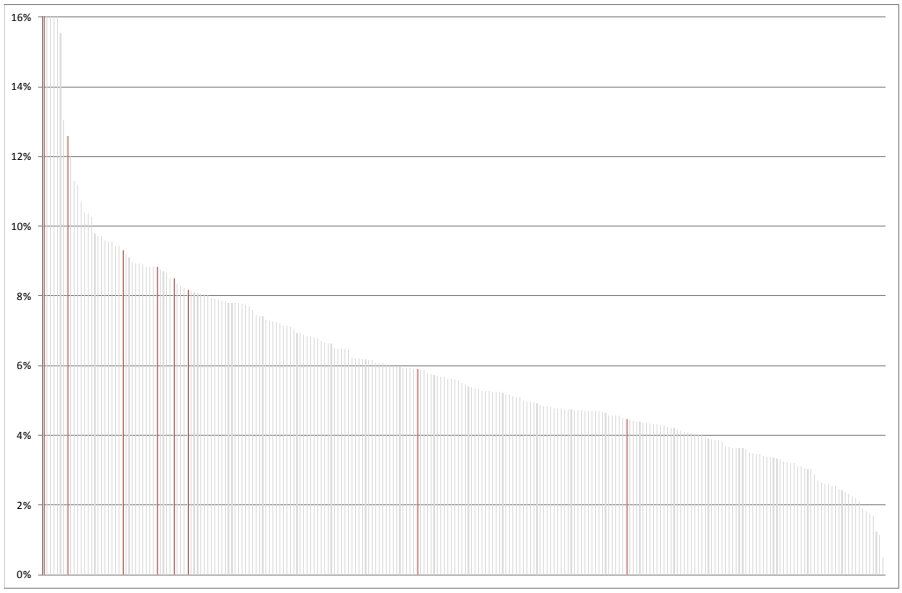
All consumer credit banks in the sample have high LRs, with only one having a LR below 5%. The median LR for this business model is 8.7%, which is much higher than the 5.5% of the full sample.

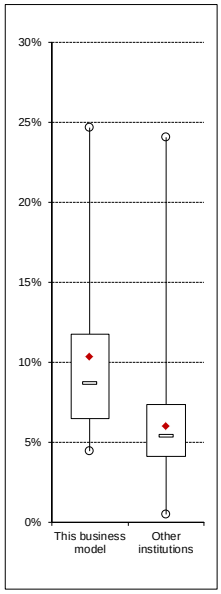
This may partly be driven by the fact that their RWA densities are very high, with a weighted average of 71.5%. Capital shortfalls are only triggered by LR requirements of 4.5% and above, and shortfall levels are very small (slightly over EUR 0.4 billion with an LR requirement of 5%).

Aggregate total exposures of consumer credit banks (EUR 209 billion) account for 0.7% of the total sample. The largest exposures class of these banks is by far ‘other retail’ exposures, with 35% of total exposures of consumer credit banks. However, due to the low number of institutions and relatively small size, these represent only 2.3% of total ‘other retail’ in the overall sample. Furthermore, exposures of consumer credit banks consist mainly of residential real estate exposures (23%) and non-financial corporates (11%).

Figure 13: Automotive, consumer credit banks

Distribution of fully loaded LRs and key statistics

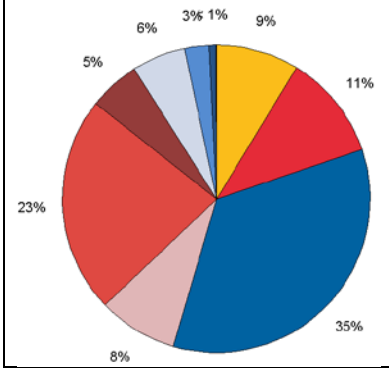




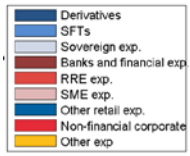
Number of entities in the sample	**8**	Total leverage exposure (billion EUR)	**209**
of which below the 3% threshold	***0***	Median LR	***8.7%***
of which below the 4% threshold	***0***	Median Tier 1 ratio	***12.1%***
of which below the 5% threshold	***1***	RWA density (weighted average)	***71.5%***

LR exposure composition

Breakdown by exposure classes

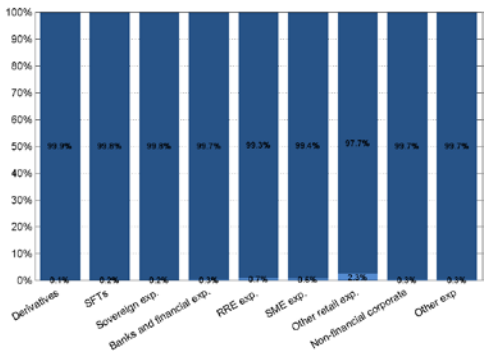


Legend pie chart (left)



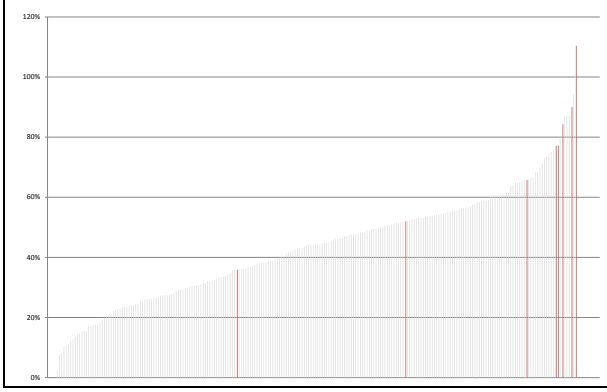
Legend bar chart (right)

Shares of this business model's exposures of the total sample

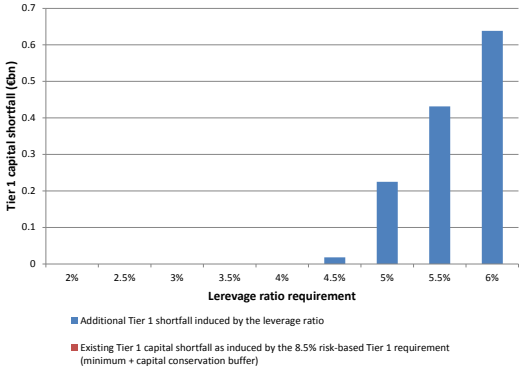


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

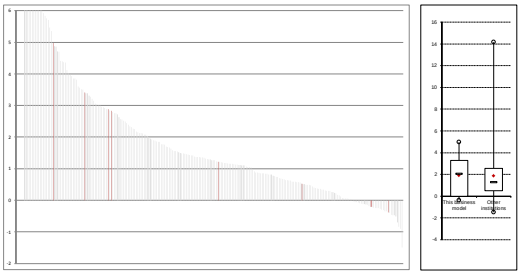


REL conclusions

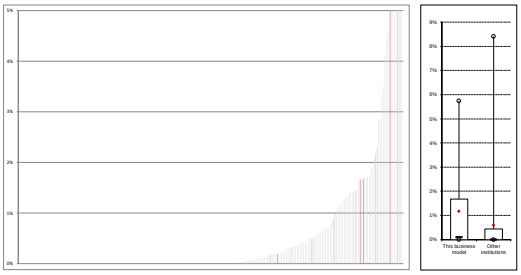
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	More exposed to R.E.L.	Neutral	More exposed to R.E.L.

Risk indicators

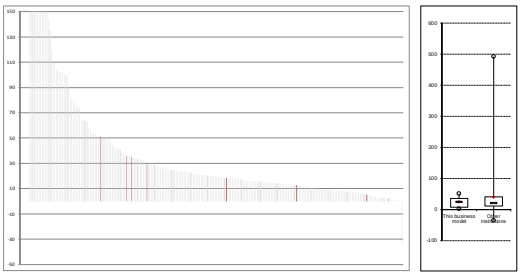
ROA (Sharpe ratio)



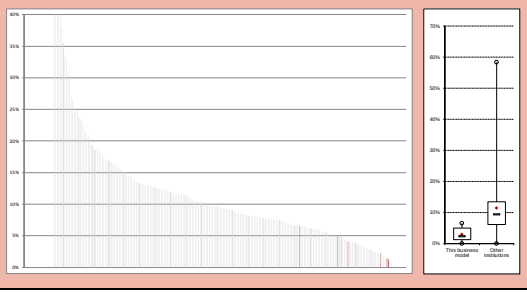
Peak loss



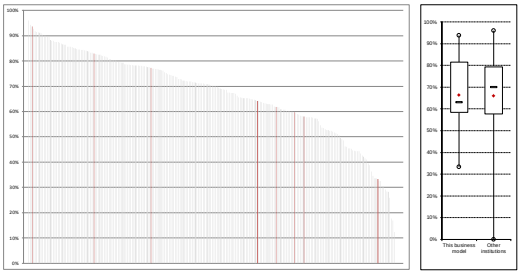
Z-score



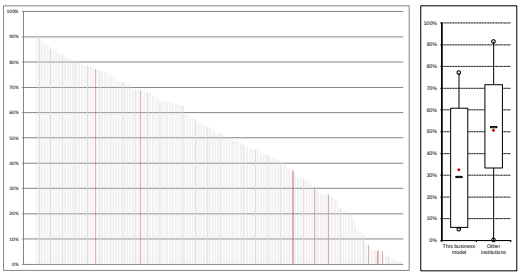
HQLA to assets (mean)



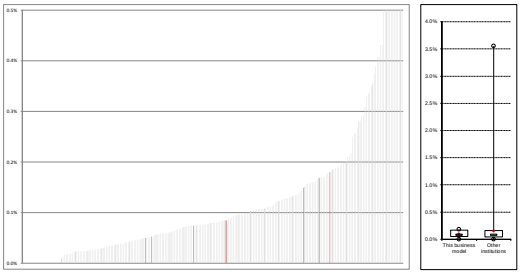
ASF to asset (mean)



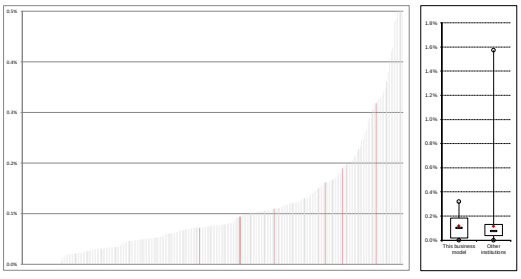
Deposit to asset (mean)



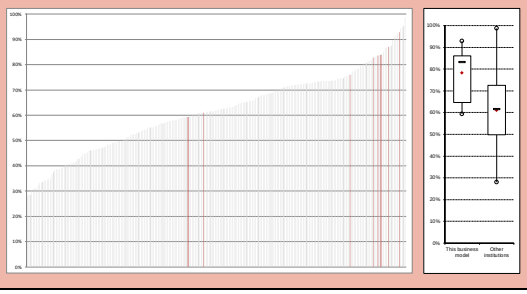
Growth rate of loans (std dev)



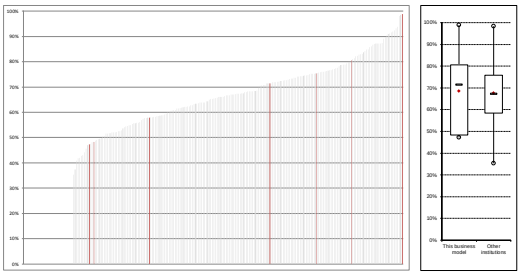
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

d. Building societies

Building societies are credit institutions which specialise in providing residential loans to retail clients, which are predominantly funded through deposits. The type of business activity is usually legally restricted. The assets are mainly residential loans but can also encompass other products connected to housing, such as payment and settlement services, trading with mortgage covered bonds or unrelated activities such as trading of sovereign bonds on own account. There are seven building societies included in the sample.

On a bank-by-bank basis in the benchmarking exercise, building societies do not appear to be materially more concentrated in their asset classes compared to the rest of the sample. With regard to income sources, however, building societies are more concentrated and are, as such, considered to be more exposed to REL than other banks with respect to the concentration risk dimension. Regarding the three other dimensions (level and stability of profitability, stability of funding and stability of business activity), building societies do not appear to be more or less exposed to REL compared to the rest of the European banking system.

Building societies have relatively low LRs (median LR 4%) compared to the full sample (median LR 5.5%), with 1 out of 7 building societies having an LR below 3% and all of them having an LR below 5%.

Due to their low average risk weight (19.7%), they still have relatively high Tier 1 ratios (median 15.7%). LR induced capital shortfalls arise as a result of LR requirement levels of 3.5% and increase sharply after a 4% LR requirement.

Aggregate total exposures of building societies (EUR 450 billion) account for 1.4% of the total sample. Residential real estate is by far the most important asset class of building societies.[83]

It should be noted that the business-model category of 'building societies' includes credit institutions from different European countries and that the national laws governing the activities of building societies vary. As for some other business models, the constraints set out in the legislation applicable to building societies are relevant to assess the results of the benchmarking exercise and REL.

In the UK, building societies are subject to the 'Building Societies Act' which prescribes certain balance-sheet proportions which include that at least 75% of assets must be loans fully secured on residential properties (implying a high degree of concentration in terms of primary asset class as observed) and at least 50% of funds must be obtained from individual members of the building society (limiting recourse to other funding sources). Moreover, UK building societies may not engage in activities such as market making in securities, commodities or currencies, as well as trading in commodities or currencies and entering into transactions involving derivatives (except for some limited hedging purposes). There are, in addition, some legal restrictions of the use of

[83] It represents a share of 59% of total exposures of building societies and accounts for 2.7% of residential real estate exposures of the overall sample, despite the low number of building societies included in the sample. Sovereigns account for 16% of total exposures of building societies, followed by bank and financial exposures (12%).

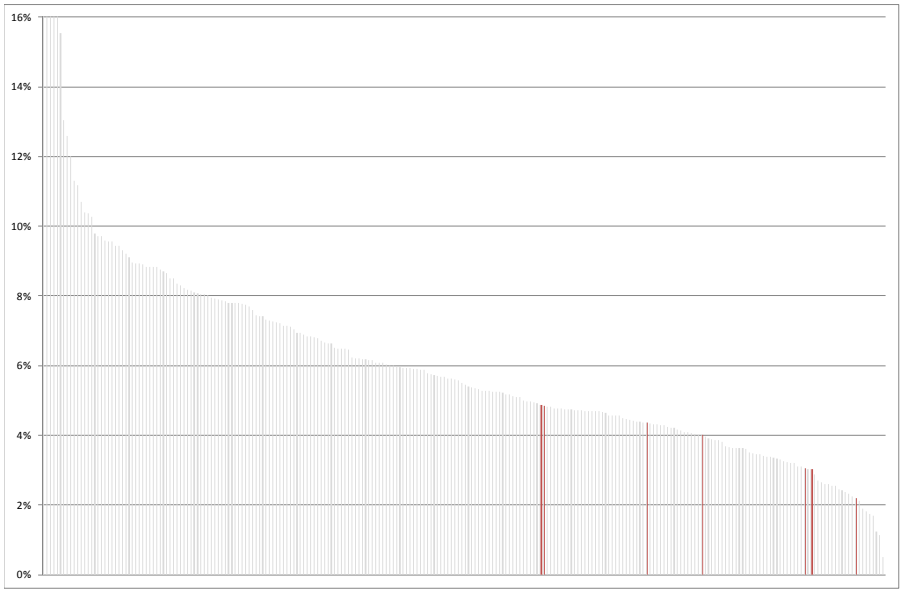
certain names and descriptions which sets out which institutions are permitted to refer to themselves as building societies. As with other business models, UK building societies tend to focus on serving their members and the profit which is not used to sustain the business is used to provide better services to members.

In continental Europe, a number of EU Member States have adopted a 'Bausparkassen Act' on the basis of which building societies in these countries operate.[84] These national laws limit the activities of the relevant credit institutions to specific activities that are economically linked to the 'Bauspar business', i.e. the provision of financing for the building or purchase of residential property. The laws also establish a link between main type of assets (real estate loans) and their funding (customer deposits) and limit the universe of possible asset classes for the investment of surplus funds. Hence, a comparatively high degree of concentration is implied by legal restrictions. Furthermore, the applicable laws also have the effect that the balance-sheet size of these entities is largely driven by the inflows stemming from 'Bauspar deposits', although the pricing of the related contracts allows for controlling the incentives given to customers for entering into new savings contracts.

[84] According to information provided by them, these countries are Austria, Croatia, the Czech Republic, Germany, Hungary, Romania and Slovakia.

Figure 14: Building societies

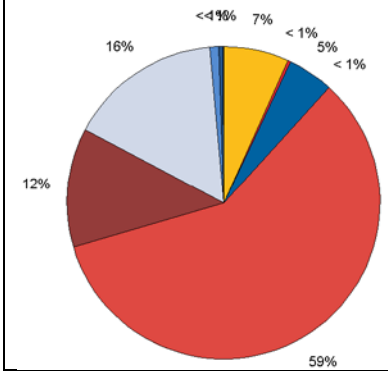
Distribution of fully loaded LRs and key statistics



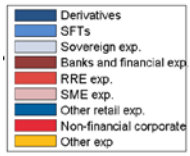
Number of entities in the sample	**7**	Total leverage exposure (billion EUR)	**450**
of which below the 3% threshold	***1***	Median LR	***4.0%***
of which below the 4% threshold	***3***	Median Tier 1 ratio	***15.7%***
of which below the 5% threshold	***7***	RWA density (weighted average)	***19.7%***

LR exposure composition

Breakdown by exposure classes

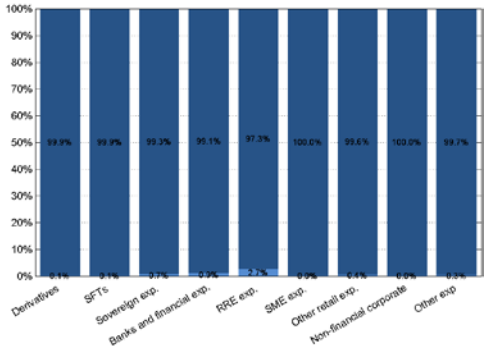


Legend pie chart (left)



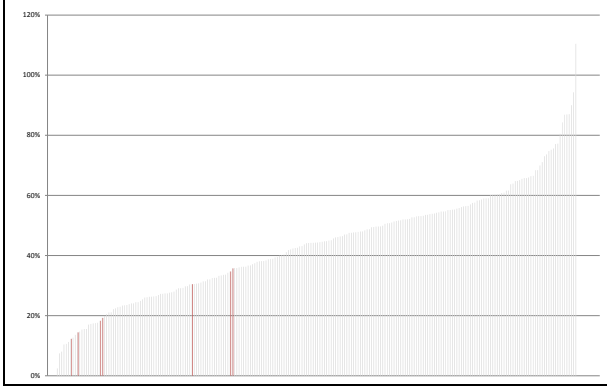
Legend bar chart (right)

Shares of this business model's exposures of the total sample

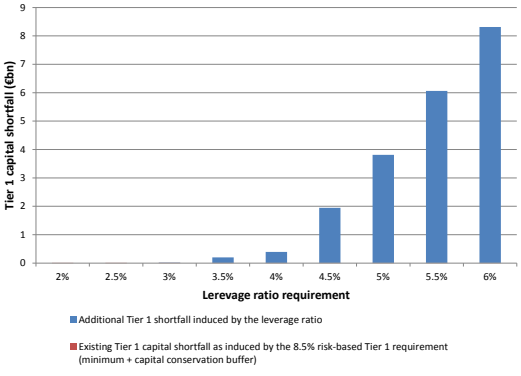


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

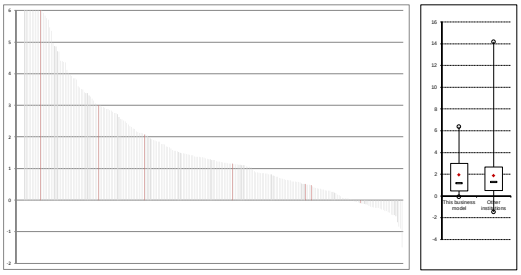


REL conclusions

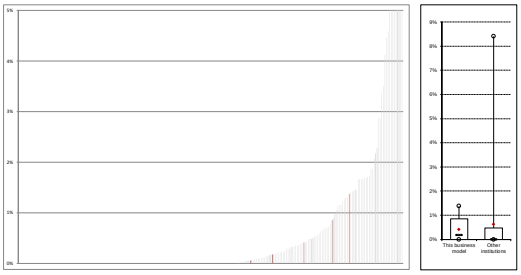
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	Neutral	More exposed to R.E.L.

Risk indicators

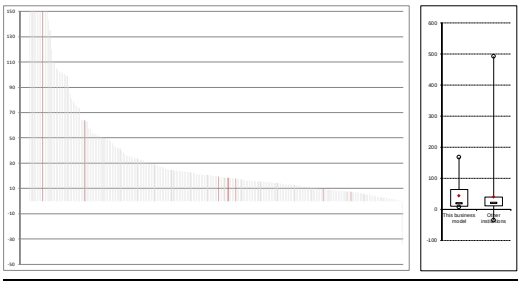
ROA (Sharpe ratio)



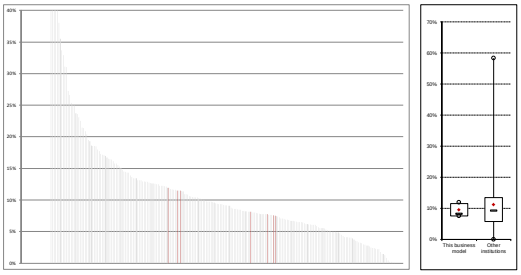
Peak loss



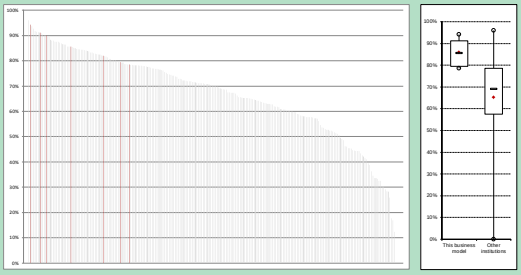
Z-score



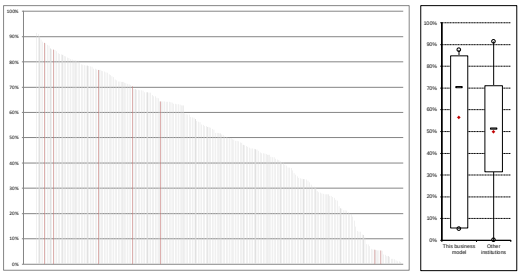
HQLA to assets (mean)



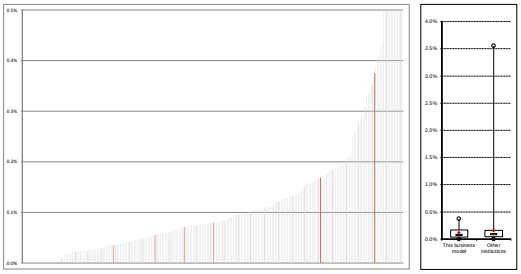
ASF to asset (mean)



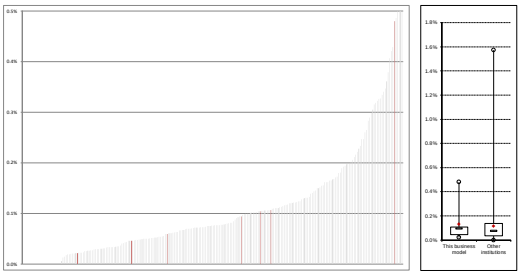
Deposit to asset (mean)



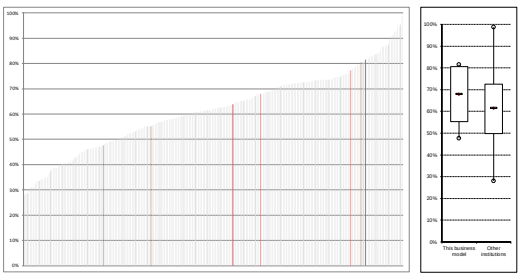
Growth rate of loans (std dev)



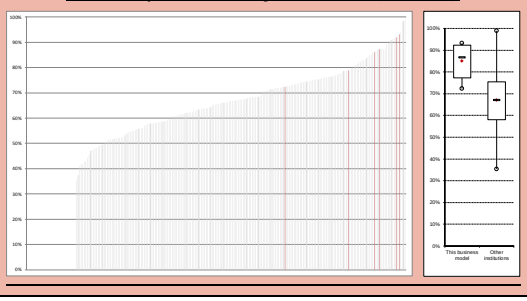
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

e. Locally active savings and loan associations/cooperative banks

Locally active savings and loan associations, including cooperative banks, are credit institutions which focus on banking activities with retail clients and SMEs and are mainly funded through deposits. They generally operate locally through a decentralised distribution network. The sample consists of 68 locally active savings and loan associations and cooperative banks.

This business-model category appears to be less exposed to REL than other banks in three of the four risk dimensions (level and stability of profitability, stability of funding and stability of business activity). Some risk indicators appear to be too heterogeneous to draw any conclusions, but for peak losses, ASF, deposits (all scaled by total assets) and the stability of growth rate of assets, this business model seems to significantly outperform compared to the rest of the sample. However, due to the relatively larger concentration in income sources at the bank-by-bank level, they appear to be more exposed to REL when considering the dimension concentration risk.

Locally active savings banks have relatively high LRs. The median LR is 6.7% and zero institutions have an LR below 3%, 3 out 68 institutions have an LR below 4% and 14 institutions have an LR below 5%.

RWA density ratios vary widely across institutions. The weighted average RWA density ratio is 39.6%, which is higher relative to the sample as a whole (36.0%), which means that in comparison to the rest of the sample this business model is somewhat less constrained by the LR than the risk-based requirement. Capital shortfalls are induced by the LR, above an 8.5% risk-based tier 1 requirement, at LR requirement levels starting at 4%.

Despite the relatively large number of institutions in the sample, aggregate total exposures of locally active savings banks (EUR 604 billion) account for only 1.9% of the overall sample. The overall exposure composition is relatively diversified with residential real estate as the largest exposure class, accounting for 28% of total exposures, followed by sovereigns, which constitute 16% of total exposures, and non-financial corporates exposures (13%). SFT and derivative exposures are particularly small (2% and 1% of total exposures, respectively). Compared to the overall sample, locally active savings banks do not represent more than 5% of total exposures of any of the exposure classes.

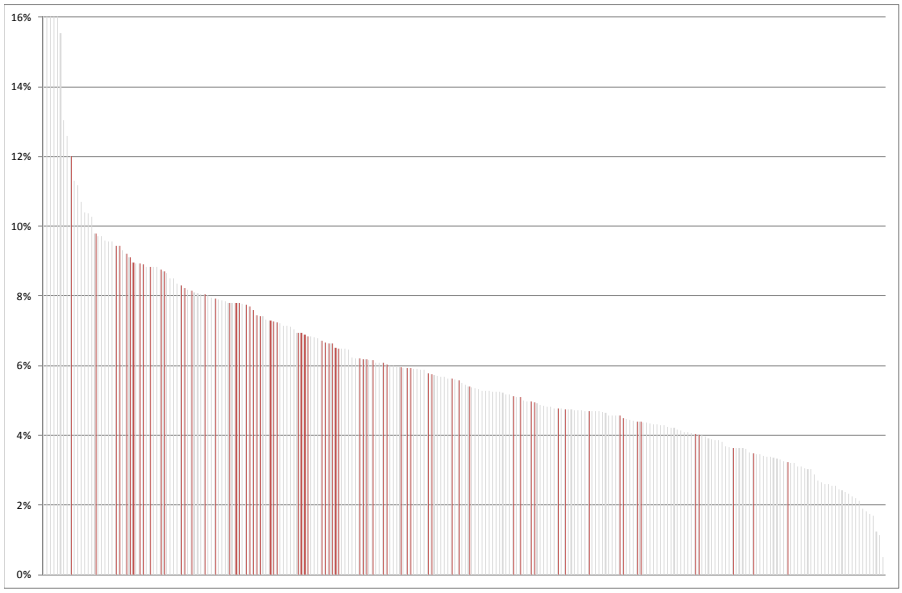
‘Locally active savings and loan associations/cooperative banks’, generally present some specific features. Particularly, cooperative and mutual institutions tend to be focused on serving their members and generally do have maximisation of profit as a main aim. In general, the key source of capital is retained profit. Profit is used to sustain the business and provide better services to members.

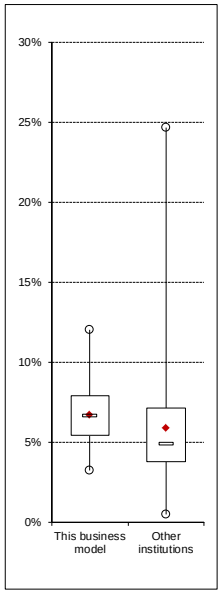
Cooperatives may be involved in the granting of promotional loans, which may be extended by governmental financing bodies, e.g. for housing loans, and passed through by institutions to final borrowers (via central institutions of cooperative groups to local banks and then to customers). Cooperative central institutions act as intermediaries between the governmental financing bodies and the local cooperative banks. As single servicer and sole risk counterparty to the governmental financing bodies the central institution bundles the promotional loans issued by the local cooperative banks. Promotional loans appear simultaneously as both assets and liabilities on the

balance sheet of both the central institution and the local banks, which implies their inclusion in the LR unless this pass-through is designed as a fiduciary scheme under Article 429(13) of the CRR.

Figure 15: Locally active savings and loan associations/cooperative banks

Distribution of fully loaded LRs and key statistics

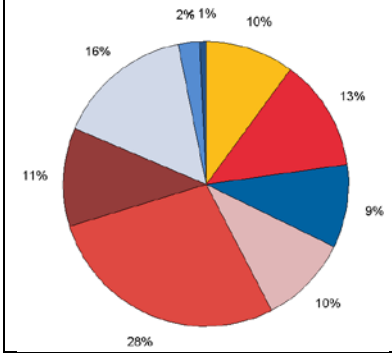




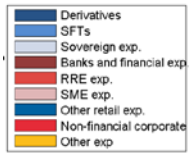
Number of entities in the sample	**68**	Total leverage exposure (billion EUR)	**604**
of which below the 3% threshold	***0***	Median LR	***6.7%***
of which below the 4% threshold	***3***	Median Tier 1 ratio	***14.1%***
of which below the 5% threshold	***14***	RWA density (weighted average)	***39.6%***

LR exposure composition

Breakdown by exposure classes

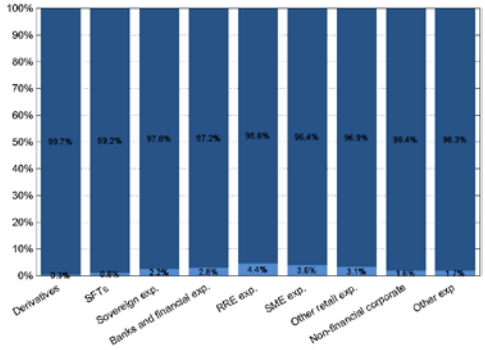


Legend pie chart (left)



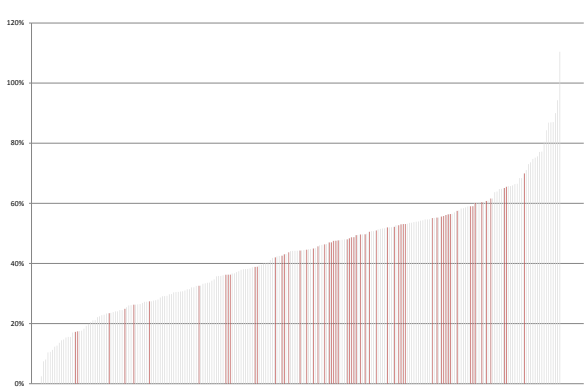
Legend bar chart (right)

Shares of this business model's exposures of the total sample

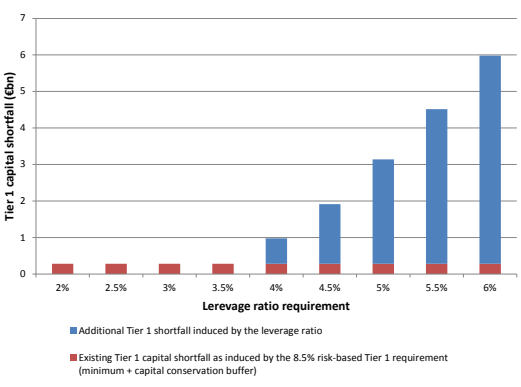


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

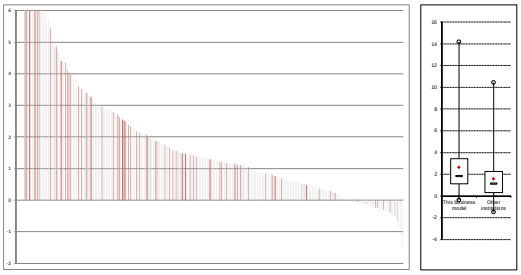


REL conclusions

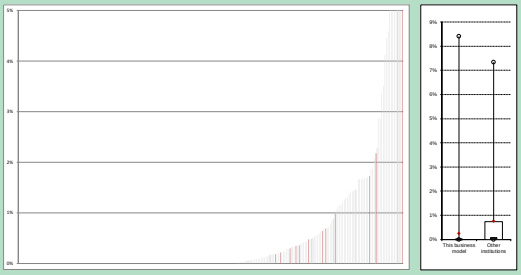
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Less exposed to R.E.L.	Less exposed to R.E.L.	Less exposed to R.E.L.	More exposed to R.E.L.

Risk indicators

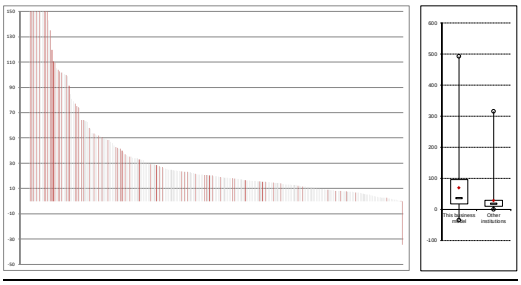
ROA (Sharpe ratio)



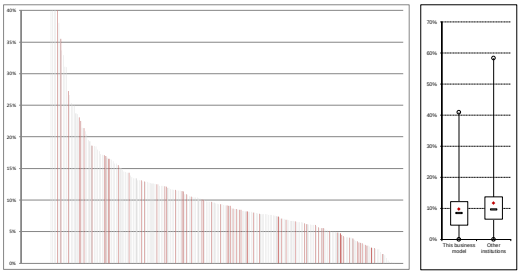
Peak loss



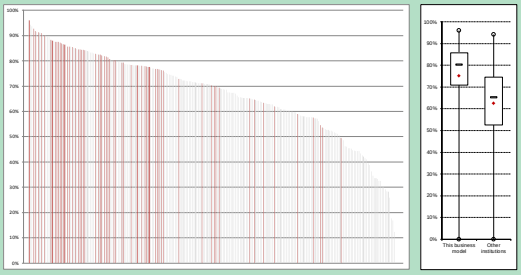
Z-score



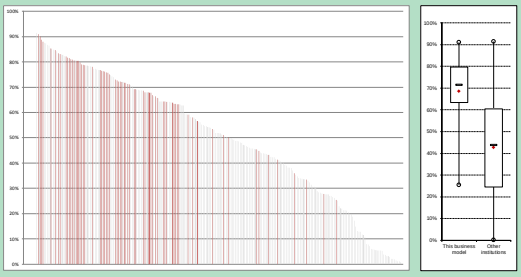
HQLA to assets (mean)



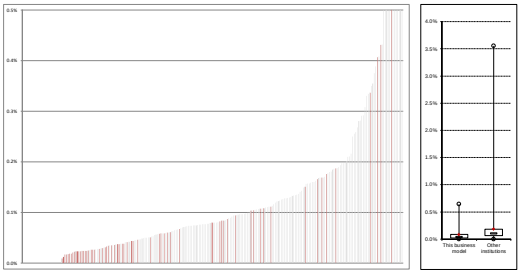
ASF to asset (mean)



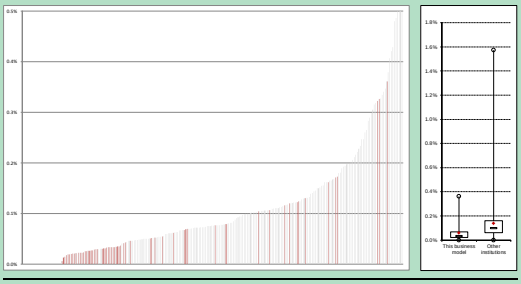
Deposit to asset (mean)



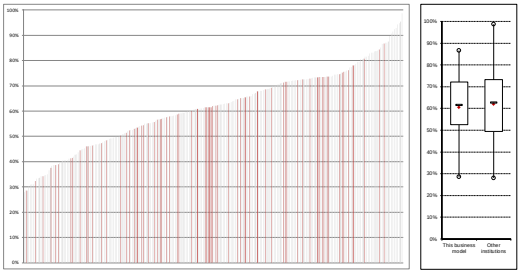
Growth rate of loans (std dev)



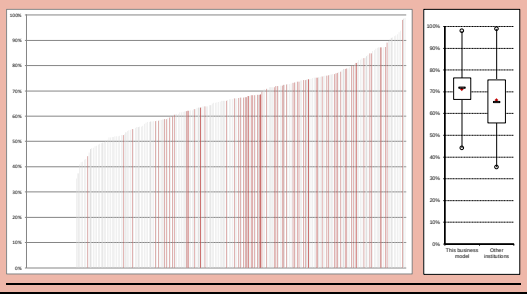
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

f. Private banks

Private banks are credit institutions which predominantly provide wealth management services to high net-worth individuals and families. Results with regard to private banks have to be interpreted with care, as there were only three private banks included in the sample.

Private banks appear to be more exposed to REL compared to other banks with regard to the stability of business activity, as they show significantly higher standard deviations in growth rates of both total assets and loans. While private banks also have lower peak losses and more HQLA to total assets, the other risk indicators in the risk dimensions on profitability and stability of funding do not indicate a lower REL. Although private banks are more concentrated with regard to the primary source of income, they are also less concentrated with regard to the primary assets class, at bank level.

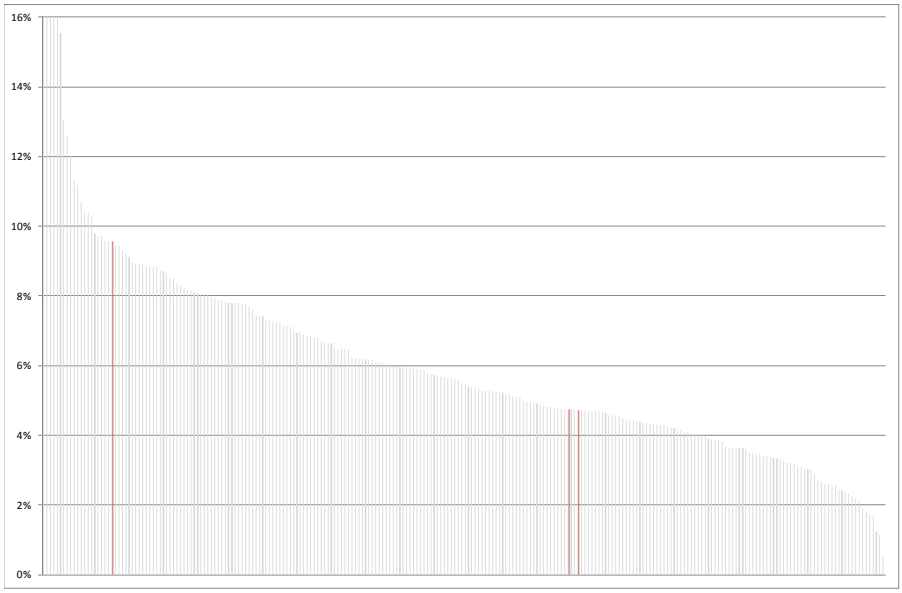
LRs of the private banks included in the sample are rather dispersed. The median (fully loaded) LR is 4.8 %. All three institutions have LRs above 4%. While two institutions have an LR below 5%, the third institution has a LR above 8%.

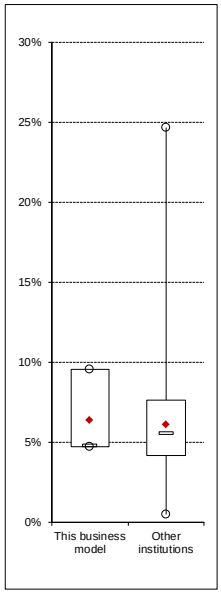
RWA density ratios also vary widely across institutions. The weighted average RWA density ratio is 45.5%, which is almost 10 percentage points larger compared to the sample as a whole (36.0%), but the minimum value is 22.2% and the maximum value is 75.2%. Capital shortfalls are triggered by the LR at LR requirement levels of 5%.

Total exposures of private banks (EUR 14.1 billion) account for only 0.04% of the overall sample. The overall exposure composition is rather concentrated and consists mainly of sovereign exposures (36%), SME exposures (29%) and SFTs (24%). Due to the small number of relatively small institutions, these exposures all represent a negligible share of total exposures within the sample.

Figure 16: Private banks

Distribution of fully loaded LRs and key statistics

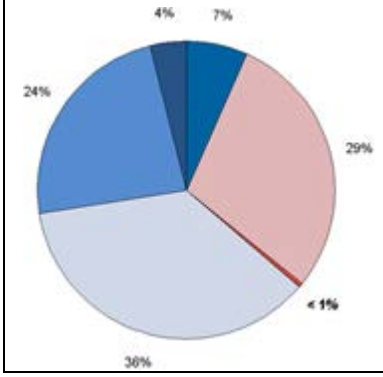




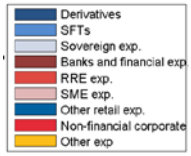
Number of entities in the sample	**3**	Total leverage exposure (billion EUR)	**14.1**
of which below the 3% threshold	***0***	Median LR	***4.8%***
of which below the 4% threshold	***0***	Median Tier 1 ratio	***13.2%***
of which below the 5% threshold	***2***	RWA density (weighted average)	***45.5%***

LR exposure composition

Breakdown by exposure classes

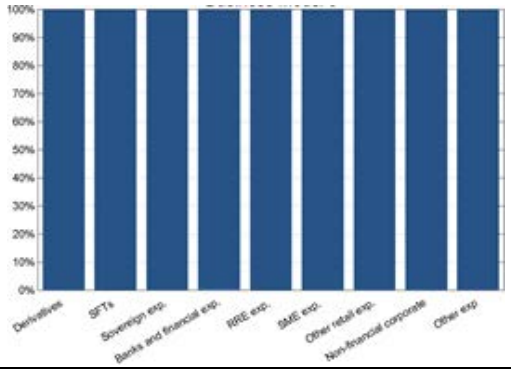


Legend pie chart (left)



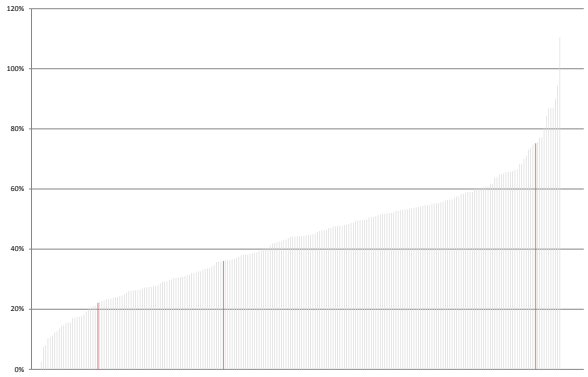
Legend bar chart (right)

Shares of this business model's exposures of the total sample

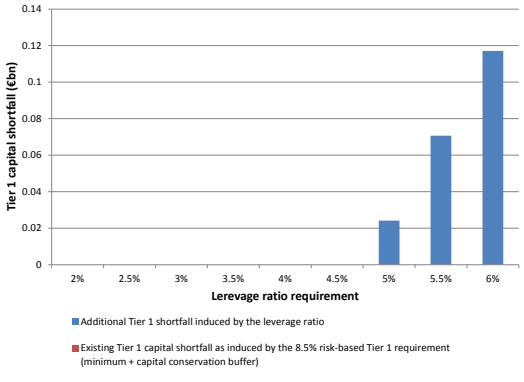


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

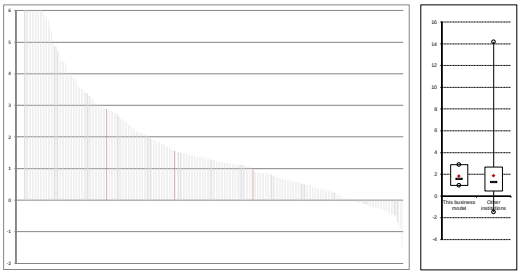


REL conclusions

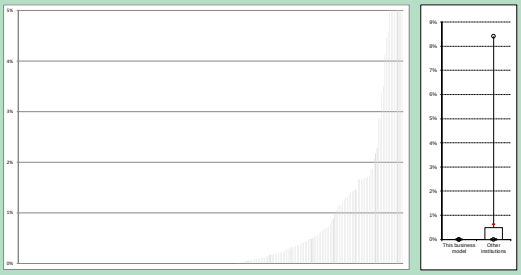
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	More exposed to R.E.L.	Neutral

Risk indicators

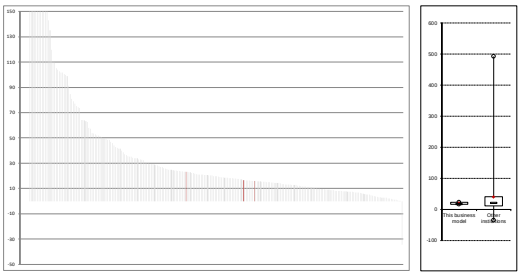
ROA (Sharpe ratio)



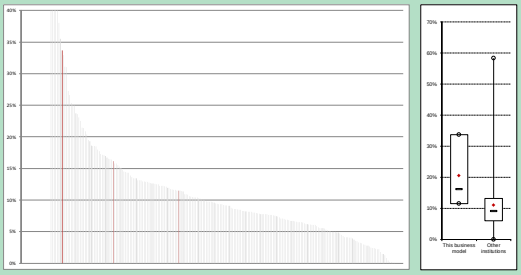
Peak loss



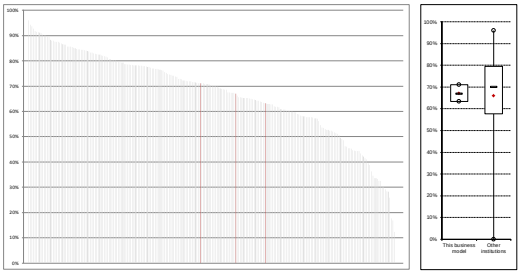
Z-score



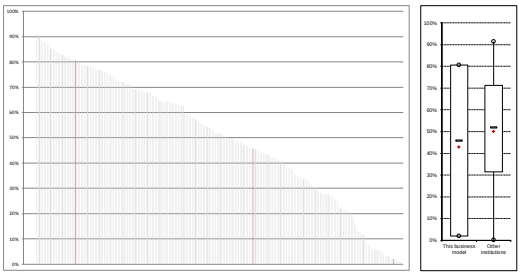
HQLA to assets (mean)



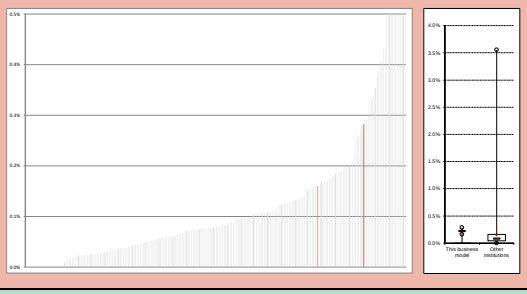
ASF to asset (mean)



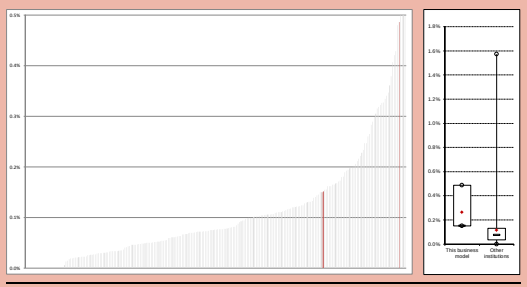
Deposit to asset (mean)



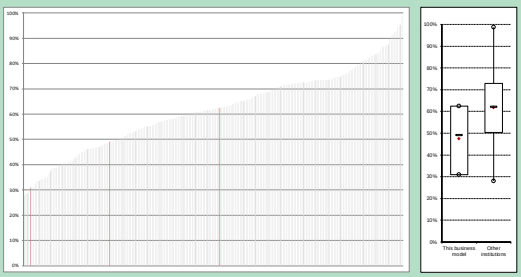
Growth rate of loans (std dev)



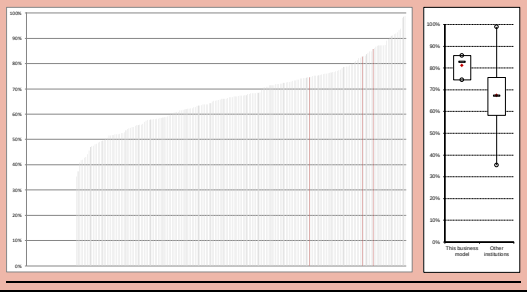
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

g. Custody banks

The main activity of custody banks consists of safekeeping, settlement and asset-administration services, on behalf of their customers (such as investment firms, pension funds and sovereign wealth funds). Custodian banks also provide major operational infrastructure and technological support as well as engage in services such as account administration, transaction settlements, collection of dividends and interest payments, tax support and foreign exchange. As such, the activities of custody banks may vary widely.

Generally, custodian banks take client deposits and place them in either central bank reserves or other types of liquid and low-risk safe assets. As such, client cash inflows and outflows to satisfy their operational needs may create material volatility in custodian banks' balance sheet, both at normal times and in stress. Although the considerations concerning custody banks may be valid for CSDs as well as, in light of the recently introduced regulation, the CSDR,[85] and their classification as financial market infrastructures, a separate paragraph is devoted to CSDs at the end of this section.

Five custody banks are included in the sample.

LRs of custody banks are relatively high but levels vary widely across institutions, with a median (fully loaded) LR of 5.2% (slightly lower than the full sample) and an LR of above 4% for all five institutions. Although two institutions have an LR below 5%, another two institutions have an LR of well above 15%.

Although the median LR is only 5.2%, the median Tier 1 ratio is 55.5%. This is reflected in the very low weighted average risk weight or average RWA density ratio of custody banks of only 11.7%, although one custody bank has an average risk weight of 60%. Capital shortfalls are induced by the LR at LR requirement levels of 4.5% and above.

Aggregate total exposures of custody banks (EUR 84.8 billion) account for 0.3% of the overall sample. The overall exposure composition consists mainly of sovereign exposures (47%), banks and financial exposures (30%) and non-financial corporates (12%). Exposures of custody banks constitute a negligible share of total exposures within the overall sample.

Custody banks appear to be more exposed to REL than other banks with regard to three risk dimensions (stability of funding, stability of business activity and concentration risk). More specifically, custody banks have lower ASF compared to assets, less stable growth rates of loans and more concentrated income sources. Regarding the remaining dimension (level and stability of profitability), custody banks do not show any significant difference compared to the European banking system in any of the three underlying risk indicators.

It may be argued that a number of risk indicators used in the REL analysis are of a lower relevance for custody banks, and especially CSDs, compared to most other types of business model given

[85] Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012.

their very specific activity profile. More specifically, the growth rate of loans may not be fully reflective of long-term expansions, as credit is usually provided on a short-term basis, in large part intraday, and is highly dependent on client deposits, which are working balances used by clients for security transactions, and some excess cash left on the account with CSD or custodian. In low interest rate environments, the volume of excess cash may be especially high. This excess cash needs to be reinvested by the custodian banks, leading to an increase in the LR exposure. As the working balances can be very volatile, the assets will also be very volatile, leading to a volatile LR, which might not be fully under the control of the custodian banks.

Moreover, ASF may also be structurally lower, but as custody banks are not investing in long-term securities or loans this may be less of a concern.

Similarly, it could be argued that the degree of concentration should actually be interpreted as being exclusively focused on custody activity, as there is no spill-over risk from the own account activity to the agency-like activity. On the other hand, the argument still holds that where the business of an institution is highly dependent on a small set of asset classes then it may be more vulnerable to specific episodes of stress.

In conclusion, it does not seem to be appropriate to require a higher LR requirement for custody banks relative to other types of credit institutions based on the quantitative analysis.

For those custody banks that are not CSDs, the distinction between a custody bank and a diversified bank offering custody services may be more difficult.

Central securities depositories (CSDs)

When considering a potential deviation from the general requirement for custody banks, it might be warranted to distinguish between CSDs and other custodian banks. Although the major EU CSDs hold banking licences and are competitors of the major custody banks in some activities, different from pure custody banks, the CSDs are considered market infrastructures by international standards[86] and are therefore subject to the CSDR.

Although CSDs across the world might have very different activities, the CSDR introduces the definition of CSD which specifies the core functions performed by a CSD.[87] The CSDR only requires the performance of the settlement service and one of the two other core services (notary or central maintenance) for an institution to be authorised as a CSD; in practice, the vast majority of CSDs perform all three services. Furthermore, the CSDR (b) limits the banking activities that the CSD can provide,[88] as well as their investment policies.[89]

There are several reasons for which a CSD acquires a banking licence. CSDs may provide credit facilities for their participants in order to facilitate settlement. Usually, these credit lines are only

[86] Principles for Financial Market Infrastructure, issued by IOSCO in April 2012.

[87] Regulation (EU) No 909/2014 (CSDR), Annex: List Of Services, Section A: Core Services of Central Securities Depositories.

[88] Regulation (EU) No 909/2014 (CSDR), Annex: List Of Services, Section C: Banking-type ancillary services.

[89] Regulation (EU) No 909/2014 (CSDR), Article 46, Investment policy.

available for obtaining intraday credit but they can be extended overnight. To offer banking-type ancillary services, however, CSDs[90] have to obtain the two authorisations to operate both as banks and as CSDs.

Different regulatory requirements distinguish CSDs and custody banks that would otherwise be very similar. The main differences are the following: a custody bank can invest client deposits in a more risky way than CSDs, which are strictly bound by the CSDR investment policy requirements.[91] Furthermore, a CSD can only provide a limited set of banking services related to the settlement activities and provided only to the participants in the settlement system.[92] Another difference is that, different from any other financial institution, CSDs are required to hold additional capital requirements[93] because of the intraday credit lines they provide and are subject to requirement on the intraday liquidity management.[94] Furthermore, CSDs are subject to stringent requirements concerning the use of bank guarantees on their credit exposures.[95] Finally, CSDs (and not custody banks) are members of the Target 2 Securities[96] (T2S) in their function of security settlement systems.

CSDs with banking licences hold deposits in relation to the settlement activities. In accordance with the CSDR, providing cash accounts and accepting deposits is allowed only towards participants of a securities settlement system and holders of securities accounts.[97] Therefore, most of the participants hold cash in a CSD deposit only during the day for the time to complete one or more transactions and these deposits are reduced to zero by close of business day. However, because of operational delays, it might happen that not all the deposits are zeroed by the end of the day.

The amount of cash left in the CSD overnight (which otherwise is not allowed to have other deposits) drives the LR calculation of CSDs. These amounts are not under the control of the CSD which has otherwise no economic incentive to hold such overnight deposits. In fact, there is no interest paid on those deposits and the CSDR requires a CSD to discourage overnight credit through the application of sanctioning rates.[98] Reinvestment of the cash in overnight deposits is difficult because of their volatility and is limited by the rules on the investment policy of a CSD.

Finally, it is worth noting that, in the area of resolution, and in the context of ex-ante contributions to resolution financing arrangements, Article 5 of Commission Delegation

[90] Regulation (EU) No 909/2014 (CSDR), Title IV: Provision Of Banking-Type Ancillary Services for CSD Participants, Article 54: Authorisation and designation to provide banking-type ancillary services.

[91] Regulation (EU) No 909/2014 (CSDR), Article 54 – Investment policy.

[92] Regulation (EU) No 909/2014 (CSDR), Annex, Section C, paragraph (a).

[93] Regulation (EU) No 909/2014 (CSDR), Article 54, paragraph 3(d).

[94] Regulation (EU) No 909/2014 (CSDR), Article 59, paragraph 4.

[95] EBA Regulatory Technical Standards on prudential requirements for central securities depositories (CSDs), 16 December 2015.

[96] https://www.ecb.europa.eu/paym/t2s/html/index.en.html.

[97] Regulation (EU) No 909/2014 (CSDR), Annex, Section C, paragraph (a).

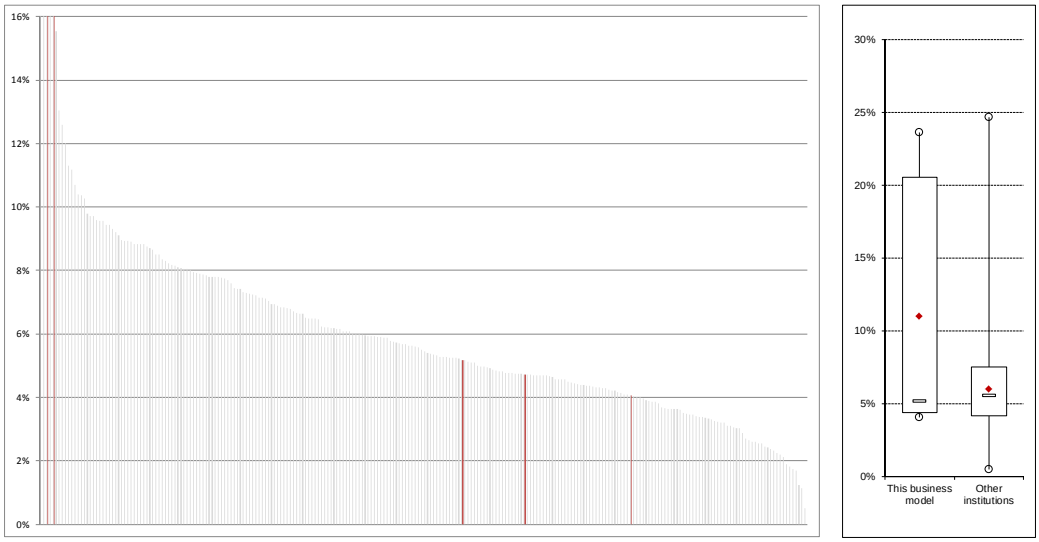
[98] Regulation (EU) No 909/2014 (CSDR), Article 59, paragraph 3(i) and Regulatory Technical Standards on prudential requirements for central securities depositories (CSDs), issued by the EBA on 16 December 2015.

Regulation (EU) 2015/63, which sets out the approach to the risk adjustment of the basic annual contribution, specifies some liabilities to be excluded from the basis for calculating contributions. Liabilities related to the activities of CSDs, including liabilities to participants or service providers of the CSDs with a maturity of less than 7 days arising from activities for which the CSD has obtained an authorisation to provide banking-type ancillary services in accordance with Title IV of Regulation (EU) No 909/2014 (but excluding other liabilities arising from banking-type activities), are excluded. As noted in recital 11 of Commission Delegated Regulation (EU) 2015/63, this is because these liabilities are incurred ancillary to the main settlement activity of CSDs and do not give rise to cash balances which could be assimilated to funding raised in order to perform banking activities. Furthermore, as the business model of CSDs does not give rise to risks comparable to those of a credit institution, only liabilities related to banking type-activities are taken into account for the purposes of establishing the amount of their total liabilities for calculating the basic annual contributions.

Therefore, policy decisions on the application of LR to CSDs should take into account any potential effects that this would have on their function as settlement systems as well as the potential conflicts with the CSDR.

Figure 17: Custody banks

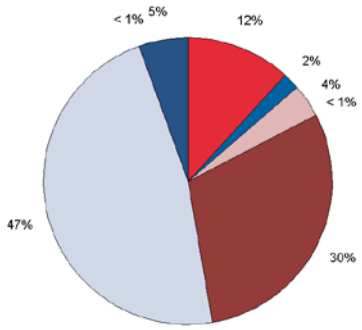
Distribution of fully loaded LRs and key statistics



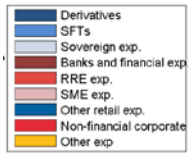
Number of entities in the sample	**5**	Total leverage exposure (billion EUR)	**84.8**
of which below the 3% threshold	***0***	Median LR	***5.2%***
of which below the 4% threshold	***0***	Median Tier 1 ratio	***55.5%***
of which below the 5% threshold	***2***	RWA density (weighted average)	***11.7%***

LR exposure composition

Breakdown by exposure classes

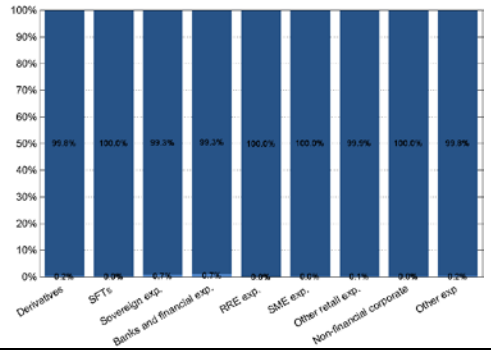


Legend pie chart (left)



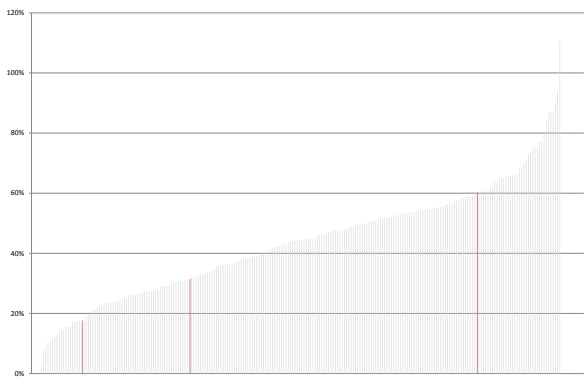
Legend bar chart (right)

Shares of this business model's exposures of the total sample

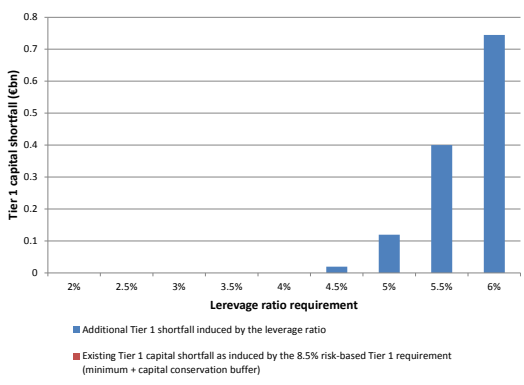


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

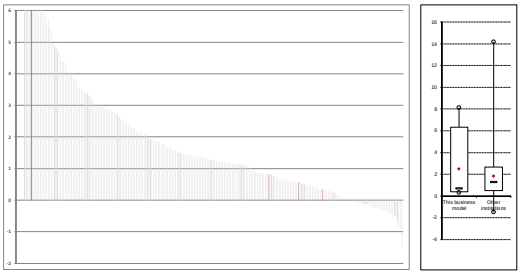


REL conclusions

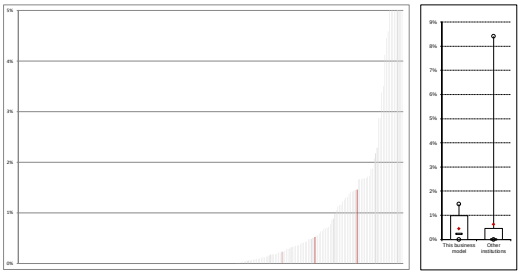
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	More exposed to R.E.L.	More exposed to R.E.L.	More exposed to R.E.L.

Risk indicators

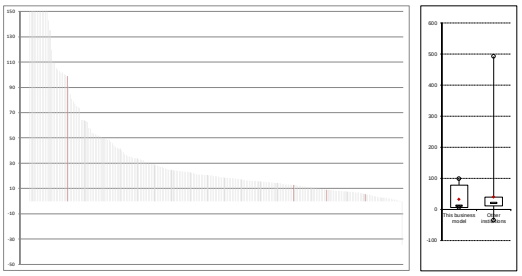
ROA (Sharpe ratio)



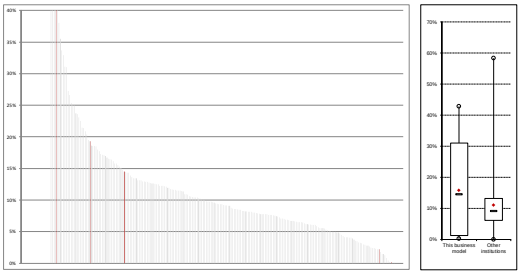
Peak loss



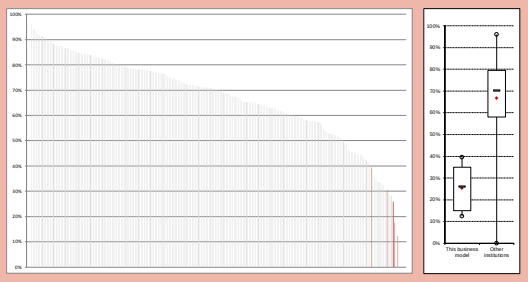
Z-score



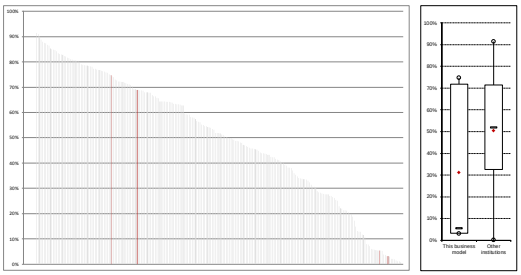
HQLA to assets (mean)



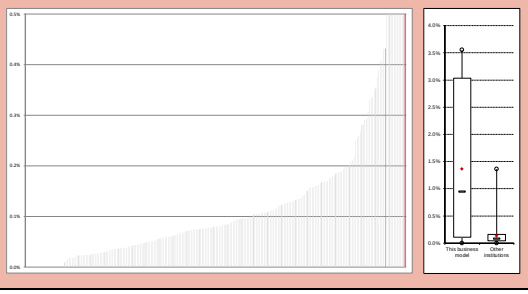
ASF to asset (mean)



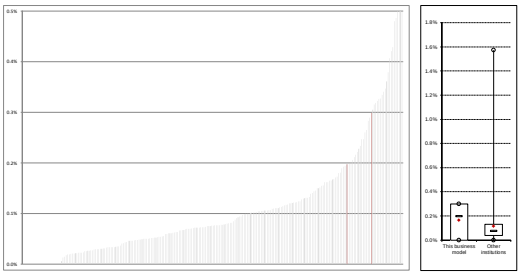
Deposit to asset (mean)



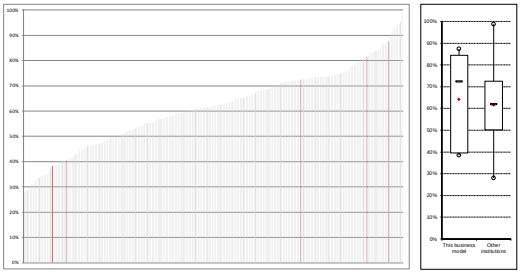
Growth rate of loans (std dev)



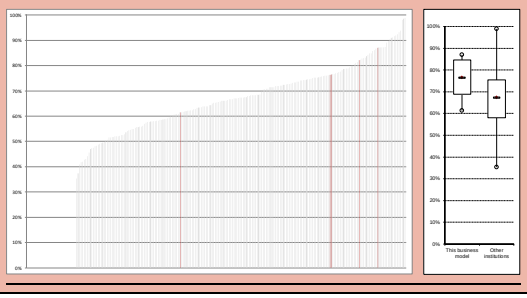
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

h. Merchant banks

Merchant banks are credit institutions that mainly finance domestic and international trade transactions. They are specialised in products such as letters of credit, bank guarantees and the collection and discounting of bills. The sample comprises only three merchant banks.

Merchant banks appear to be more exposed to REL than other banks with regard to the stability of business activity. More specifically, the growth rates of both loans and total assets appear to be less stable compared to the rest of the sample. They also tend to underperform for the deposit-to-asset ratio. However, the overall assessment in the three other dimensions (level and stability of profitability, stability of funding and concentration) is 'neutral', which indicates no statistically significant difference with the rest of the sample.

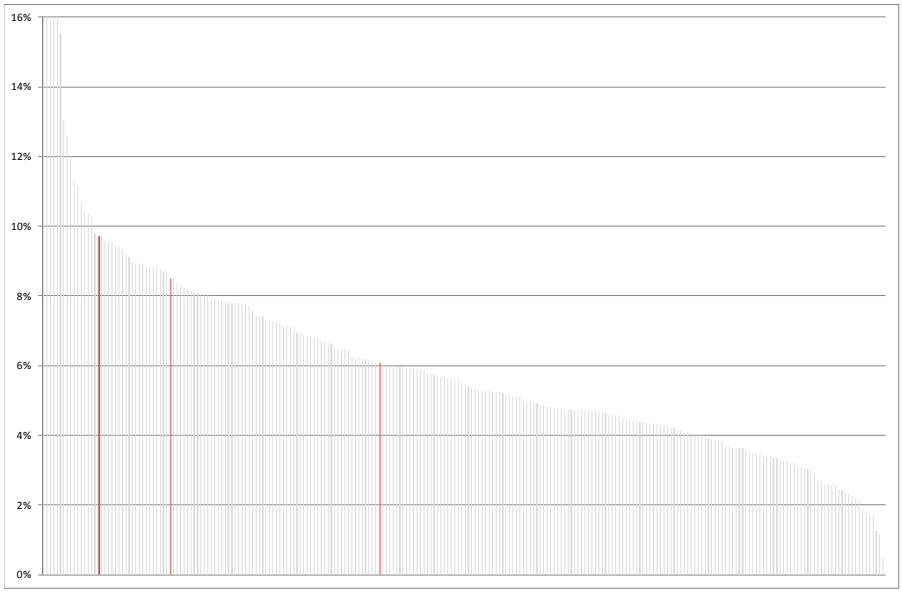
LRs of merchant banks are relatively high. The median (fully loaded) LR amounts to 8.5% and no institutions included in the sample have a LR of below 5%. Hence, no capital shortfalls are induced by the LR at LR requirement levels up to 5%.

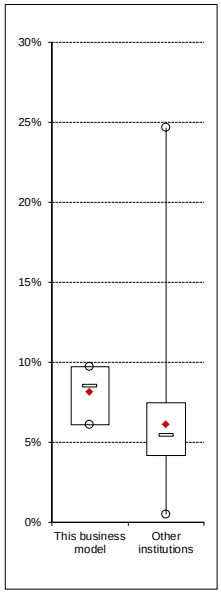
The average risk weight or average RWA density ratio of custody banks is rather high (41.9%), but the distributions varies widely across institutions, with the highest value being 66.0% and the lowest value 22.4%.

Aggregate total exposures of merchant banks (EUR 48.8 billion) account for 0.2% of the overall sample and consist mainly of exposures to bank and financial exposures (56%), non-financial corporates exposures (32%) and SFTs (10%). When compared to the exposures of the overall sample, the share of exposures of merchant banks appear to be non-material. Only the share of merchant banks for banks and financial exposures, SFTs and non-financial corporates amounts to a few percentage points (0.7%, 0.2% and 0.2%, respectively).

Figure 18: Merchant banks

Distribution of fully loaded LRs and key statistics

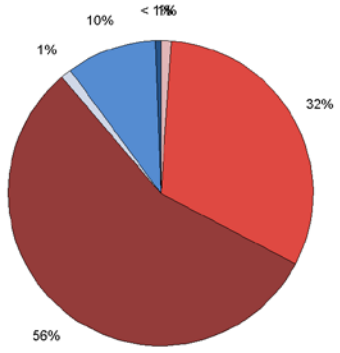




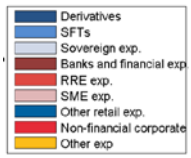
Number of entities in the sample	**3**	Total leverage exposure (billion EUR)	**48.8**
of which below the 3% threshold	***0***	Median LR	***8.5%***
of which below the 4% threshold	***0***	Median Tier 1 ratio	***22.3%***
of which below the 5% threshold	***0***	RWA density (weighted average)	***41.9%***

LR exposure composition

Breakdown by exposure classes

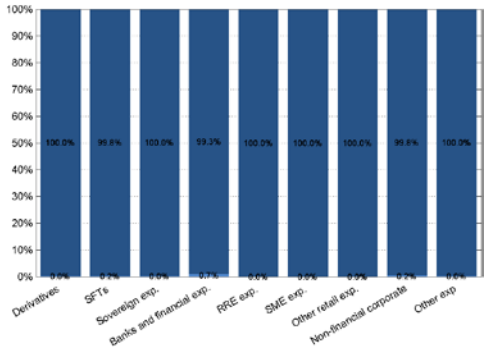


Legend pie chart (left)



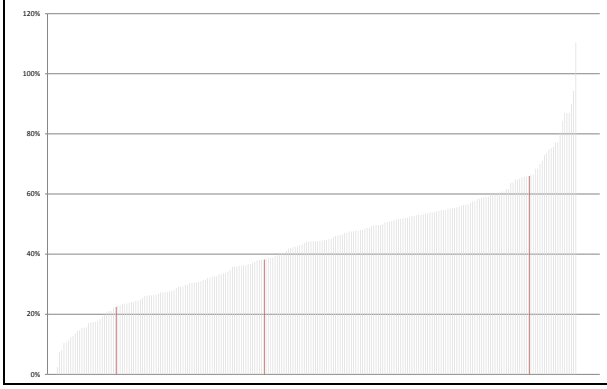
Legend bar chart (right)

Shares of this business model's exposures of the total sample

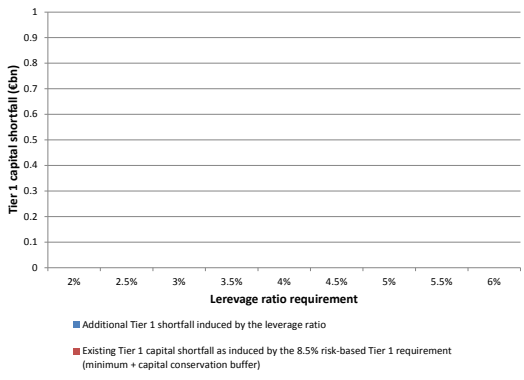


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

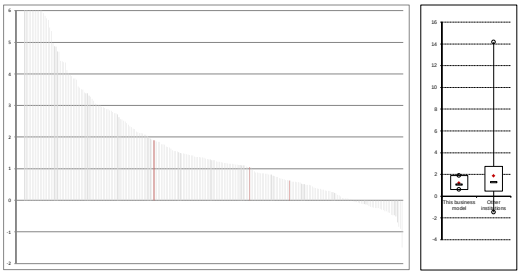


REL conclusions

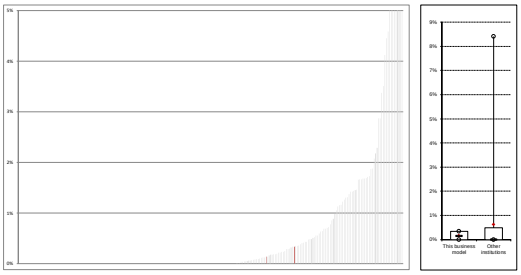
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	More exposed to R.E.L.	Neutral

Risk indicators

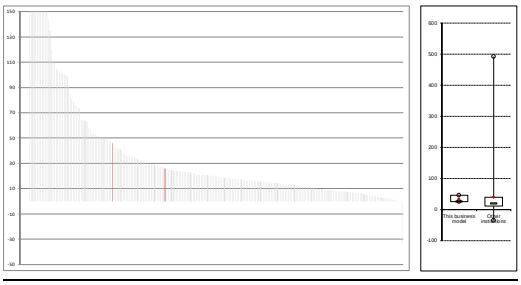
ROA (Sharpe ratio)



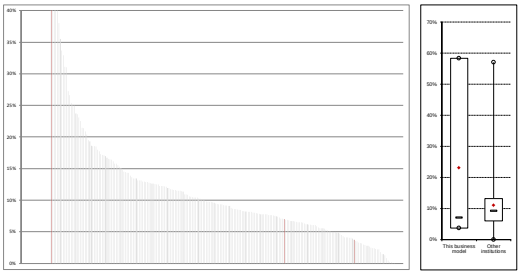
Peak loss



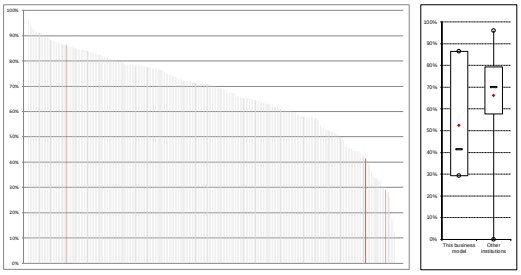
Z-score



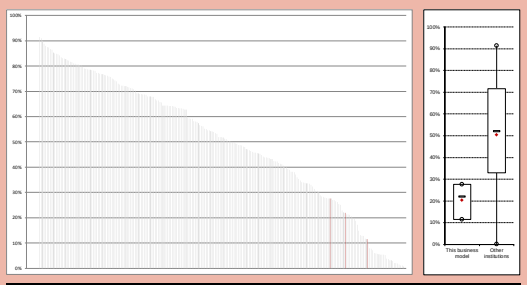
HQLA to assets (mean)



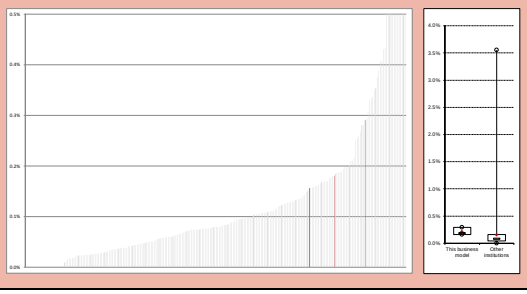
ASF to asset (mean)



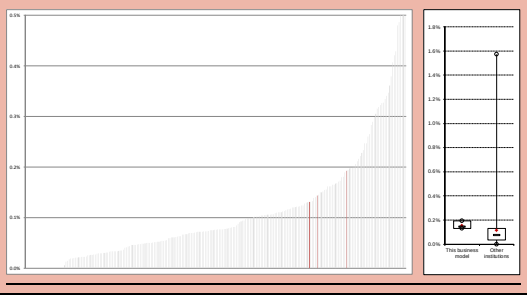
Deposit to asset (mean)



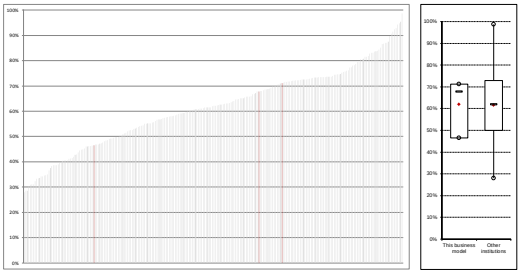
Growth rate of loans (std dev)



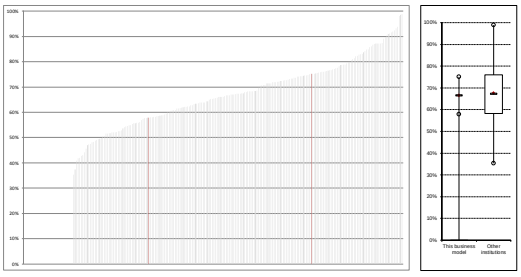
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

i. Leasing and factoring banks

Leasing and factoring banks are specialised in leasing (asset-based financing) and/or factoring activities (financing methods in which the bank pays a company the value of the receivables less a discount for commissions and fees). Only four leasing and factoring banks are included in the sample.

Leasing and factoring banks appear to be less exposed to REL compared to the rest of the sample with regard to the stability of business activity, as the growth rate of total assets appears to be more stable. Regarding the three other dimensions (level and stability of profitability, stability of funding and concentration), the overall conclusions indicate no significant difference compared to the rest of the sample.

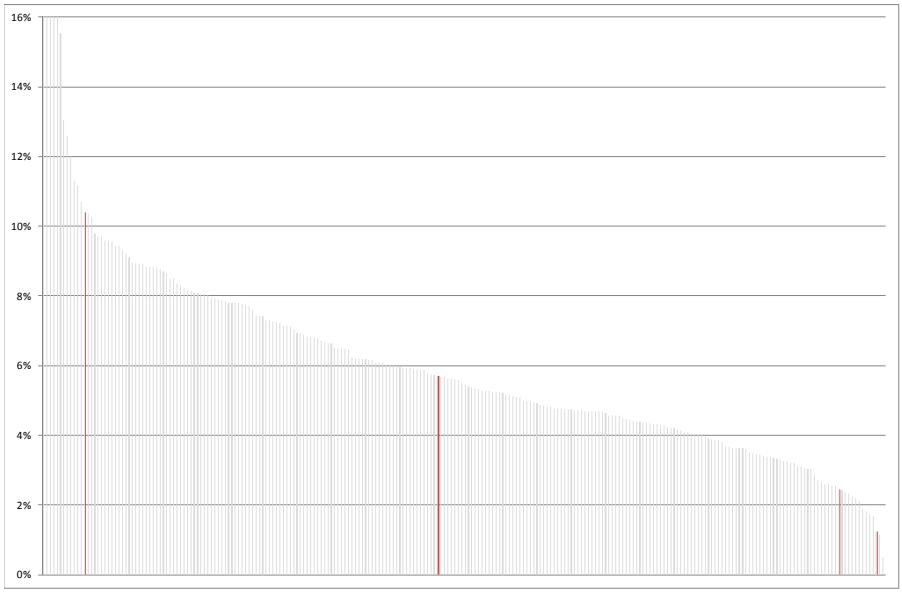
LRs of leasing and factoring banks are relatively low but levels vary widely across institutions, with a median (fully loaded) LR of 4.1%. Two institutions have an LR below 3%, while the other two have an LR above 5%.

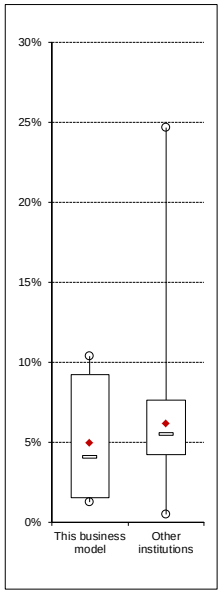
The average RWA density ratio is high (55.1%), but values are very dispersed. The graph illustrating the Tier 1 capital shortfall at different calibrations of the LR does not show any shortfall, despite two of these four banks being below the 3% LR requirement. This is not an inconsistency but results from the fact that, to avoid any double-counting issue, subsidiaries of EU parent banks have not been taken into account in the shortfall computations. As there are leasing and factoring banks bound by LR requirements ranging from 2% to 6% that are subsidiaries of EU parent banks (potentially already taken into account in other business models), no shortfall was computed.

Total exposures of leasing and factoring banks (EUR 21.4 billion) account for 0.1% of the overall sample. The largest exposure classes are SME exposures (43%), banks and financial exposures (36%) and sovereign exposures (15%). Exposures of leasing and factoring banks constitute a negligible share of total exposures within the overall sample.

Figure 19: Leasing and factoring banks

Distribution of fully loaded LRs and key statistics

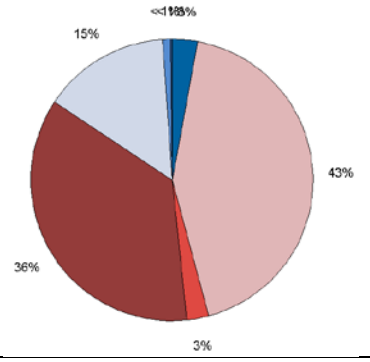




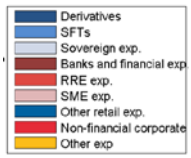
Number of entities in the sample	**4**	Total leverage exposure (billion EUR)	**21.4**
of which below the 3% threshold	***2***	Median LR	***4.1%***
of which below the 4% threshold	***2***	Median Tier 1 ratio	***10.2%***
of which below the 5% threshold	***2***	RWA density (weighted average)	***55.1%***

LR exposure composition

Breakdown by exposure classes

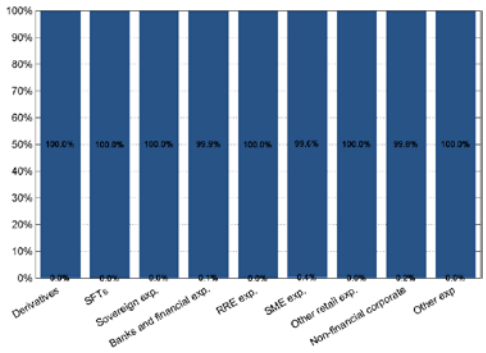


Legend pie chart (left)



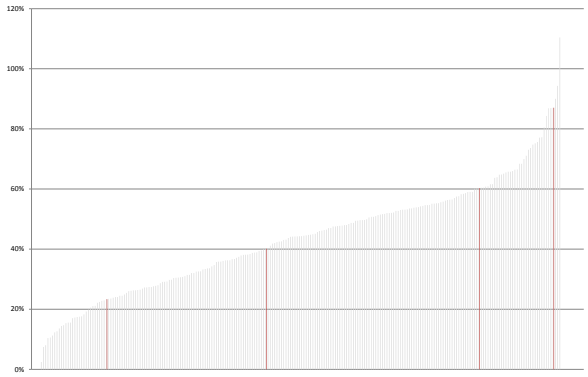
Legend bar chart (right)

Shares of this business model's exposures of the total sample

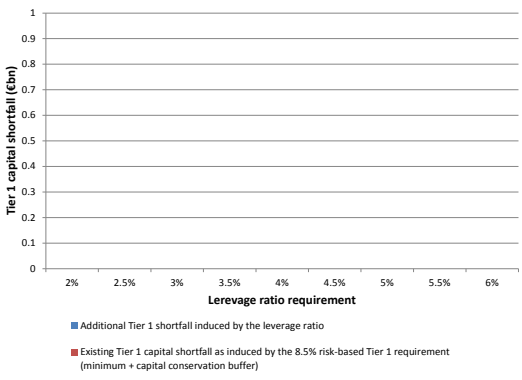


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

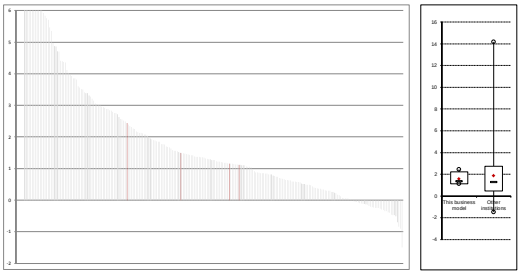


REL conclusions

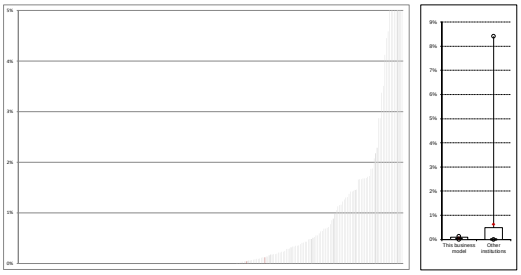
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	Less exposed to R.E.L.	Neutral

Risk indicators

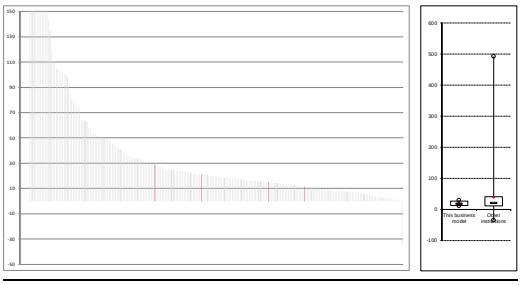
ROA (Sharpe ratio)



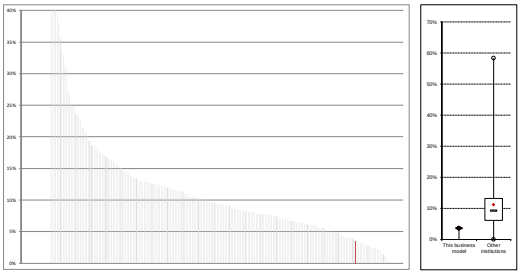
Peak loss



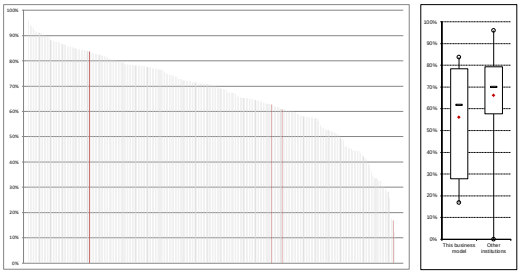
Z-score



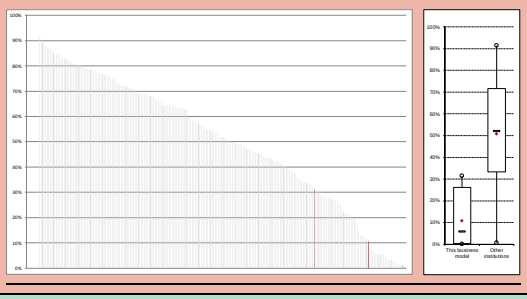
HQLA to assets (mean)



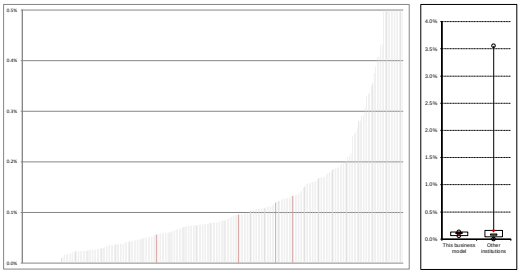
ASF to asset (mean)



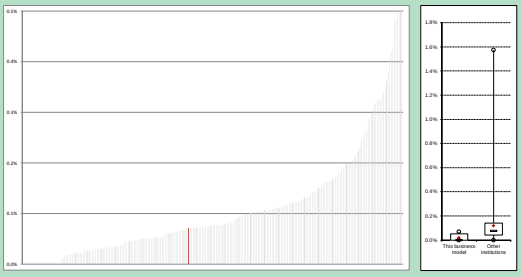
Deposit to asset (mean)



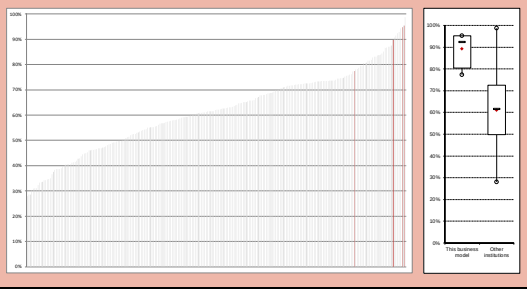
Growth rate of loans (std dev)



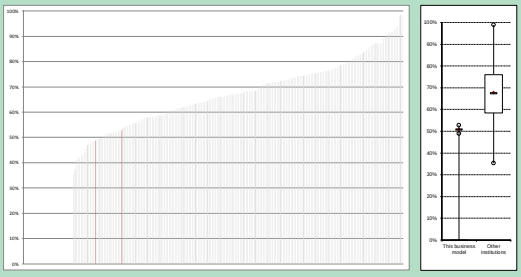
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

j. Public development banks

In summary, public development banks are credit institutions which specialise in financing public sector projects and/or providing promotional credit or municipal loans. They are often majority-owned by the state or the public sector and/or may benefit from various types of guarantee structures. They are also subject to specific statutory requirements with respect to the purpose and/or principal activity of the entity. However, the distribution of promotional loans is operated along infinitely varied processes across the EU and extends from full ownership of the bank to the mere control of the thin channelisation via commercial banks.

Twelve public development banks are included in the sample.

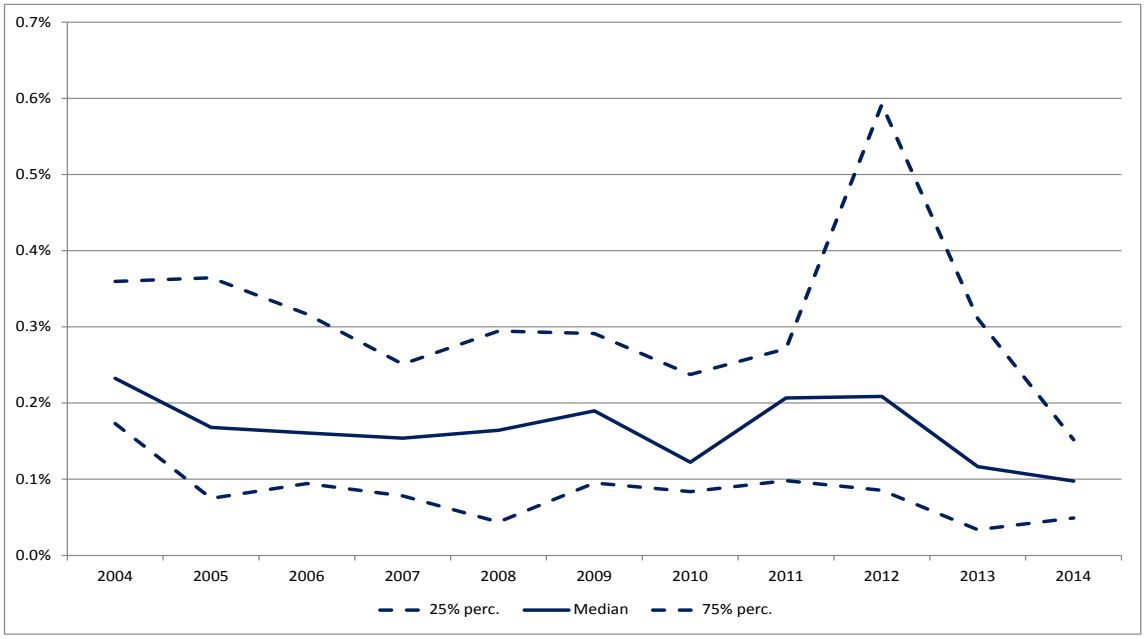
The results of the benchmarking analysis do not point to any distinctive features of public development banks in terms of their exposure to REL as they do not appear to be more or less exposed to REL than other banks in any of the four risk dimensions considered. Based on this quantitative analysis, neither a lower nor a higher LR requirement would therefore be warranted for this type of business model.

LRs of public development banks are very low, with a median (fully loaded) LR of 2.8%. A total of 6 out of 12 institutions have an LR below 3%, 9 institutions have an LR below 4% and 10 institutions have an LR below 5%. As these banks generally have assets with rather low risk weights, they appear to be particularly constrained by an LR requirement.

This is evidenced by the very low RWA density ratio of only 17.5%, allowing risk-based capital ratios of public development banks to be relatively high (median Tier 1 ratio of 20.3%), despite the low LRs. In general, by being involved in low-risk business, such as public sector lending, they generate low margins, and leverage is necessary to achieve sufficient economies of scale (the crucial rationale for the business model in the first place). Capital shortfalls are induced by the LR starting with a requirement level of 2%, with a 3% requirement resulting in a Tier 1 shortfall of nearly EUR 4 billion and a requirement of 5% resulting in Tier 1 shortfall of over EUR 12 billion.

In case certain public development banks would need to increase their Tier 1 capital in order to improve their LR, one potential source could be through profit retentions. Figure 20 displays the net income after taxes relative to total assets for public development banks for the period 2004-2014. It can be observed that the median generally ranged between 0.1% and 0.2%, with the 25th and 75th percentiles relatively close to the median. These figures suggest that increasing capital through profit retention may require some time in the case of public development banks despite relatively stable profitability. Assuming, for example, that profits equalling 0.1% of total assets could be retained per year, and that total assets are relatively close to total LR exposure, it would take approximately 10 years to increase the LR by 1 percentage point (e.g. from 2% to 3%).

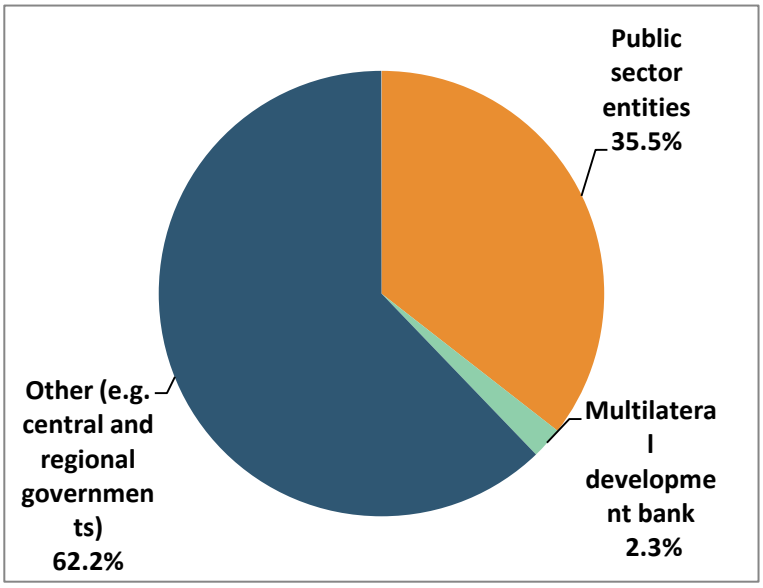
Figure 20: Income after taxes to total assets for public development banks between 2004 and 2014



Source: EBA QIS (June 2015)

Aggregate total exposures of public development banks (EUR 709 billion) account for 2.2% of the overall sample. The largest exposure classes of public development banks are sovereign exposures (37%) and banks and financial exposures (36%), constituting 3.7% and 6.4%, respectively, of these exposures within the total sample. Figure 21 breaks down the aggregate sovereign exposures of public development banks into three sub-categories. 35.5% of these exposures are held towards PSEs, 2.3% towards multilateral development banks and the remaining 62.2% towards other sovereign counterparties including central and regional governments.

Figure 21: Breakdown of sovereign exposures of public development banks



Source: EBA QIS (June 2015)

While the risk dimensions and indicators have been judged globally as valid for the assessment of REL, the meaningfulness of some indicators, as for other business-models categories, may be reduced for some of them with regard to public banks.

In particular, the specific statutory requirements public development banks operate under, may influence their performance on the risk indicators. For instance, their specific mission of financing public sector projects may imply a high degree of concentration both in terms of asset composition (which is dominated by sovereign as well as bank and financial exposures) and income sources. The distribution of concentration risk indicators broadly confirms this. Moreover, public development banks are generally not set up with direct access to customer deposits but only limited access under their specific mission/purpose, a feature which may explain their relative underperformance on the deposit-to-asset ratio indicator. However, since public development banks outperform on the ASF-to-asset indicator, they seem generally able to compensate for their limited access to customer deposits by obtaining funding from other stable sources. The relevance of the indicator HQLA to total assets is also questionable to the extent that it does not consider that assets held by promotional banks are often public exposures or guaranteed by a PSE, and are therefore often eligible to ECB open market operations despite not being traded securities and therefore somewhat underestimating the available resources of promotional banks. Finally, indicators related to profitability do not fit well for public sector development banks, since their main goal is not to optimise earnings or profit, but to fulfil the owner's public policy goals. At the same time, the related risk indicators do not focus exclusively on the level of profitability but also on stability/continuity. This may explain why public development banks neither outperform nor underperform on any of the profitability related risk indicators.

In conclusion, while the risk indicators employed in the quantitative benchmarking seem to be relevant also in the case of public development banks, the interpretation of the results warrants particular caution as performance may hinge on their specific mission and statutory

requirements. In that regard, the assessment, which requires grouping credit institutions in a set of categories, is complicated by the heterogeneous landscape of public development banks in the EU. This fact may explain the rather high degree of dispersion of observations in the risk indicator distribution in the case of public development banks.

With a supervisory judgement complementing the quantitative benchmarking exercise, the following remarks can be made.

Of the common features that can be generally observed, the following are noteworthy:

- Most public banks do not take retail deposits.
- They are usually organised as public law institutions, are usually under state ownership and benefit from state guarantees as long as they are entrusted with promotional tasks, in some cases under EU State Aid rules.
- They are legally confined to be active in a limited number of business areas (like financing local authorities, public health institutions, public infrastructures, financing SMEs, housing, environment-friendly investments, sometimes export financing) based on narrow mandates. In some cases, there are explicit references in the mandates or decisions establishing the public banks to a recognised insufficient provision of loans to PSEs on the local market or 'underserved' areas. In some cases, the Commission has expressly recognised the promotional mission and has stipulated under which competition law conditions the institution should operate. Insofar as some EU funds are used, some public banks are subject to scrutiny by the European Court of Auditors.
- They are generally non-profit or low-profit institutions due to low margined activities.
- They generally offer simple and transparent 'plain vanilla' loans and their risk profile is generally limited. Due to the nature of the beneficiaries of the loans, the exposures generally benefit from a very low risk weight under the CRR credit risk provisions related to exposures to regional governments, local authorities or PSEs.
- Some may obtain funding on the capital market but they also use public funds from EU sources or government sources. In some cases, the funding is explicitly guaranteed by the State.
- The sovereign rating is generally the main driver of the public development banks funding cost.

At the same time, public development banks still present quite diverse features.

It should be kept in mind that the landscape of public development banks in Europe is quite complex and heterogeneous. There is no single model which has been set up on a national, regional or more local level, as each national, regional or local government adapts itself to specific legal and market framework conditions in its own way. This degree of flexibility is judged essential by public development banks in order to implement the model that works best for the jurisdiction in question. Therefore, the business model of public development banks encompasses a variety of models.

- Some of the public development banks can be pure players in the distribution of promotional loans, while others conduct (limited) types of other activities (for example export funding) in which they compete with private actors.

- The level of 'bindingness' of the legal mandates ranges from decisions from the Commission to decisions taken at different jurisdictional levels, including in some cases articles of association or statutes or mandates by the national competent authority.

- The group structure of the public banks is heterogeneous. Some do operate as completely independent stand-alone banks, whereas others are part of more common commercial banking groups, albeit as separate entities in the group.

- While not generally taking retail deposits, some public development banks take deposits from customers to the extent that there is a direct relationship to promotional tasks and that the use of the funds collected is restricted to some specific activities or placements.

- The disbursement schemes reflect the variety of promotional bank business models in Europe. Such loans can be disbursed directly to the final beneficiary or indirectly via partner banks acting as intermediaries towards the final beneficiaries (in a kind of 'pass-through' process) and distributors of the promotional loan products. Sometimes they are originated within the traditional commercial banking sector and transferred to the public development bank to be refinanced with the commercial sector acting as the originator.

- Finally, while some public development banks maybe of a limited size, some of them are institutions of a significant size, which may even be qualified as GSIIs in some jurisdictions.

In terms of the regulatory framework applicable to public development banks, despite the diversity observed in the different models of public development banks, the current legislation already contains some provisions specific to their status.

It is worth noting that a promotional bank is defined, in the area of resolution, and in the context of institutions' ex-ante contributions to resolution financing arrangements, by the Commission Delegation Regulation (EU) 2015/63 in Article 3(27) as 'any undertaking or entity set up by a Member State, central or regional government, which grants promotional loans on a non-competitive, not for profit basis in order to promote that government's public policy objectives, provided that that government has an obligation to protect the economic basis of the undertaking or entity and maintain its viability throughout its lifetime, or that at least 90 % of its original funding or the promotional loan it grants is directly or indirectly guaranteed by the Member State's central or regional government', while a promotional loan is defined in Article 3(28) as 'a loan granted by a promotional bank or through an intermediate bank on a non-competitive, not-for-profit basis, in order to promote the public policy objectives of central or regional governments in a Member State'.

It provides for special treatment in Article 5 of Commission Delegation Regulation (EU) 2015/63, which sets out the approach to the risk adjustment of the basic annual contribution, specifies some liabilities to be excluded from the contributions calculations, in particular 'for institutions

operating promotional loans, liabilities of the intermediary institution towards the originating or another promotional bank or other intermediary institution and the liabilities of the original promotional bank towards its funding parties in so far as the amount of these liabilities is matched by the promotional loans of that institution'. These liabilities, which are entered into for broadly public policy purposes, are perceived as low risk as they are directly or indirectly partially guaranteed by the central or regional government of the local authority concerned and, therefore, can be ignored in establishing the relevant institution's contributions to the resolution financing arrangement.

The CRR provisions related to credit risk can be mentioned, in particular Articles 115 (exposures to regional governments or local authorities) and 116 (exposures to PSEs). In addition, Article 1(8) of the CRR defines a 'public sector entity' as a 'non-commercial administrative body responsible to central governments, regional governments or local authorities, or to authorities that exercise the same responsibilities as regional governments and local authorities, or a non-commercial undertaking that is owned by or set up and sponsored by central governments, regional governments or local authorities, and that has explicit guarantee arrangements, and may include self-administered bodies governed by law that are under public supervision'.

In the area of liquidity, Article 10(e)(ii) of Commission Delegated Regulation 2015/61 (LCR DA) specifies that 'a promotional lender shall be understood as any credit institution whose purpose is to advance the public policy objectives of the Union or of the central or regional government or local authority in a Member State predominantly through the provision of promotional loans on a non-competitive, not for profit basis, provided that at least 90 % of the loans that it grants are directly or indirectly guaranteed by the central or regional government or local authority and that any exposure to that regional government or local authority, as applicable, is treated as an exposure to the central government of the Member State in accordance with Article 115(2) of Regulation (EU) No 575/2013 (CRR)'.

In the area of the LR, following Commission Delegated Regulation 2015/62 (LR DA), Article 429(14) of the CRR provides that 'competent authorities may permit institutions to exclude from the exposure measure, exposures to a public sector entity, which are treated in accordance with Article 116(4) of the CRR, provided that they arise from deposits that the institution is legally obliged to transfer to the public sector entity for the purposes of funding general interest investments'. Some public banks argue that, while this provision would not include promotional loans, a similar solution also allowing promotional loans to be excluded from the exposure measure of the LR could be envisaged.

Finally, in the area of resolution, and in the context of ex-ante contributions to resolution financing arrangements, contributions are adjusted in proportion to the risk profile of concerned institutions on the basis of a number of factors, including the risk exposure of the institution, the stability and variety of the institution's sources of funding and unencumbered highly liquid assets, the probability that the institution enters into resolution, and the fact that the institution is part of an institutional protection scheme. These factors are used to qualify the likelihood and impact of an institution's failure and therefore the need to resolve it using the resolution tools and powers and the resolution financing arrangements.

In conclusion, it could be argued that the existing regulatory framework has addressed to some extent the specificities of some of the public banks' activities and has allowed for a differentiated treatment. Referring to the beneficial treatments already in place for several prudential metrics, some public banks argue that this should be replicated for the LR, for example by excluding claims against public authorities from the exposure measure. On the other hand, it also could be argued that the LR as a 'backstop' measure should provide a capital requirement without special treatments.

The difficulties and risks attached to an LR differentiation for public banks, however, should not be underestimated.

From a prudential perspective it seems that low-risk business can create blindness and risky expansion of loans if insufficiently controlled. An increase in the cost of capital by way of an LR could then act as an effective control. However, public development banks generally argue that imposing a LR on them would act as a 'front stop' instead of a backstop, whereas in their view REL in this business model is very limited.

As ceasing/downsizing their activity is a priori not an option in view of their public mission, this would lead to a disproportionate increase of capital, which in most cases would be financed by the State where deemed feasible and acceptable from their perspective, which would in return lead to very high capital ratios. In this case, the leverage requirements would appear to contradict the objective of the LR, which is to complement the risk-based approach (backstop) without being the main driver of capital requirements. Some public banks also argue that in this case the LR would hinder public policies attached to the distribution of promotional loans and would become an incentive to diversify into riskier businesses, if permitted by the mandate.

In assessing a potential need for a differentiation for public banks, the EBA has considered all the following aspects:

While it does not seem appropriate to exempt public banks from any leverage constraint at all, the questions which can be raised relate to (i) whether the specific constraints attached to this business model would warrant a differentiated (in the sense of lower) LR requirement or (ii) whether there should be some specific treatments allowed to exclude some exposures from the exposure measure to the extent that they are backed by specific legal mechanisms.

In case a differentiated treatment was envisaged, the main question would be how/where to set the bar and not to open the door too widely, how to avoid a given proposed treatment not being abused by banks which could not adhere to it and how to ensure a certain level playing field with banks which provide loans to the public sector but are not public banks as such (the question of a specific treatment on the basis of a specific entity nature or on the basis of a transaction approach).

Based on the description provided above on the activities and specificities of public development banks, which have both common and different features in EU jurisdictions, it is not easy to define a list of 'one size fits all' criteria that could be applied to justify either a lower LR requirement or some exemptions in the exposure measure, while at the same time keeping the spirit of the LR design. The LR is a backstop metric which should be disconnected by nature from RWAs. In

addition, there is a wider debate taking place on the sovereign risk treatment. This list of criteria, if any, should be stringent enough not to defeat the original purpose of the LR. In addition, exemptions from the exposure measure would affect the comparability of the LR, also in the context of the global standards of the BCBS.

It could also be argued that some of these public banks should probably be in the list of institutions that are exempted from regulatory requirements as per Article 2(5) CRD IV.

The most immediate criteria which can ground a specificity could be the binding legal mandate imposing a public mission on the public development bank while restricting its activities to very specific business areas, often resulting in a not-for-profit objective; the 'bindingness' of the legal mandate (at which level it has been defined) and the possibilities to change it shall be very carefully appreciated. The highest security seems to exist where requirements come directly from Commission decisions and EU State Aid rules. The benefit from public guarantees to the public bank or their loans to the public sector may also be considered.

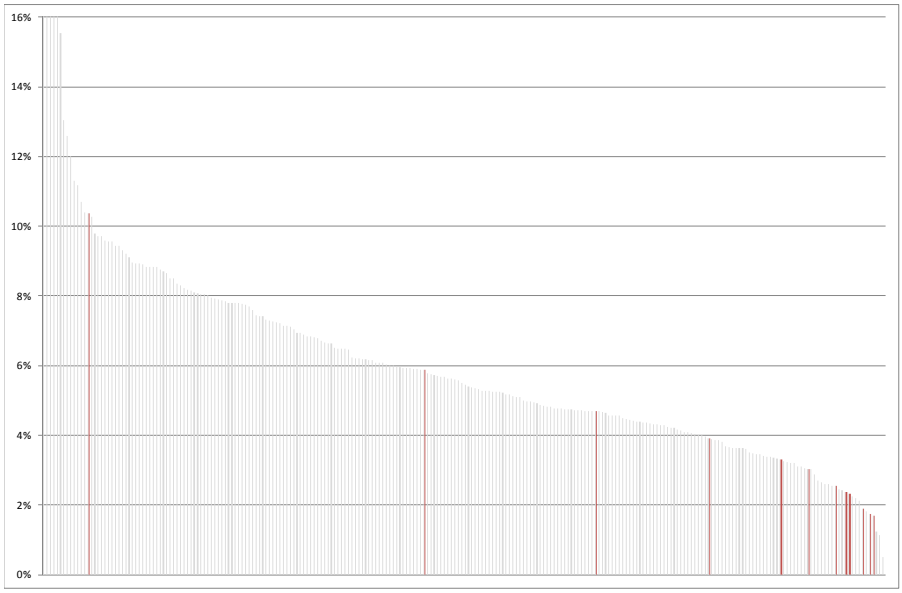
The backing of a 'pass through' system where the promotional bank is not exposed to REL could in particular be considered. However, it should also be noted that the existing rules already allow for the exclusion of certain pass-through transactions under Article 429(13) of the CRR.

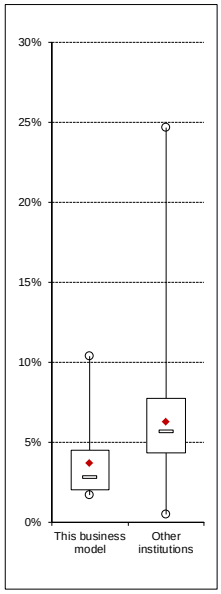
A full pass-through arrangement could potentially bring prudential risk relief that would justify less attention to leverage risk and therewith offer an alternative to capping the risk of the institution and the system by limiting the business volume via an LR requirement.

The final conclusion of the reflections on a potential differentiated LR for public banks is reflected in the Executive Summary of the report. The EBA believes that it has provided a good overview of aspects to be investigated by the Commission, where deemed appropriate, in its forthcoming legislative proposals.

Figure 22: Public development banks

Distribution of fully loaded LRs and key statistics

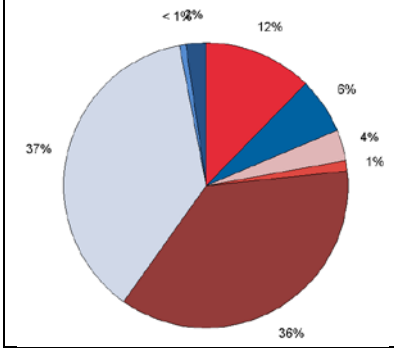




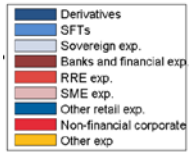
Number of entities in the sample	**12**	Total leverage exposure (billion EUR)	**709**
of which below the 3% threshold	***6***	Median LR	***2.8%***
of which below the 4% threshold	***9***	Median Tier 1 ratio	***20.3%***
of which below the 5% threshold	***10***	RWA density (weighted average)	***17.5%***

LR exposure composition

Breakdown by exposure classes

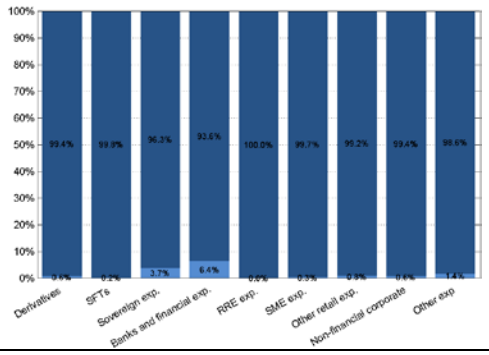


Legend pie chart (left)



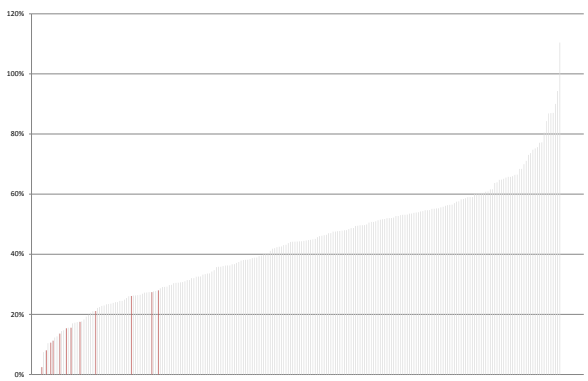
Legend bar chart (right)

Shares of this business model's exposures of the total sample

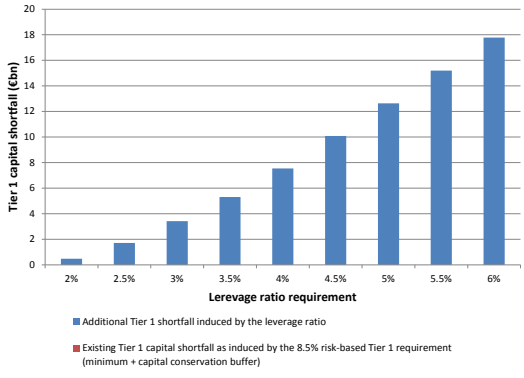


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

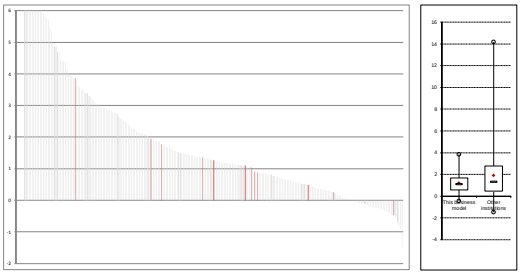


REL conclusions

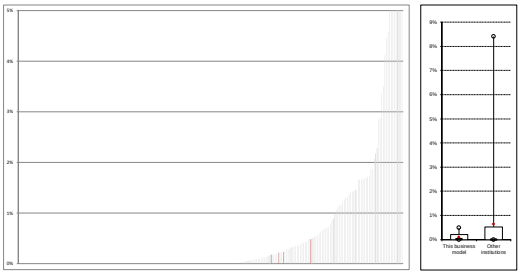
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	Neutral	Neutral

Risk indicators

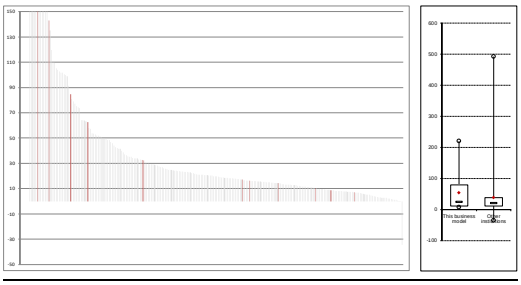
ROA (Sharpe ratio)



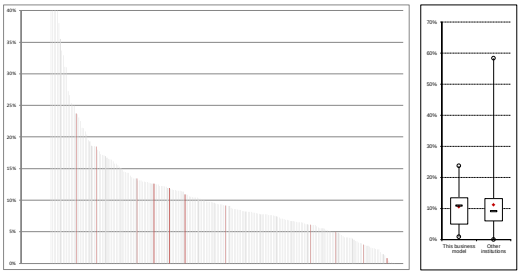
Peak loss



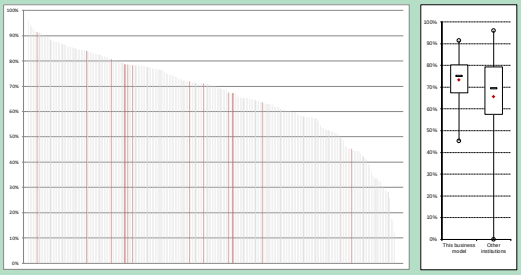
Z-score



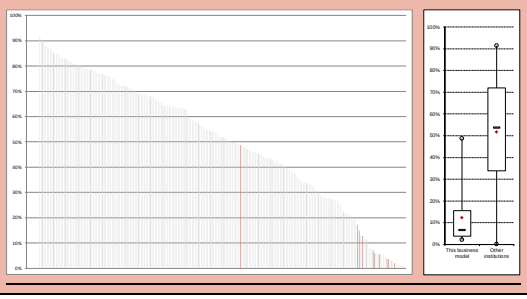
HQLA to assets (mean)



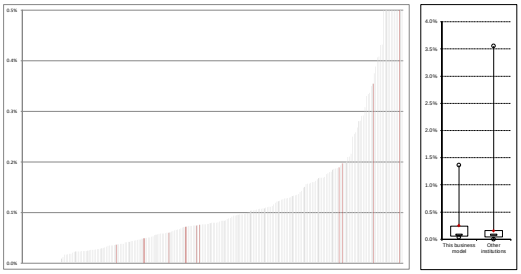
ASF to asset (mean)



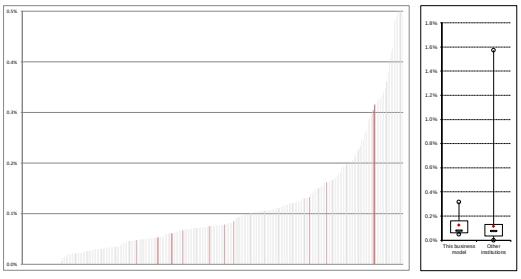
Deposit to asset (mean)



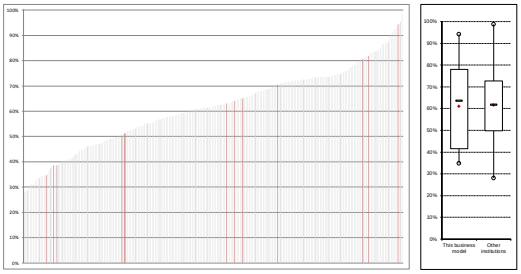
Growth rate of loans (std dev)



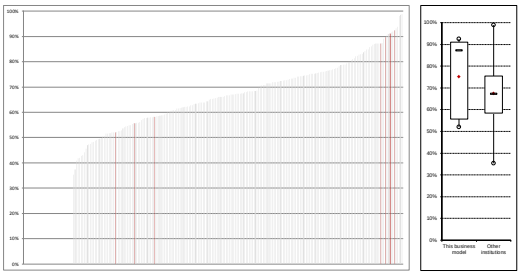
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

k. Mortgage banks including pass-through financing mortgage banks

Mortgage banks are credit institutions that specialise in directly originating or servicing mortgage loans and are predominantly funded through the issuance of covered bonds. They are usually prohibited from taking deposits. There are 12 mortgage banks included in the sample. Mortgage banks are often confined to mortgage lending activities financed by mortgage bond origination by way of regulation or the business model's structural framework.

Mortgage banks appear to be more exposed to REL than other banks when considering the risk dimensions of stability of funding and concentration of risk. More specifically, mortgage banks tend to have lower HQLA to total assets and deposit-to-asset ratios and be more concentrated in both asset classes and income sources. Although it could be argued that the stability of funding dimension is not as relevant for mortgage banks, as these banks are often not allowed to take deposits and may also have a lower funding risk, with less need for liquid assets, as they are often in large part (matched) funded through covered bonds.

In addition, the result on the concentration risk dimension could be influenced by mortgage banks being legally required to limit their balance-sheet composition to a single or a few classes of assets which can be characterised as low risk. Also, an established market for collaterals, lending and valuation standards can influence decisions on balance-sheet structure.

Regarding the two other dimensions (level and stability of profitability and stability of business activity), the overall conclusion is 'neutral', indicating no significant difference with the rest of the European banking sector.

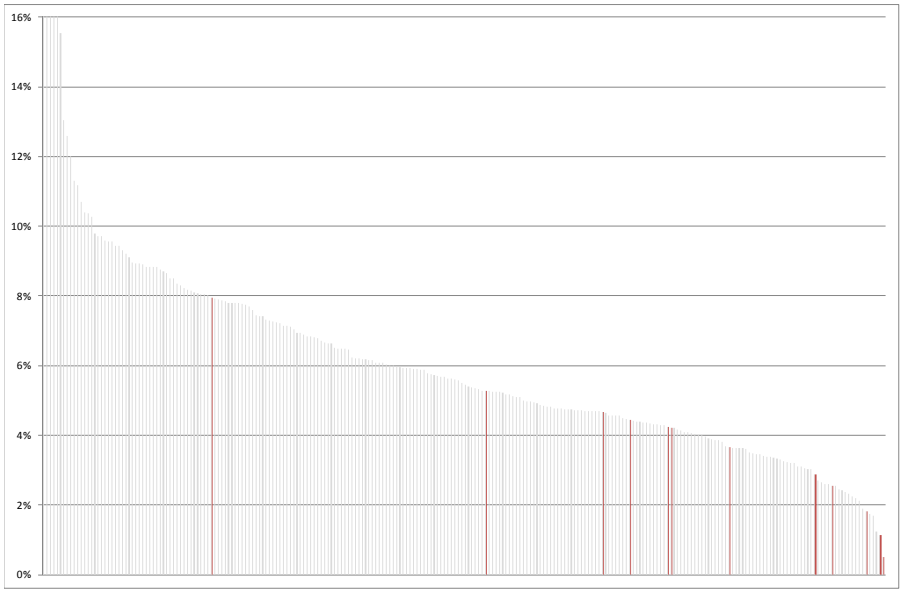
LRs of mortgage banks are rather low, with a median (fully loaded) LR of 3.9%. Five out of 12 institutions have an LR below 3%, six institutions have an LR below 4% and 10 institutions have an LR below 5%. Therefore, an LR requirement would be rather constraining for this business model.

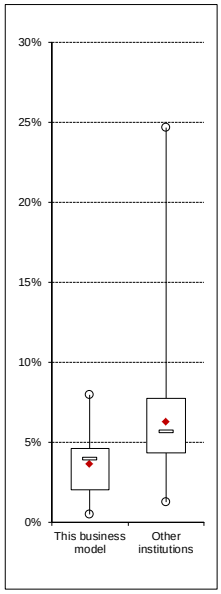
Average risk weights are relatively low, with a weighted average density factor of 22.3%. Tier 1 capital shortfalls are already triggered by the LR, above an 8.5% risk-based Tier 1 requirement, as of LR requirement levels of 2.5%. A 3% LR requirement will result in a Tier 1 shortfall of nearly EUR 2 billion, and a requirement of 5% will result in Tier 1 shortfall of over EUR 8 billion.

Aggregate total exposures of mortgage banks (EUR 532 billion) account for 1.7% of the overall sample. The exposure composition is rather diversified, with the largest exposure classes being non-financial corporates (27%), residential real estate (20%), sovereigns (16%) and other exposures (16%). The share of exposures of mortgage banks in the overall sample is not bigger than a few percentage points, even for the largest exposure classes of mortgage banks.

Figure 23: Mortgage banks including pass-through financing mortgage banks

Distribution of fully loaded LRs and key statistics

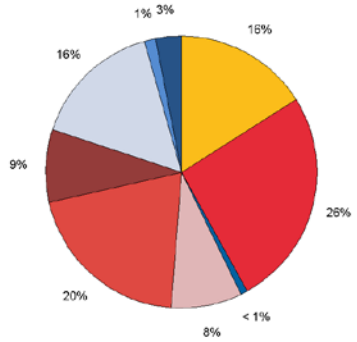




Number of entities in the sample	**12**	Total leverage exposure (billion EUR)	**532**
of which below the 3% threshold	***5***	Median LR	***3.9%***
of which below the 4% threshold	***6***	Median Tier 1 ratio	***13.6%***
of which below the 5% threshold	***10***	RWA density (weighted average)	***22.3%***

LR exposure composition

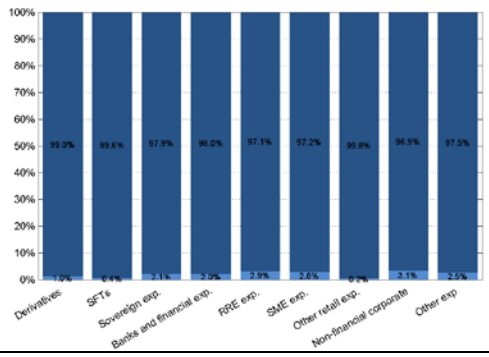
Breakdown by exposure classes



Legend pie chart (left)

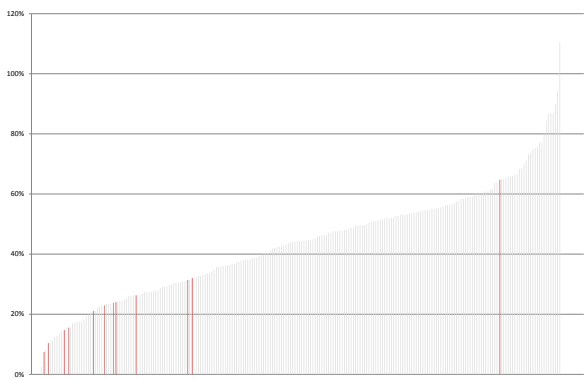
Legend bar chart (right)

Shares of this business model's exposures of the total sample

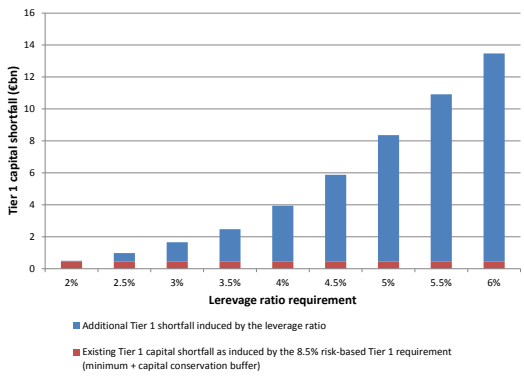


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

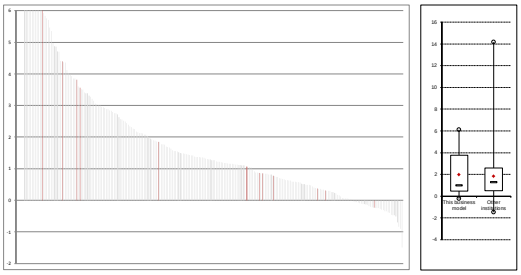


REL conclusions

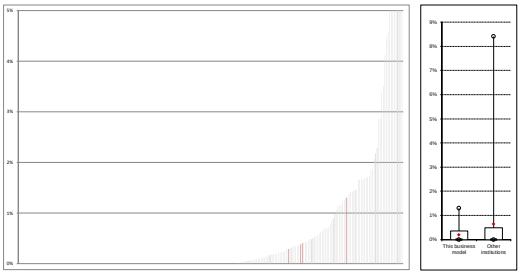
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	More exposed to R.E.L.	Neutral	More exposed to R.E.L.

Risk indicators

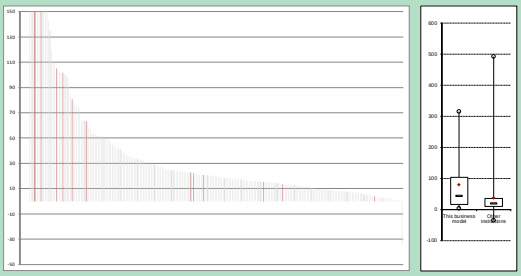
ROA (Sharpe ratio)



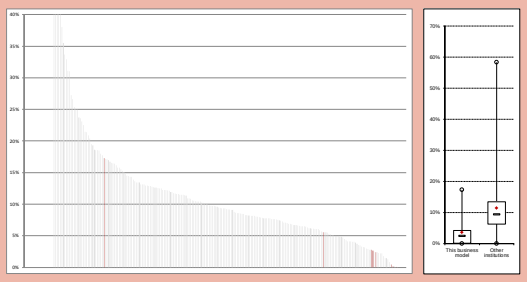
Peak loss



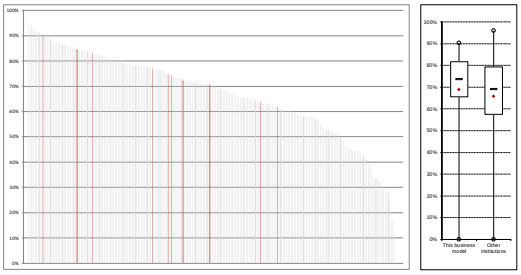
Z-score



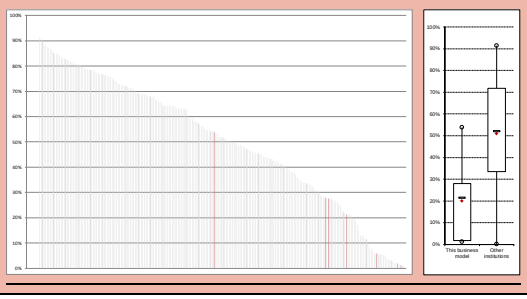
HQLA to assets (mean)



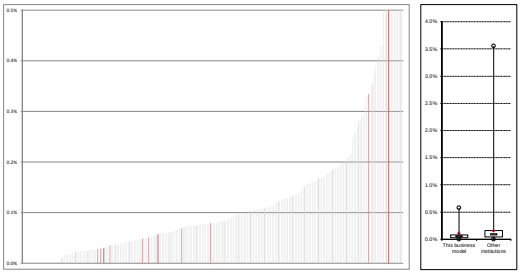
ASF to asset (mean)



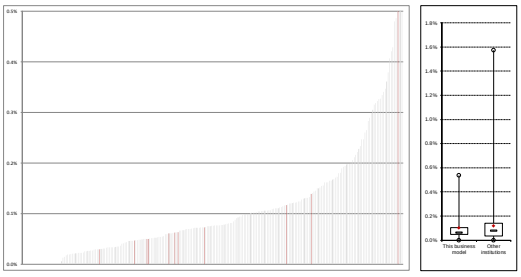
Deposit to asset (mean)



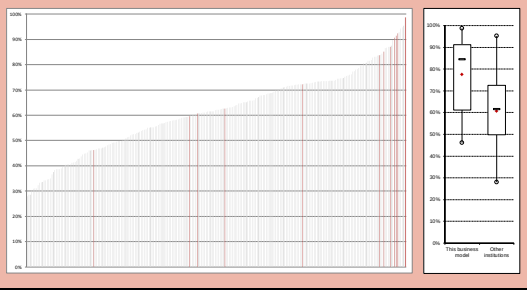
Growth rate of loans (std dev)



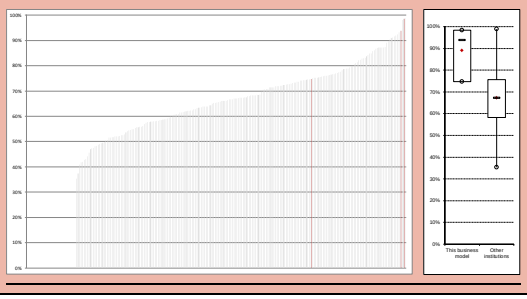
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

I. Other specialised banks

This category includes credit institutions that are not included in any of the above categories and include banks such as shari'ah-compliant banks and institutions mainly engaged in pass-through finance (not specialised in mortgage lending). There are 19 institutions in the sample that are classified as other specialised banks.

The levels of the LRs are rather dispersed, which could be expected given that this business model is not a homogeneous group. The median LR is 5.4% (very close to the median of the full sample equal to 5.5%), with three institutions having an LR below 3%, six institutions having an LR below 4% and nine institutions having an LR below 5%.

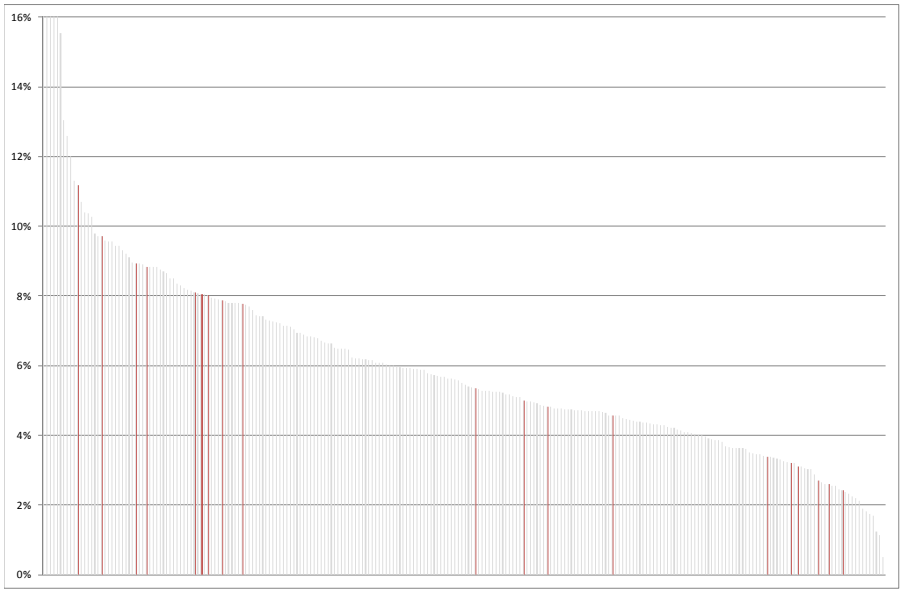
The average risk weight is rather low, with a RWA density ratio of 28.6%, but average risk weights of individual institutions vary widely across the sample. Tier 1 capital shortfalls are induced by the LR, above an 8.5% risk-based tier 1 requirement, at LR requirement levels of 3% and above. While capital shortfalls remain close to EUR 0.75 billion at an LR requirement level of 3%, they rise to over EUR 16 billion at LR requirement levels of 5%.

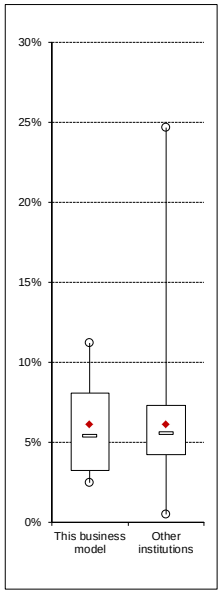
Total exposures of other specialised banks (EUR 1 057 billion) account for 3.3% of the total sample. The exposure classes are rather well diversified, with the largest exposure classes being non-financial corporates exposures (23%), sovereign exposures (22%) and banks and financial exposures (19%). The share of exposures of other specialised banks in the total sample is close to 10% for banks and financial exposures. For the other exposure classes, the share is not bigger than a few percentage points.

The analysis of the exposure to the REL indicates that other specialised banks are more exposed to the REL than other banks when considering the stability of business activity, as they have less stable growth rates of assets. In the three other dimensions, there is no significant indication of either more or less REL.

Figure 24: Other specialised banks

Distribution of fully loaded LRs and key statistics

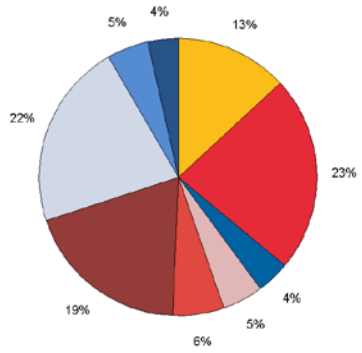




Number of entities in the sample	**19**	Total leverage exposure (billion EUR)	**1 057**
of which below the 3% threshold	***3***	Median LR	***5.4%***
of which below the 4% threshold	***6***	Median Tier 1 ratio	***17.2%***
of which below the 5% threshold	***9***	RWA density (weighted average)	***28.6%***

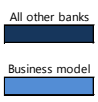
LR exposure composition

Breakdown by exposure classes

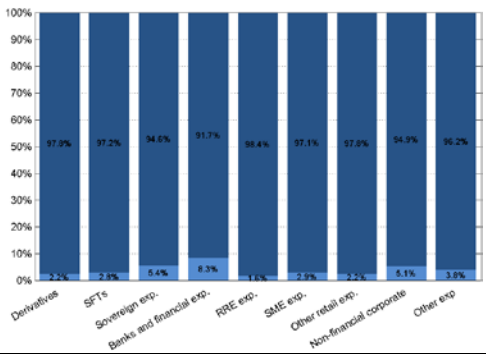


Legend pie chart (left)

Legend bar chart (right)

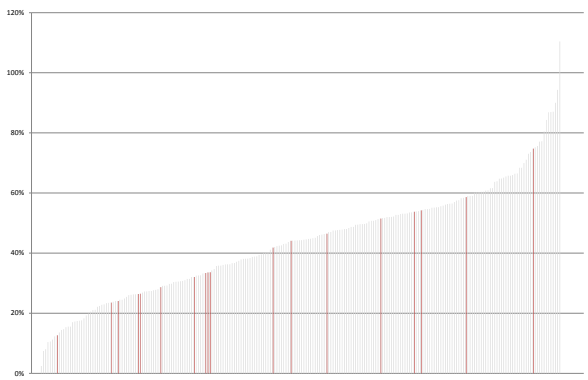


Shares of this business model's exposures of the total sample

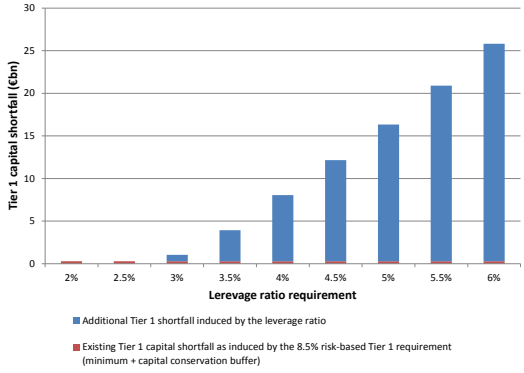


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

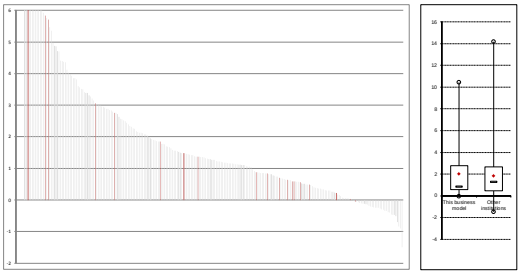


REL conclusions

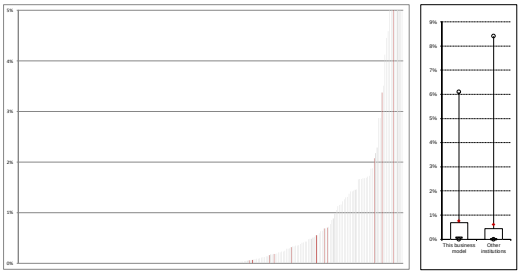
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Neutral	Neutral	More exposed to R.E.L.	Neutral

Risk indicators

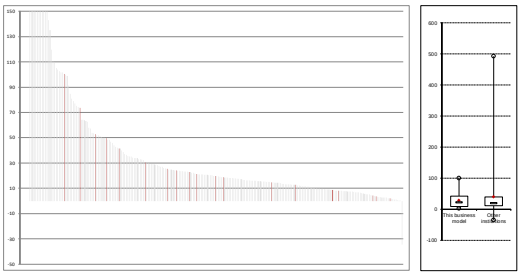
ROA (Sharpe ratio)



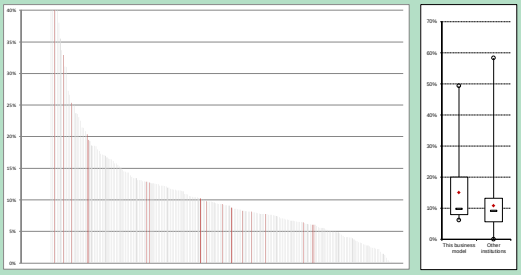
Peak loss



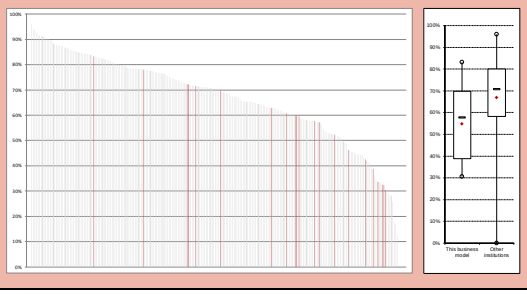
Z-score



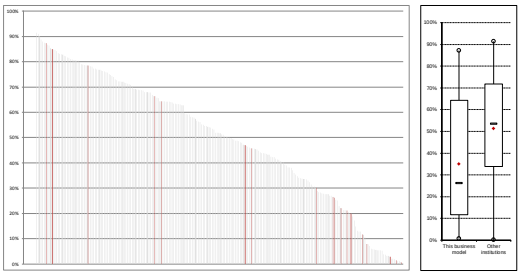
HQLA to assets (mean)



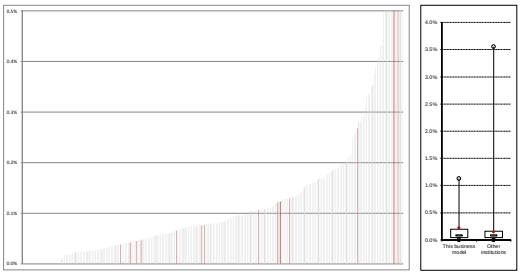
ASF to asset (mean)



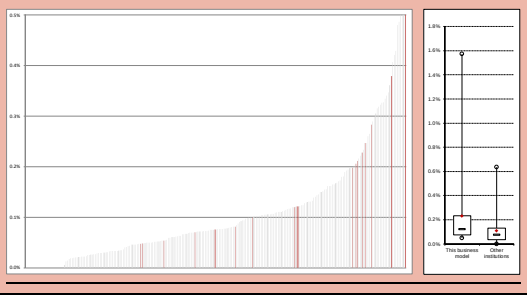
Deposit to asset (mean)



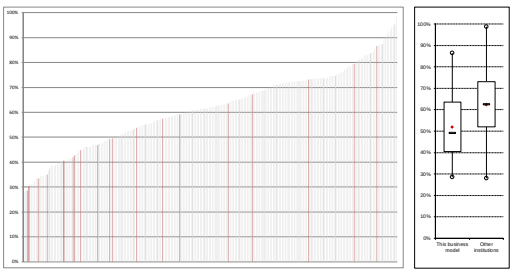
Growth rate of loans (std dev)



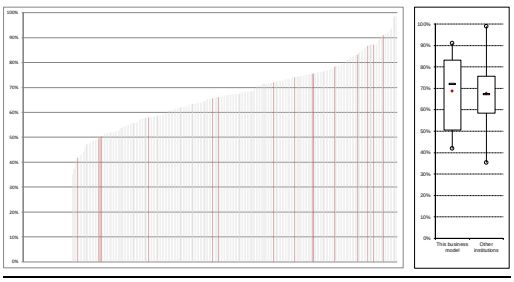
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

BOX 1: Central Counterparties (CCPs)

Due to the specific nature of CCPs, the REL benchmarking methodology has not been applied to CCPs. Instead, a more qualitative approach has been followed, focused on the main function and activities of CCPs, reasons for which a few CCPs in the EU hold a banking licence – which brings them into the scope of application of the CRR – and how additional EU regulations constrain the activities of CCPs.

Central counterparties (CCPs) are primarily subject to and licensed according to Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, CCPs and trade repositories (European Market Infrastructure Regulation, EMIR). CCPs are generally not automatically subject to CRR[99] and hence potential CRR LR requirements. The reason for considering CCPs as separate business models within the context of the present report, however, is that CCPs may be subject to the CRR as soon as they hold a banking licence in addition to the CCP licence according to EMIR. EMIR does not prevent Member States from adopting an authorisation as a credit institution for CCPs.[100] In this regard some EU Member States legally require CCPs in their jurisdiction to hold a banking licence in addition to the mandatory CCP licence according to EMIR. In other Member States CCPs voluntarily apply for a banking licence as this may support clearing business. According to the current Eurosystem framework, a banking licence is required to gain a full access to central bank facilities in the euro area. This may be valuable for CCPs' provision of liquidity, in particular under stressed market conditions.

As CCPs' activities differ from those of regular banks, e.g. CCPs do generally not collect client funds with the aim of providing financing for consumption and investment, the methodology for the benchmarking on REL is not considered adequate in the specific case of CCPs. Hence, CCPs are not included in the business model benchmarking and should be considered separately instead. CCPs are excluded from the benchmarking analysis due to the following reasons:

CCPs' core purpose is the management and mitigation of counterparty credit risk. CCPs are actually financial market infrastructures that manage and reduce counterparty credit risks for financial market participants by means of novation[101]. In this way, by reducing participant exposure to a single counterparty, CCPs help to prevent the build-up of excessive risk in financial markets. Most of the exposures from CCP activity consist of trade exposures towards clearing members as a consequence of the novation of the contracts and financial collateral (margins) to limit counterparty risk towards clearing members according to EMIR. After the financial crisis, this specific role of CCPs has been presented by the G20, the BCBS and the Financial Stability Board as essential for ensuring financial stability.

In this context it is important to note that ESMA considers that EMIR shall prevent CCPs from *providing services or perform activities which are not linked to clearing.*[102]

CCPs only act by novation between the two initial counterparties of a transaction. As far as CCPs take deposits from clearing members, this occurs for purposes of risk management in the application of EMIR

[99] This applies to credit institutions and investment firms.

[100] EMIR, Article 14(5) - Authorisation of a CCP.

[101] 'CCP' means a legal entity that interposes itself between the counterparties to the contracts traded on one or more financial markets, becoming the buyer to every seller and the seller to every buyer; Article 2(1) of EMIR.

[102] CCP answer 6(d) of https://www.esma.europa.eu/sites/default/files/library/2016-539_qa_xvii_on_emir_implementation.pdf.

instead of wider funding investment activities. Hence, the 'stability of funding' risk dimension used in the benchmarking methodology, and its underlying indicators, would not be relevant in this particular case.

This business model ensures that CCPs are not normally exposed to direct market risk, as every position is matched with an identical counter-position. However, due to this specific counterparty credit risk when a CCP's clearing member enters in default, open positions will occur. CCPs are required to manage or liquidate promptly this defaulter position in order to ensure the performance of the contracts. Therefore, EMIR requires CCPs to mitigate the risk arising from such cases by (i) marking positions to market on a daily basis and exchanging the corresponding variation margin[103], (ii) requiring and segregating[104] prefunded initial margin[105] from the clearing members and their clients and (iii) constituting prefunded mutualised default funds[106].

In this regard, the amounts of received collateral are exogenous to CCPs. As required by EMIR[107], those amounts of collateral are calculated in relation to the potential future exposure of clearing members' transactions and of their clients. Furthermore, clearing members have discretion with respect to the type of collateral (cash vs. securities) and the amount of over-collateralisation. CCPs are the central point of regulated financial markets and, with the forthcoming mandatory clearing obligation, for certain OTC derivatives. The amount of prefunded financial collateral collected that is recorded as liabilities in the CCP's balance sheet is proportional to the amount of risk stemming from cleared transactions. The amount of collateral normally increases in adverse market conditions. In fact, on the one hand, clearing members and their clients tend to increase the clearing transaction exposures and, by construction, the amount of collateral held. On the other hand, at a constant clearing transaction amount, the CCP would increase the amount of prefunded collateral called because of the higher market volatility. Therefore, the size of CCPs' balance sheets is overwhelmingly driven by the amount of transactions cleared, which implies that the 'stability of business activity' dimension used in the benchmarking methodology is also not indicative of higher or lower REL.

It is also important to note that collateral, in particular cash collateral, must be invested by CCPs according to EMIR requirements. Eligible investment opportunities are restricted by Article 47 of the EMIR, i.e. they have to be low-risk and highly liquid investments and limited to central bank deposits, reverse repo and outright purchase of national/supranational bonds[108]. Most often, proceeds from those investment activities are partially passed through to clearing members. The amount stemming from this reinvestment recorded in the asset part of a CCP's balance sheet is therefore proportional and linked to the clearing activity.

Furthermore, when comparing CCPs within the EU, as well as worldwide, holding a banking licence appears to be an exception rather than a common feature. This, however, implies that the vast majority of CCPs around the world is not subject to banking regulation in general and LR regulation in particular. Hence level playing field issues may arise when some CCPs are required to meet LR requirements while others are not.

[103] Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council with regard to regulatory technical standards on requirements for central counterparties, Chapter I, Article 1 – Definitions.

[104] EMIR, Article 39 - Segregation and portability.

[105] Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012, Chapter I, Article 1 – Definitions.

[106] EMIR, Article 42 - Segregation and portability.

[107] EMIR, Article 46 - Collateral requirements.

[108] Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012, p. 62.

Finally, it is worth noting that, in the area of resolution, and in the context of ex-ante contributions to resolution financing arrangements, Article 5 of Commission Delegation Regulation (EU) 2015/63, which sets out the approach to the risk adjustment of the basic annual contribution, specifies some liabilities to be excluded from the basis for calculating contributions. As noted in recital 11 of Commission Delegated Regulation (EU) 2015/63, this is because these liabilities are incurred ancillary to the main settlement activity of CCPs and do not give rise to cash balances which could be assimilated to funding raised in order to perform banking activities. Furthermore, as the business model of CCPs does not give rise to risks comparable to those of a credit institution, only liabilities related to banking type-activities are taken into account for the purposes of establishing the amount of their total liabilities for calculating the basic annual contributions.

In sum, given their activities and given their very specific risk profile, both of which are strictly limited according to EMIR, the LR does not seem suitable for regulating CCPs. Consequently, the relevance of applying a LR requirement to CCPs operating with a banking licence should be questioned, due to the specificities of those institutions, for which tailored prudential requirements have been incorporated in other pieces of European legislation.

3.4.2 For each size bucket

a. Small banks

'Small banks' are defined as credit institutions with a total LR exposure below EUR 10 billion. The present analysis includes 92 small banks and covers 37% of the total sample used for this benchmarking analysis.

The overall benchmarking results suggest that small banks are less exposed to REL than all other larger size groups. The analysis of the exposures to REL shows that small banks tend to be (1) less exposed than other banks when considering the level and the stability of profitability and (2) not particularly exposed to the risk of instability of funding and business activity and to the risk of concentration.

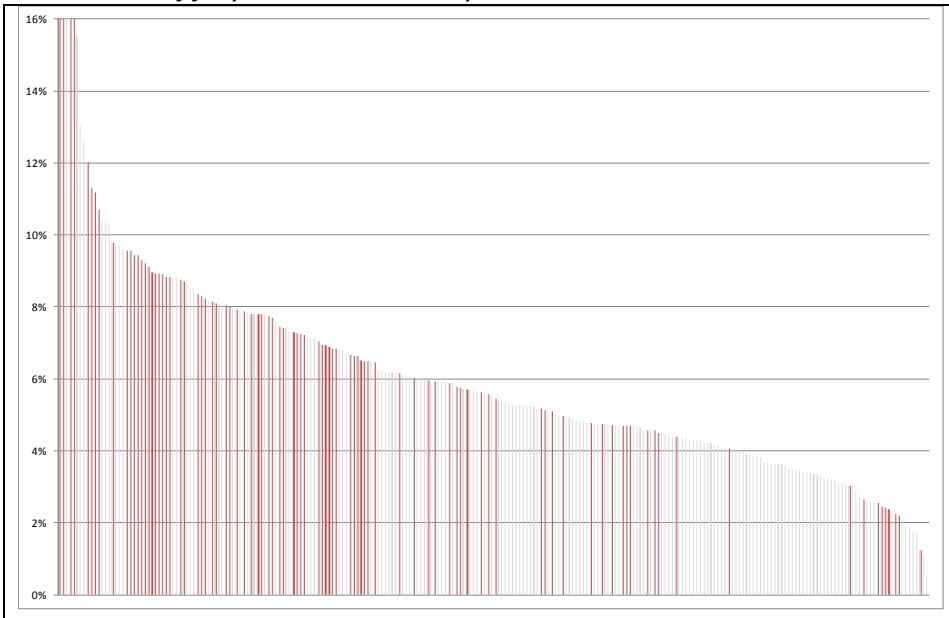
Small banks display comparatively high LRs. The median (fully loaded) LR is 6.9%, with 8 out of 92 institutions displaying an LR below 3%, 9 institutions below 4% and 21 institutions below 5%.

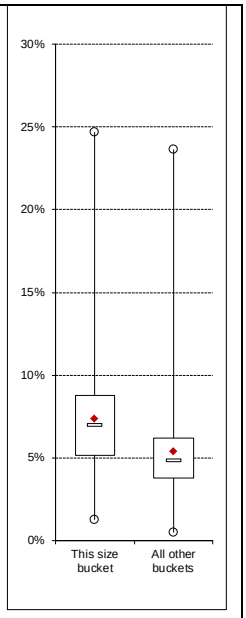
Aggregate total exposures of small banks (EUR 309 billion) account for only 1% of the overall sample (by far the smallest of all size buckets analysed). The share of small banks in each individual LR exposure is also very residual (i.e. no more than 2.3%). The composition of the total LR exposure is diversified, with no single exposure class accounting for more than 18% of the total LR exposures. Compared with larger size groups, small banks are far less exposed to SFTs and derivatives which account for only 1% and 2%, respectively, of their total LR exposures.

With a level of 40.4%, the average risk weights (or RWA densities) of small banks are comparable to those observed for medium and large banks but are significantly higher than the level observed for very large banks (34.7%). Tier 1 capital shortfalls, above an 8.5% risk-based Tier 1 requirement, would be triggered by an LR requirement of 2.5%. However, these capital shortfalls are rather residual amounts; they would reach EUR 0.5 billion (0.2% of small banks' total LR exposures) only at an LR requirement of 4% and above.

Figure 25: Small banks

Distribution of fully loaded LRs and key statistics

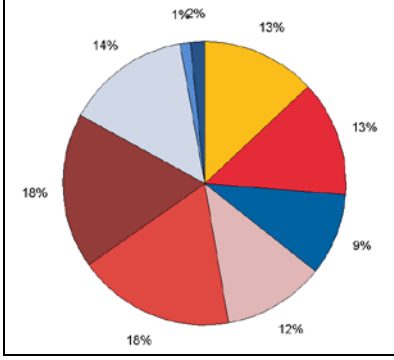




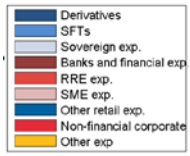
Number of entities in the sample	**92**	Total leverage exposure (billion EUR)	**309**
of which below the 3% threshold	***8***	Median LR	***6.9%***
of which below the 4% threshold	***9***	Median Tier 1 ratio	***15.2%***
of which below the 5% threshold	***21***	RWA density (weighted average)	***40.4%***

LR exposure composition

Breakdown by exposure classes

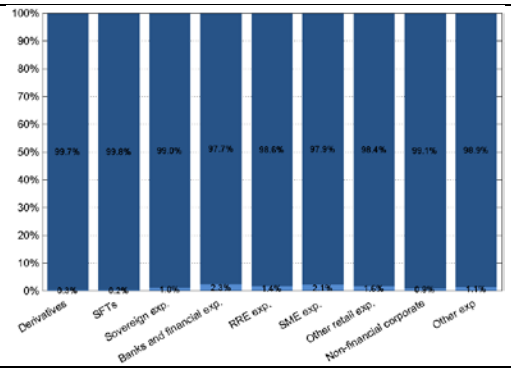


Legend pie chart (left)



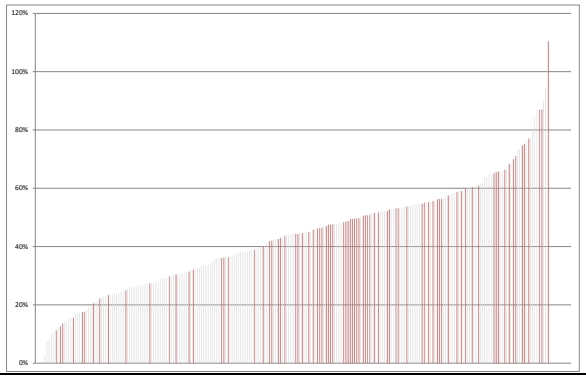
Legend bar chart (right)

Shares of this business model's exposures of the total sample

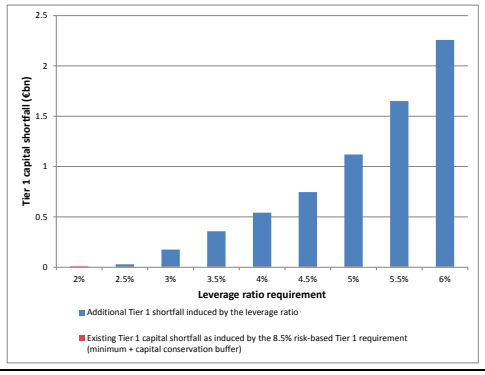


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

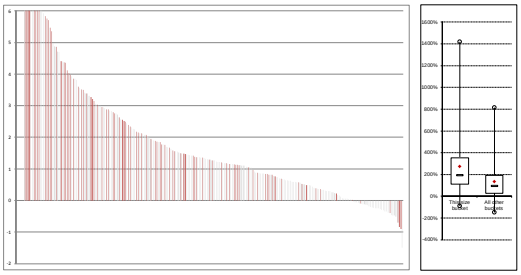


REL conclusions

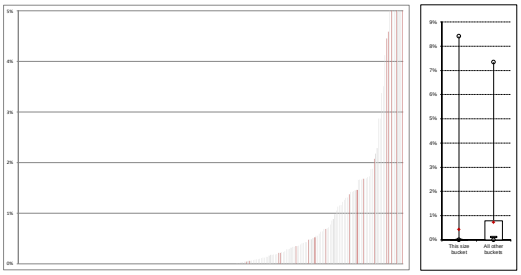
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	**Stability of funding**	**Stability of business activity**	**Concentration**
Less exposed to R.E.L.	Neutral	Neutral	Neutral

Risk indicators

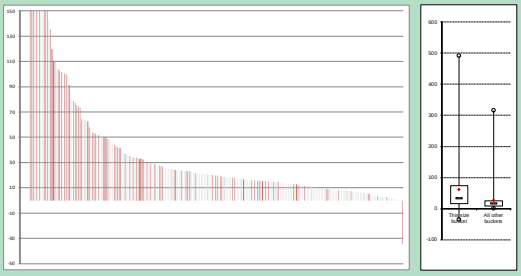
ROA (Sharpe ratio)



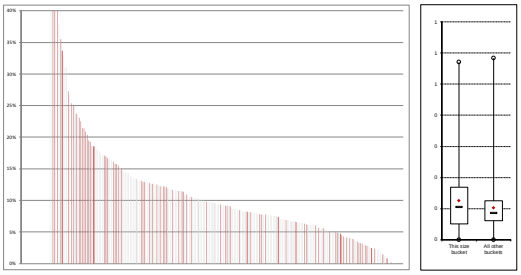
Peak loss



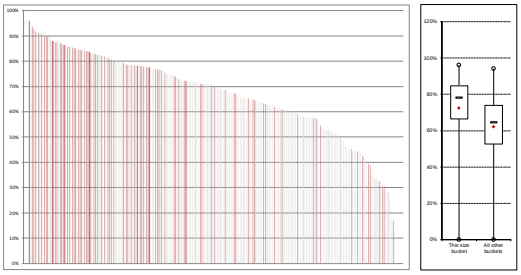
Z-score



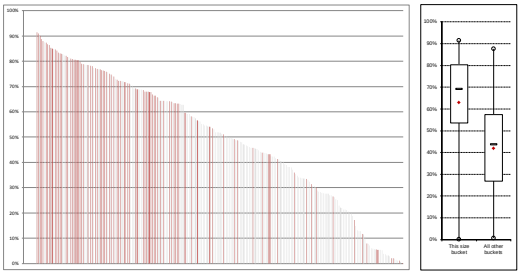
HQLA to assets (mean)



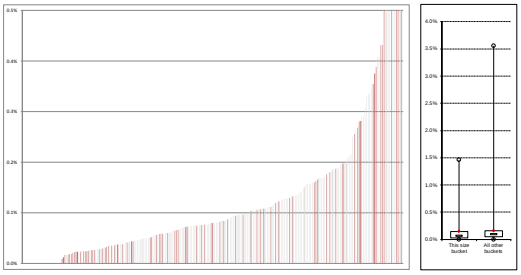
ASF to asset (mean)



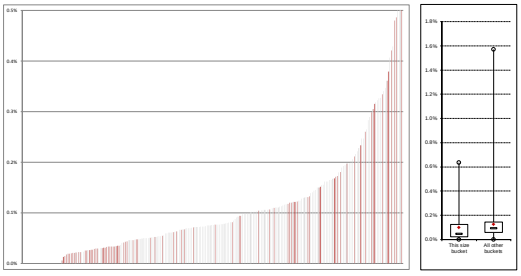
Deposit to asset (mean)



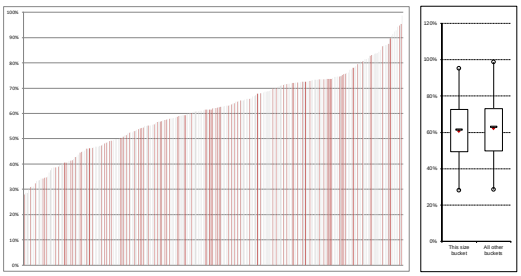
Growth rate of loans (std dev)



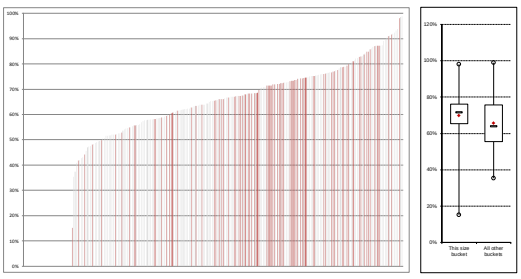
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

b. Medium banks

'Medium banks' are defined as credit institutions with a total LR exposure of between EUR 10 billion and EUR 100 billion. The present analysis includes 97 medium banks and covers 39% of the total sample used for this benchmarking analysis.

The overall benchmarking results suggest that medium banks are less exposed to REL than larger size groups but more exposed than small banks. The analysis of the exposures to REL shows that medium banks tend to be (1) more exposed than other banks when considering the level and the stability of profitability but (2) not particularly exposed to the risk of instability of funding and business activity and to the risk of concentration.

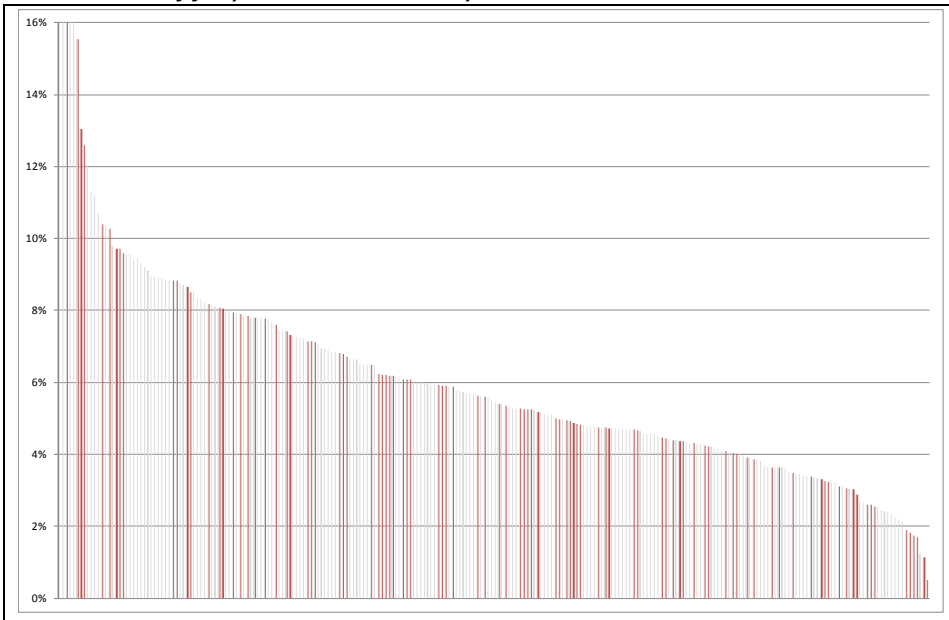
Medium banks display, comparatively, an average level of LRs. The median (fully loaded) LR is 5.3%, with 10 out of 97 institutions displaying an LR below 3%, 22 institutions displaying an LR below 4% and 45 institutions displaying an LR below 5%.

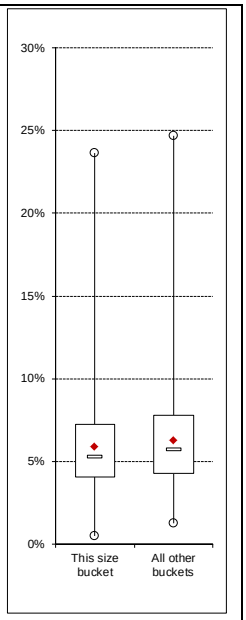
Aggregate total exposures of medium banks (EUR 3 214 billion) account for 10% of the overall sample. The share of medium banks in each individual LR exposure ranges between 9% and 15% with the exception of SFTs and derivatives where the medium banks only account for 3% of the total LR exposures on these products. The LR exposure composition of the medium banks is similar to that of small banks (i.e. quite diversified with little exposures on SFTs and derivatives).

With a level of 39.6%, the average risk weights (or RWA densities) of medium banks are comparable to those observed for small and large banks but are significantly higher than the level observed for very large banks (34.7%). AT1 capital shortfalls (above an 8.5% risk-based tier 1 requirement) would be triggered by an LR requirement of 3%. Total capital shortfalls would be close to EUR 9 billion (0.3% of medium banks' total LR exposures) at an LR requirement of 3.5%.

Figure 26: Medium banks

Distribution of fully loaded LRs and key statistics

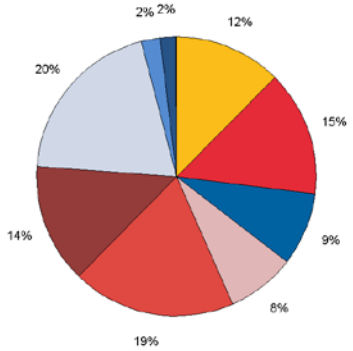




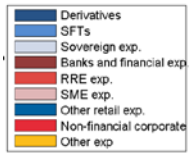
Number of entities in the sample	**97**	Total leverage exposure (billion EUR)	**3 214**
of which below the 3% threshold	***10***	Median LR	***5.3%***
of which below the 4% threshold	***22***	Median Tier 1 ratio	***12.6%***
of which below the 5% threshold	***45***	RWA density (weighted average)	***39.6%***

LR exposure composition

Breakdown by exposure classes

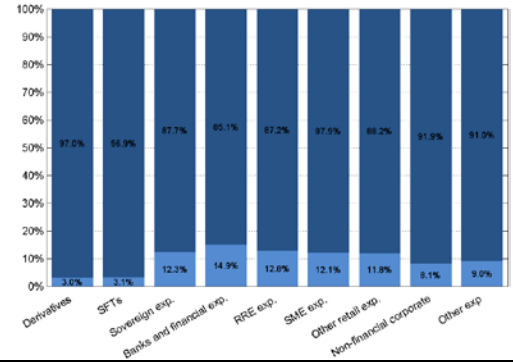


Legend pie chart (left)



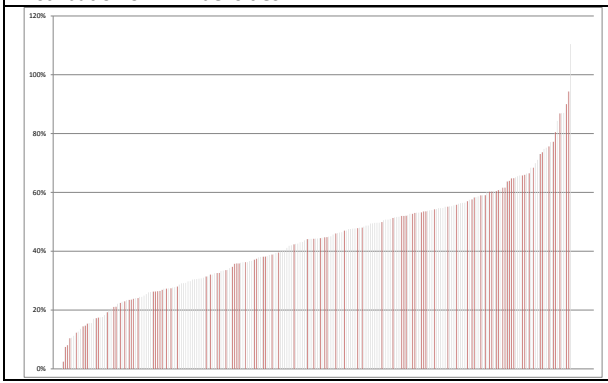
Legend bar chart (right)

Shares of this business model's exposures of the total sample

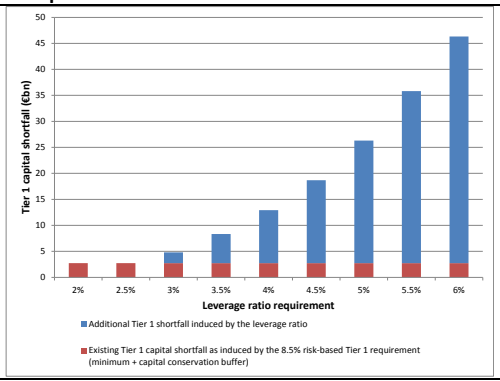


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

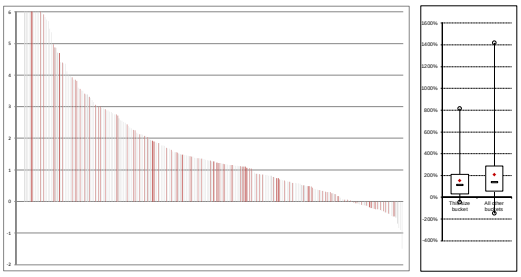


REL conclusions

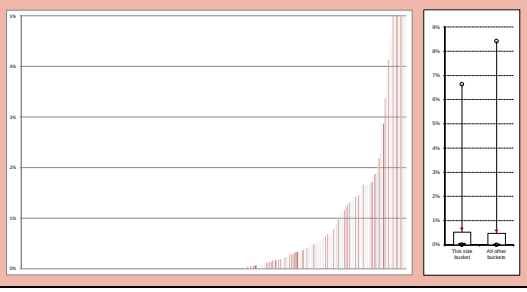
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	Neutral	Neutral	Neutral

Risk indicators

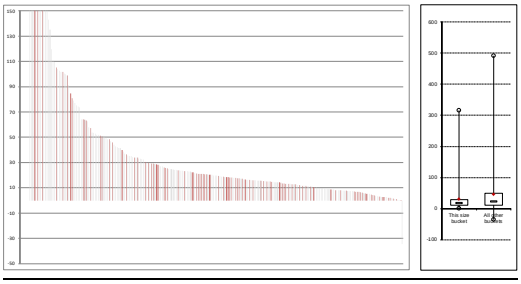
ROA (Sharpe ratio)



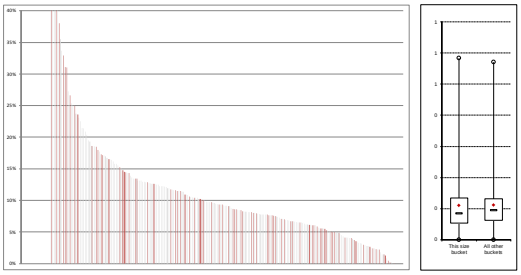
Peak loss



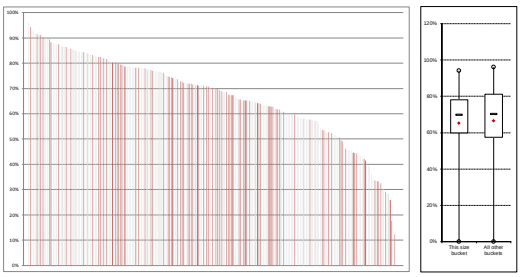
Z-score



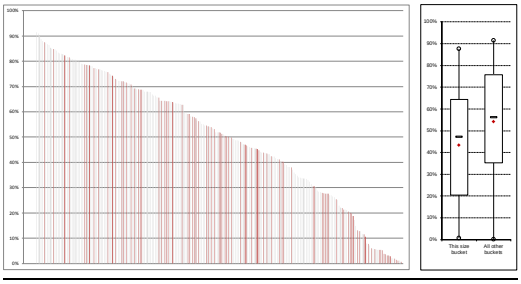
HQLA to assets (mean)



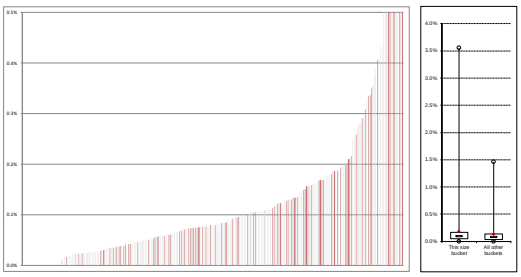
ASF to asset (mean)



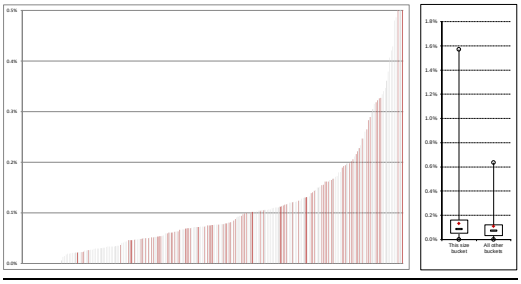
Deposit to asset (mean)



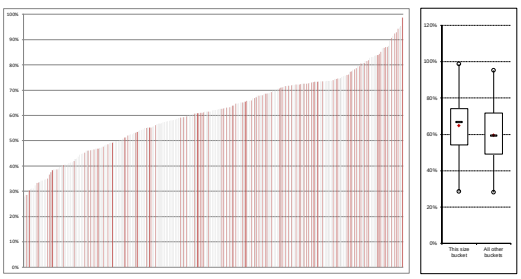
Growth rate of loans (std dev)



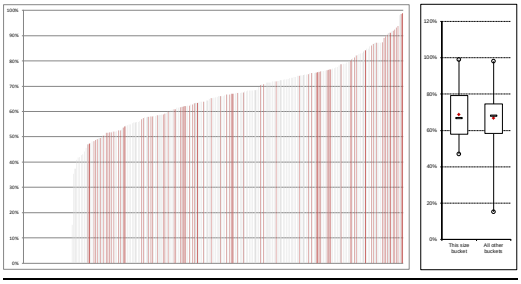
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

c. Large banks

'Large banks' are defined as credit institutions with a total LR exposure of between EUR 100 billion and EUR 200 billion. The present analysis includes only 19 large banks and covers 8% of the total sample used for this benchmarking analysis.

The overall benchmarking results suggest that large banks are less exposed to REL than very large banks but more exposed than small and medium banks. The analysis of the exposures to REL shows that large banks tend to be (1) more exposed than other banks when considering the level and the stability of profitability and the stability of funding but (2) not particularly exposed to the risk of concentration.

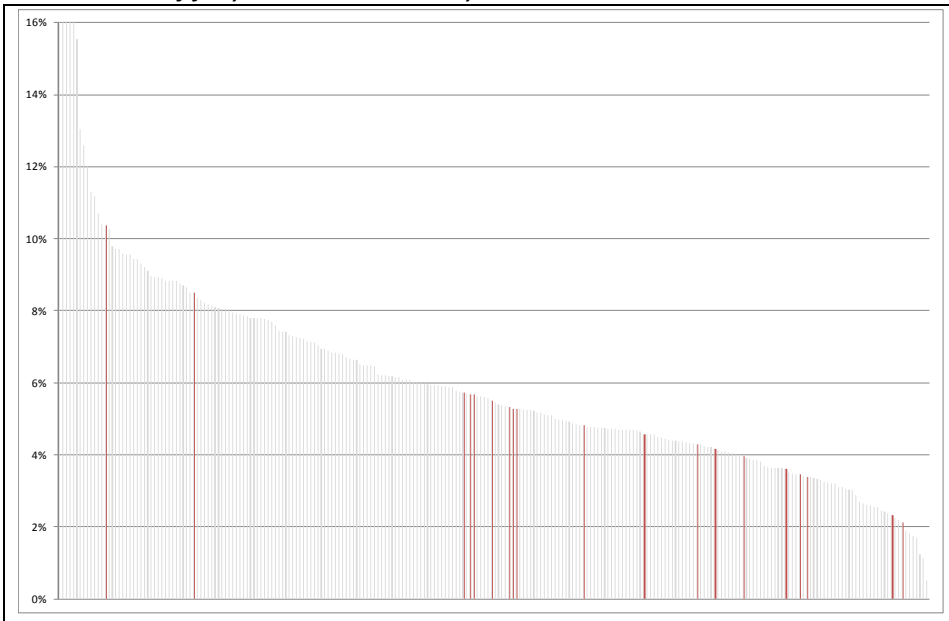
Large banks display comparatively low LRs. The median (fully loaded) LR is 4.8%, with 2 out of 19 institutions displaying an LR below 3%, 6 institutions displaying an LR below 4% and 10 institutions displaying an LR below 5%.

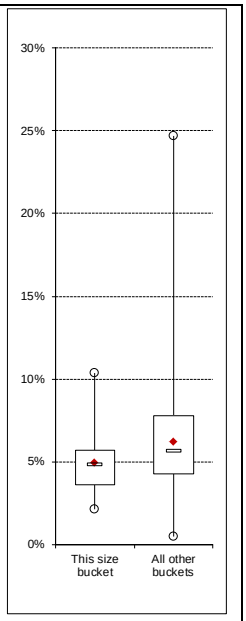
Aggregate total exposures of large banks (EUR 2 395 billion) account for 7% of the overall sample. The share of large banks in each individual LR exposure ranges between 5% and 12% with the exception of SFTs, derivatives and exposures to other retails where large banks account for less than 3.5% of the total LR exposures on these products. Compared with other institutions, large banks' LR exposures are highly concentrated on sovereign and real estate which account for nearly 45% of their total LR exposures.

With a level of 40.5%, the average risk weights (or RWA densities) of large banks are comparable to those observed for small and medium banks but are significantly higher than the level observed for very large banks (34.7%). AT1 capital shortfalls (above an 8.5% risk-based tier 1 requirement) would be triggered by an LR requirement of 4%. Total capital shortfall of large institutions would exceed EUR 10 billion (0.4% of large banks' total LR exposures) at an LR requirement of 4% and above.

Figure 27: Large banks

Distribution of fully loaded LRs and key statistics

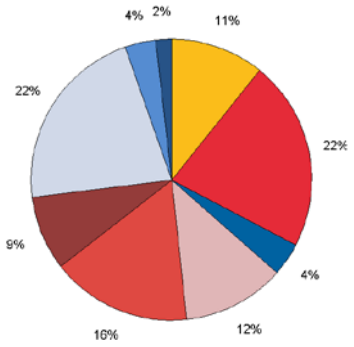




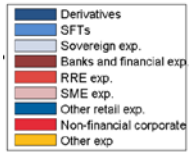
Number of entities in the sample	**19**	Total leverage exposure (billion EUR)	**2 395**
of which below the 3% threshold	***2***	Median LR	***4.8%***
of which below the 4% threshold	***6***	Median Tier 1 ratio	***11.3%***
of which below the 5% threshold	***10***	RWA density (weighted average)	***40.5%***

LR exposure composition

Breakdown by exposure classes

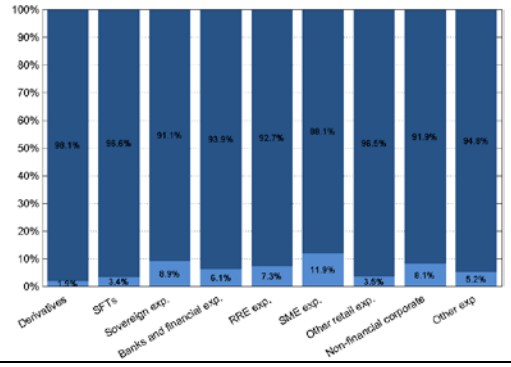


Legend pie chart (left)



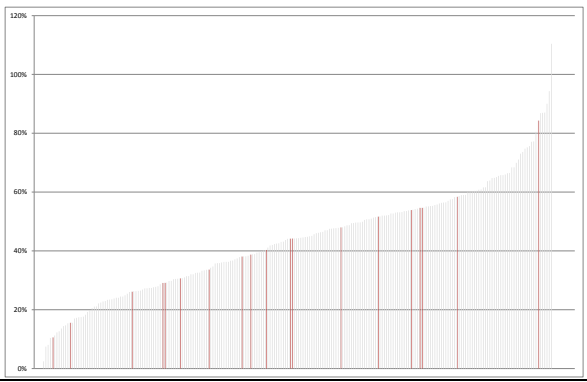
Legend bar chart (right)

Shares of this business model's exposures of the total sample

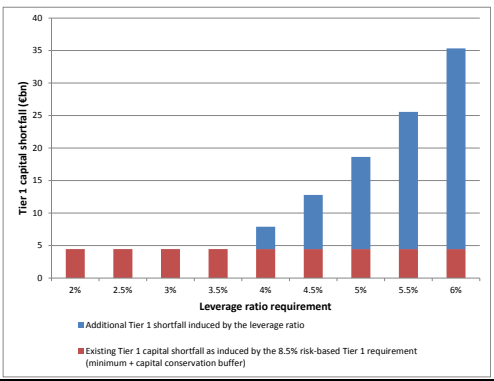


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

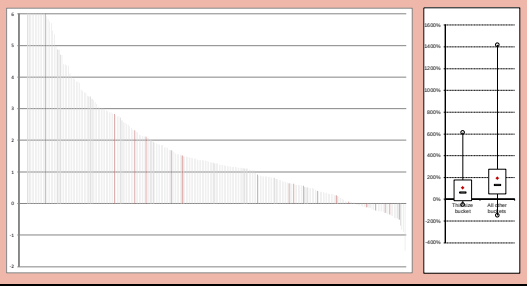


REL conclusions

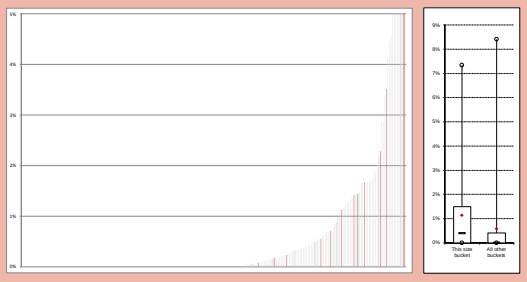
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	More exposed to R.E.L.	Neutral	Neutral

Risk indicators

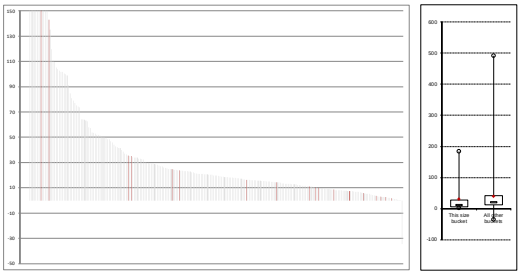
ROA (Sharpe ratio)



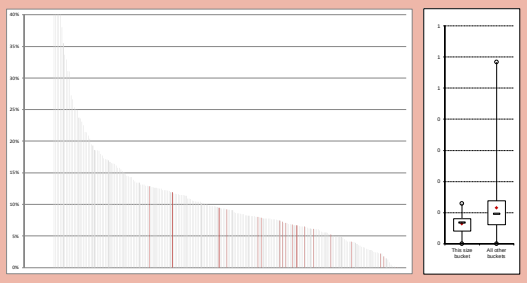
Peak loss



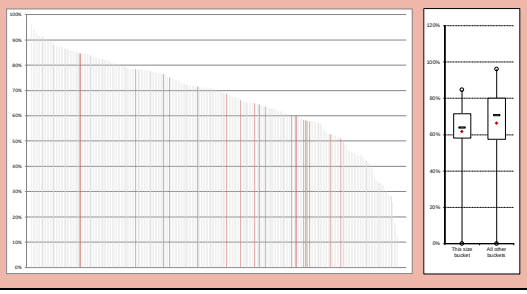
Z-score



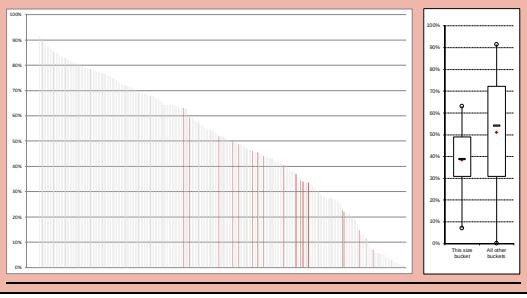
HQLA to assets (mean)



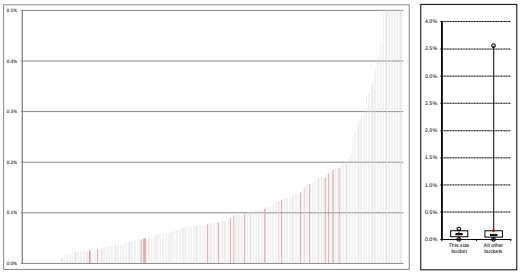
ASF to asset (mean)



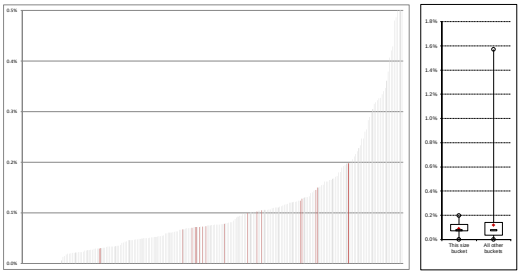
Deposit to asset (mean)



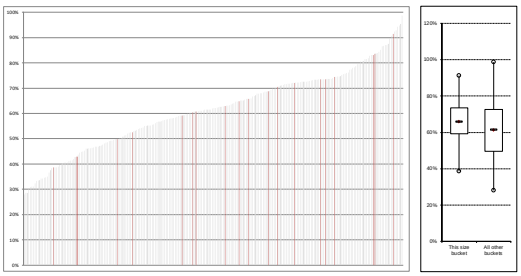
Growth rate of loans (std dev)



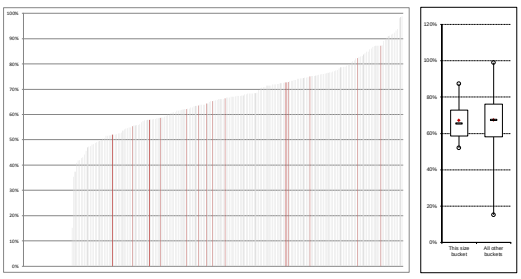
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

d. Very large banks

'Very large banks' are defined as credit institutions with a total LR exposure above EUR 200 billion. The present analysis includes 38 very large banks and covers 15% of the total sample used for this benchmarking analysis.

The overall benchmarking results suggest that very large banks are more exposed to REL than all other institutions. The analysis of the exposures to REL shows that very large banks tend to be (1) more exposed than other banks when considering the level and the stability of profitability, the stability of funding and the stability business activity but (2) less exposed to the risk of concentration.

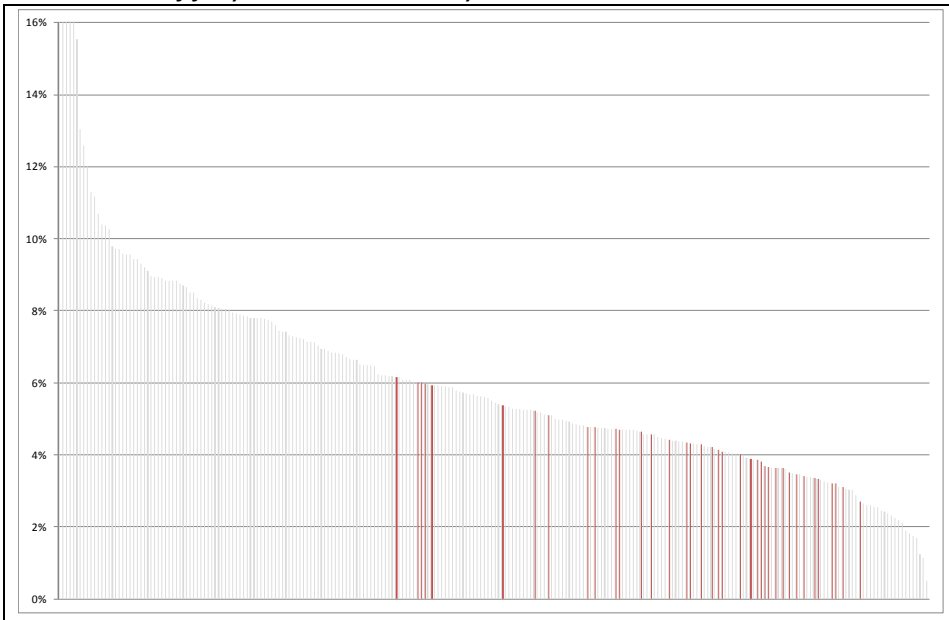
Very large banks display comparatively low LRs. The median (fully loaded) LR is 4.2%, with 1 out of 38 institutions displaying an LR below 3%, 16 institutions below 4% and 30 institutions below 5%.

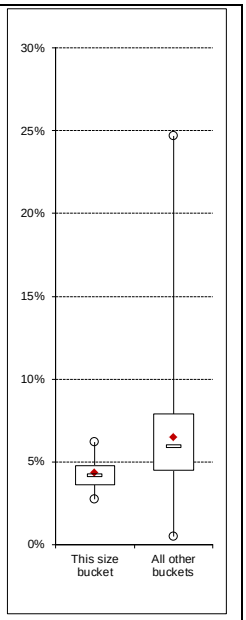
Aggregate total exposures of very large banks (EUR 26 212 billion) account for 82% of the overall sample (by far the highest along all the size buckets analysed). Consequently, the share of very large banks in each individual LR exposure is very large, ranging between 74% and 95%. The composition of the LR exposures is very diversified with no single class of exposures accounting for more for more than 18%.

At a level of 34.7%, the average risk weights (or RWA densities) of very large banks are notably lower than for other institutions. AT1 capital shortfalls (above an 8.5% risk-based tier 1 requirement) would be triggered by an LR requirement of 3.5%. Due to their very large size, the total capital shortfalls of very large institutions are rather substantial amounts, in particular for LR requirements levels of 4% and above where they would exceed EUR 100 billion (0.4% of very large banks total' LR exposures).

Figure 28: Very large banks

Distribution of fully loaded LRs and key statistics

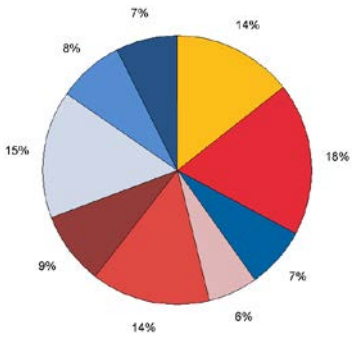




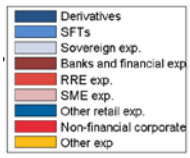
Number of entities in the sample	**38**	Total leverage exposure (billion EUR)	**26 212**
of which below the 3% threshold	***1***	Median LR	***4.2%***
of which below the 4% threshold	***16***	Median Tier 1 ratio	***11.9%***
of which below the 5% threshold	***30***	RWA density (weighted average)	***34.7%***

LR exposure composition

Breakdown by exposure classes

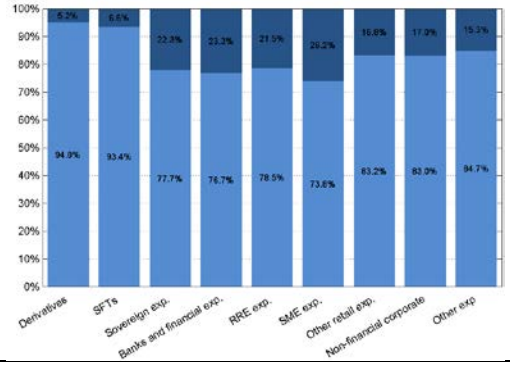


Legend pie chart (left)



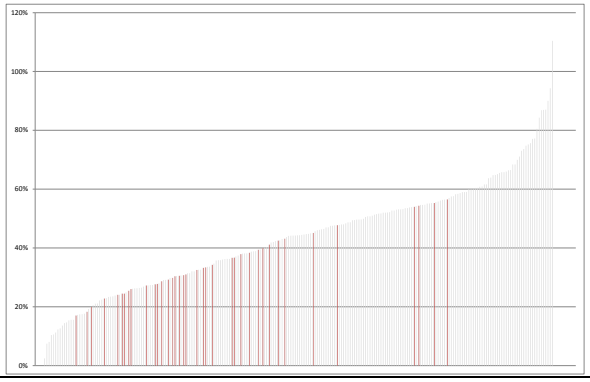
Legend bar chart (right)

Shares of this business model's exposures of the total sample

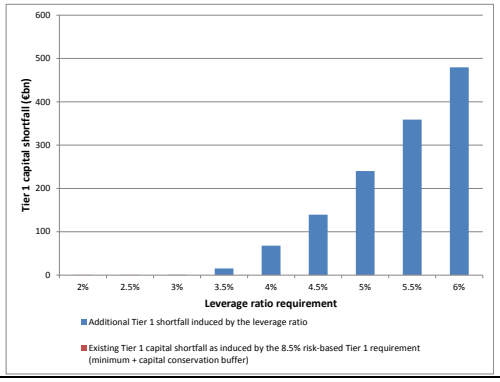


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

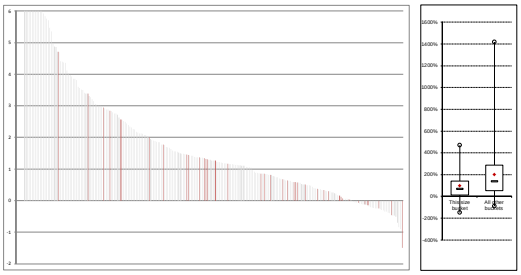


REL conclusions

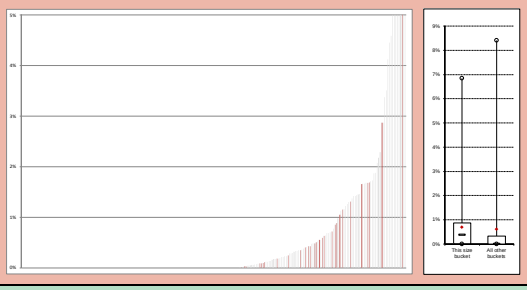
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	More exposed to R.E.L.	More exposed to R.E.L.	Less exposed to R.E.L.

Risk indicators

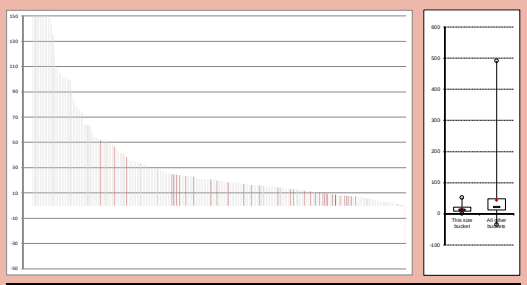
ROA (Sharpe ratio)



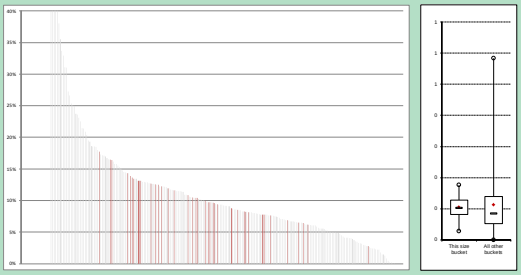
Peak loss



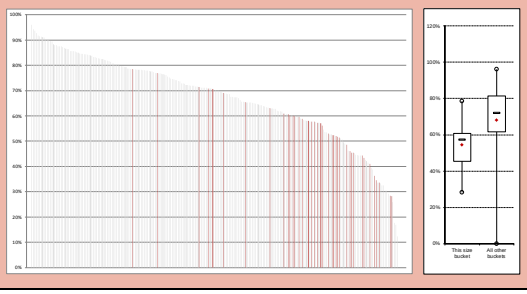
Z-score



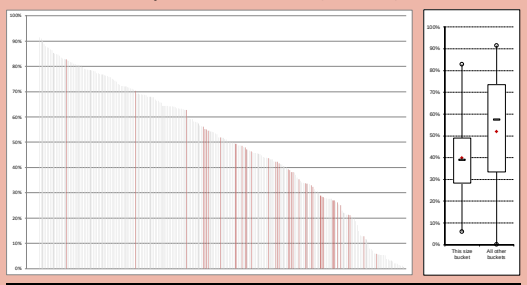
HQLA to assets (mean)



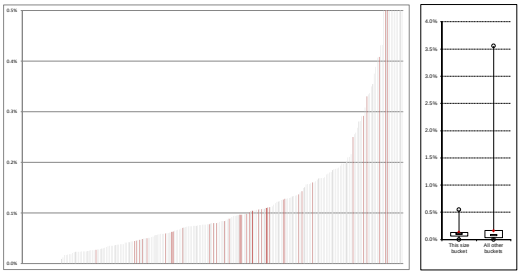
ASF to asset (mean)



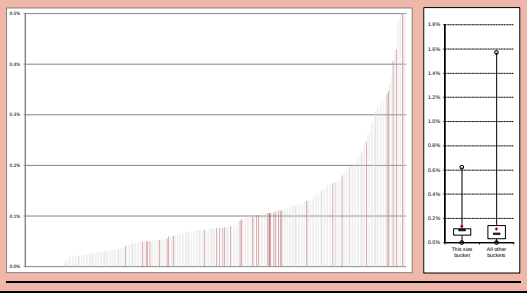
Deposit to asset (mean)



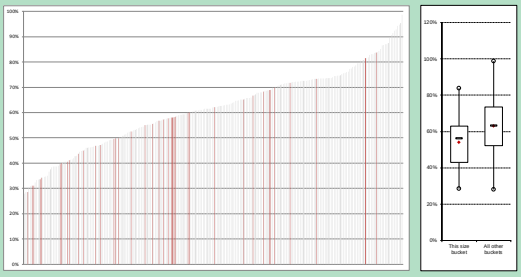
Growth rate of loans (std dev)



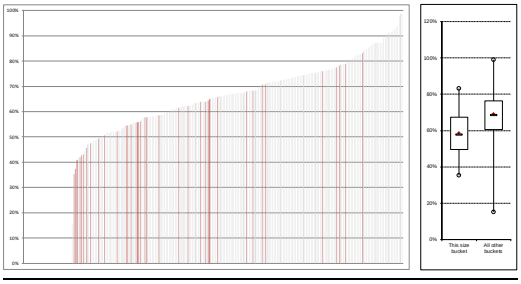
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

3.4.3 For GSIIs versus non-GSIIs

a. Globally Systemically Important Institutions (GSIIs)

This category includes EU credit institutions which have been classified by the FSB as GSIIs in its last published list.[109] The present analysis includes all 14 EU GSIIs and covers 6% of the total sample used for the benchmarking analysis.

The benchmarking analysis for GSIIs displays, globally, the same results as for very large banks: the GSIIs are more exposed to REL than non-GSIIs. The analysis of the exposures to REL shows that GSIIs tend to be (1) more exposed than other banks when considering the level and the stability of profitability, the stability of funding and the stability business activity but (2) less exposed to the risk of concentration.

GSIIs display comparatively low LRs. The median (fully loaded) LR is 4.3%, with none of the GSIIs displaying an LR below 3%, 6 of them below 4% and 13 of them below 5%.

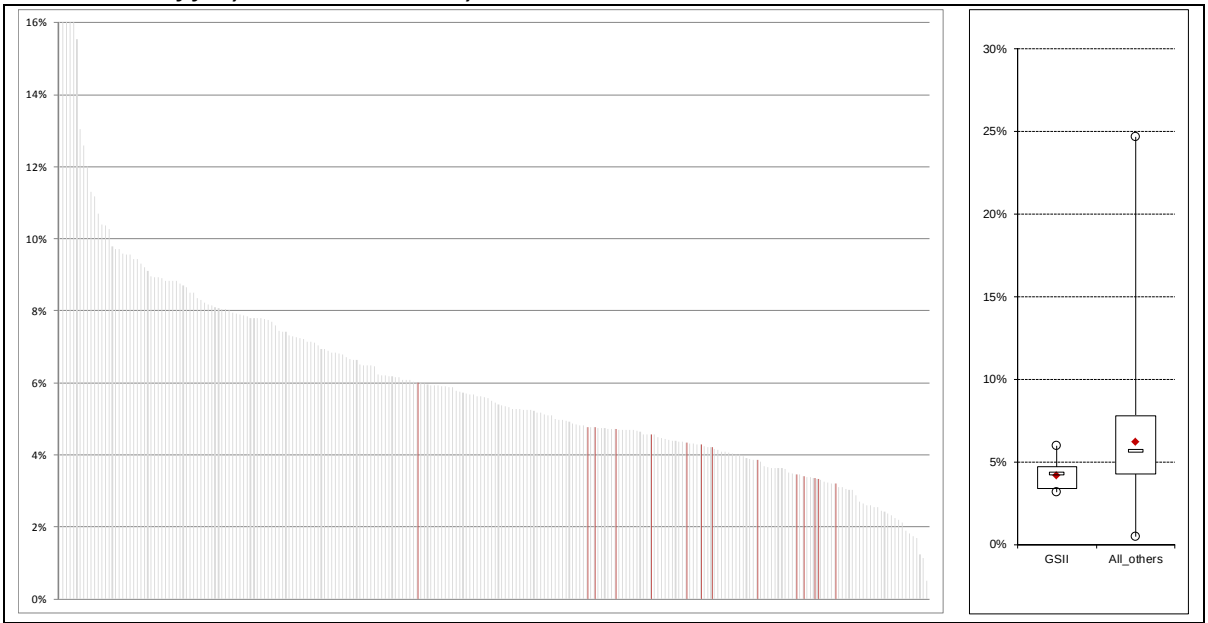
Aggregate total exposures of GSIIs (EUR 17 850 billion) account for 56% of the overall sample. The share of GSIIs in each individual LR exposure is very large; it ranges between 35% and 77%. GSIIs hold a large majority of the LR exposures on SFTs and derivatives (i.e. more than 70%). Similar to very large banks, the composition of the LR exposures is very diversified with no single class of exposures accounting for more than 18%.

At a level of 35.3%, the average risk weights (or RWA densities) of GSIIs are very close to those observed for very large banks and are notably lower than those of other institutions. Tier 1 capital shortfalls (above an 8.5% risk-based tier 1 requirement) would be triggered by an LR requirement of 3.5%. Due to their very large size, the capital shortfalls of GSIIs are rather substantial amounts, in particular for LR requirement levels of 4.5% and above where they would reach EUR 100 billion (0.4% of GSIIs LR exposures).

[109] http://www.fsb.org/2015/11/fsb-publishes-the-2015-update-of-the-g-sii-list/.

Figure 29: Globally Systemically Important Institutions (GSIIs)

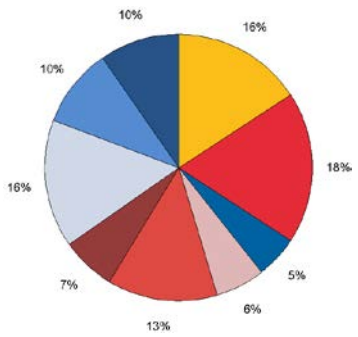
Distribution of fully loaded LRs and key statistics



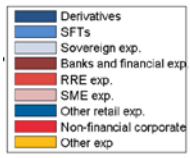
Number of entities in the sample	**14**	Total leverage exposure (billion EUR)	**17 850**
of which below the 3% threshold	***0***	Median LR	***4.3%***
of which below the 4% threshold	***6***	Median Tier 1 ratio	***11.5%***
of which below the 5% threshold	***13***	RWA density (weighted average)	***35.3%***

LR exposure composition

Breakdown by exposure classes

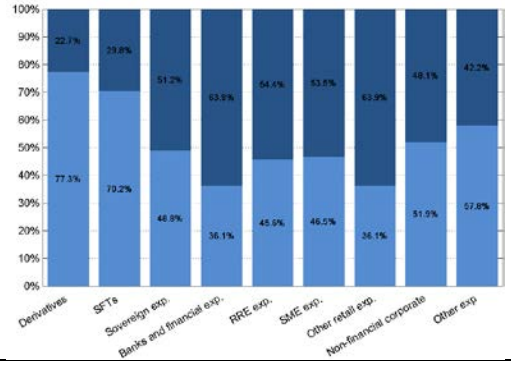


Legend pie chart (left)



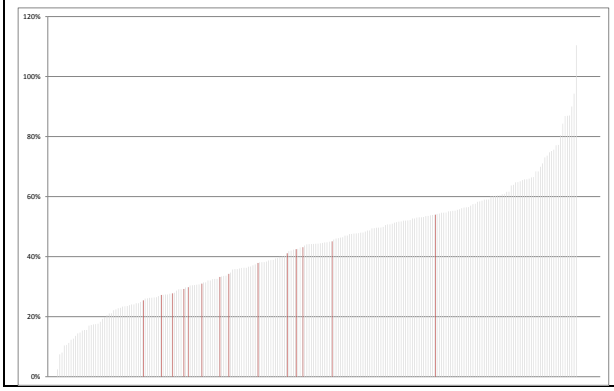
Legend bar chart (right)

Shares of this business model's exposures of the total sample

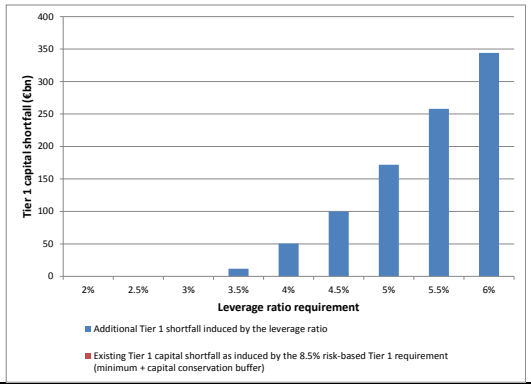


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

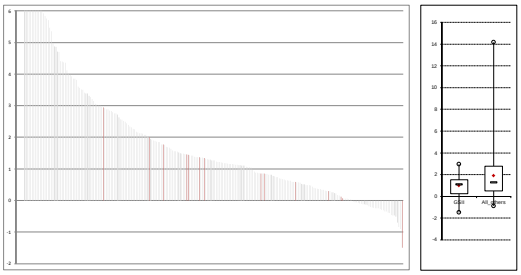


REL conclusions

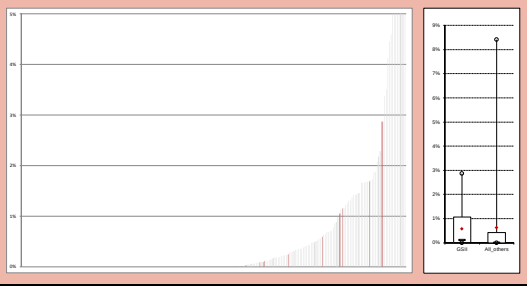
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
More exposed to R.E.L.	More exposed to R.E.L.	More exposed to R.E.L.	Less exposed to R.E.L.

Risk indicators

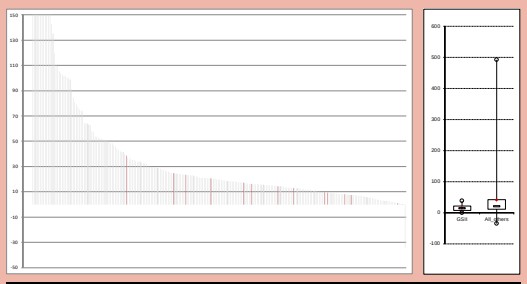
ROA (Sharpe ratio)



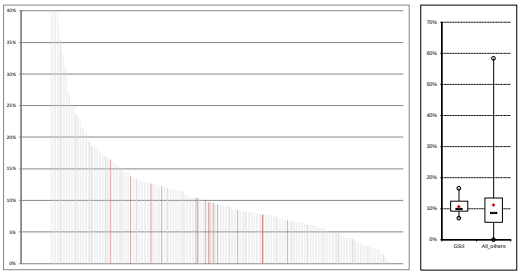
Peak loss



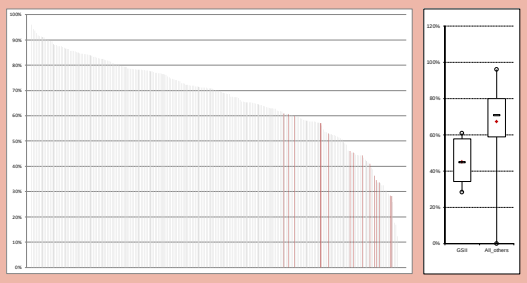
Z-score



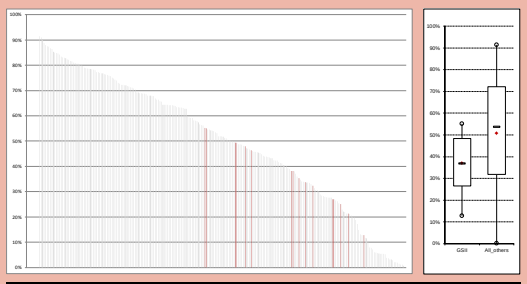
HQLA to assets (mean)



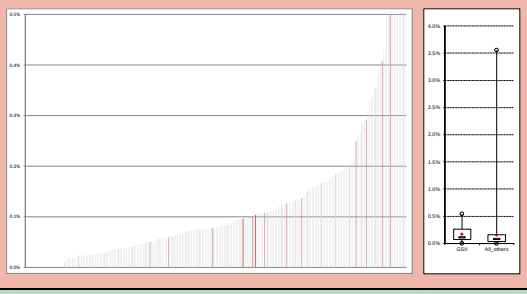
ASF to asset (mean)



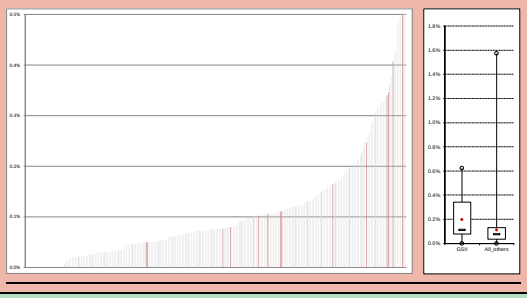
Deposit to asset (mean)



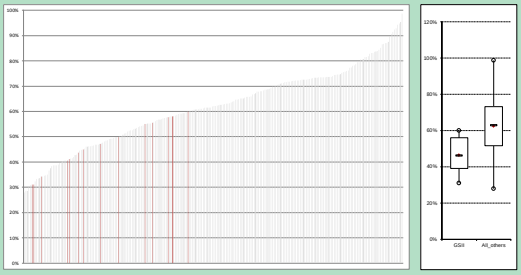
Growth rate of loans (std dev)



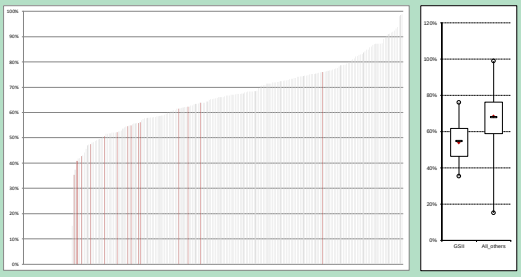
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

b. Non-GSIIs

This category includes all institutions of the overall sample except those classified as GSIIs (see above). The present analysis includes 232 institutions and covers 94% of the total sample used for this benchmarking analysis.

The overall benchmarking results suggest that non-GSIIs are less exposed to REL than GSIIs. The analysis of the exposures to REL shows that non-GSIIs tend to be (1) less exposed than other banks when considering the level and the stability of profitability, the stability of funding and the stability business activity but (2) more exposed to the risk of concentration.

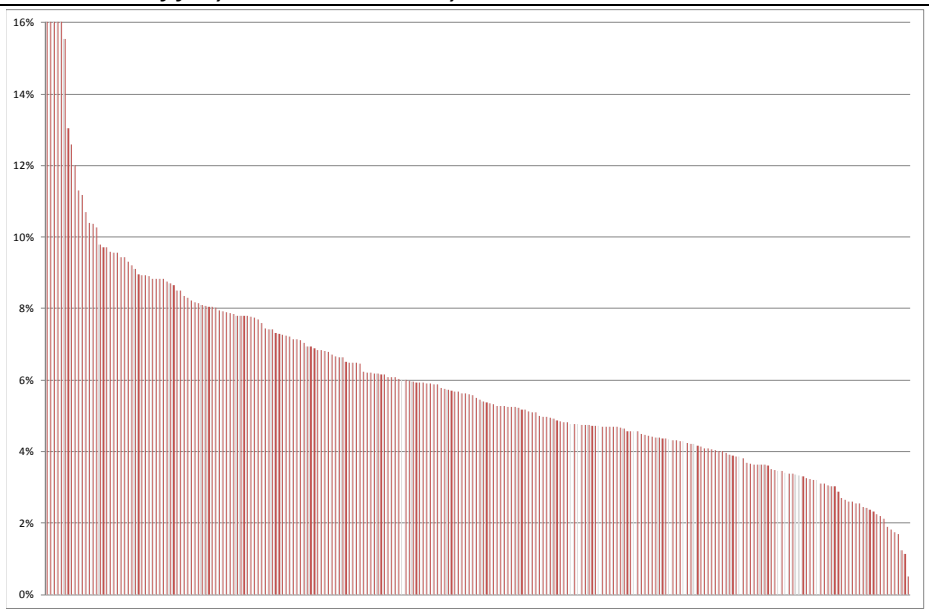
Non-GSIIs display comparatively high average LRs. The median (fully loaded) LR is 5.7%, with 21 institutions out of 232 displaying an LR below 3%, 47 institutions below 4% and 93 institutions below 5%.

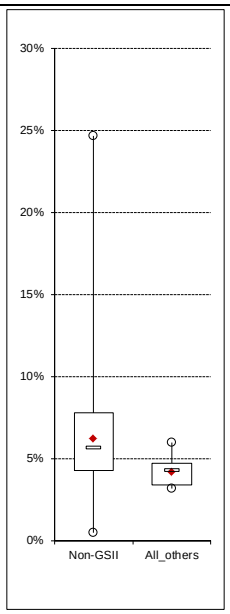
Aggregate total exposures of non-GSIIs (EUR 14 279 billion) account for 44% of the overall sample and the share of non-GSIIs in each individual LR exposure varies between 23% and 63%. Exposures to sovereigns, real estate and non-financial corporate represent half of their total LR exposures.

With a level of 36.4%, the average risk weights (or RWA densities) of non-GSIIs are slightly higher than the average risk weights of GSIIs (+1pp). AT1 capital shortfalls (above an 8.5% risk-based tier 1 requirement) would be triggered by an LR requirement of 3.5%. The total capital shortfalls of non-GSIIs would exceed EUR 70 billion (0.3% of non-GSIIs LR exposures) for LR requirements of 4.5% and above.

Figure 30: Non-GSIIs

Distribution of fully loaded LRs and key statistics

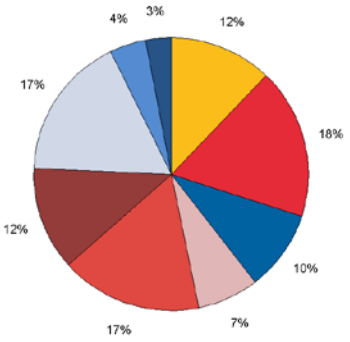




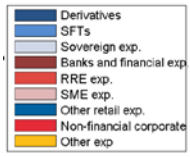
Number of entities in the sample	**232**	Total leverage exposure (billion EUR)	**14 279**
of which below the 3% threshold	***21***	Median LR	***5.7%***
of which below the 4% threshold	***47***	Median Tier 1 ratio	***13.4%***
of which below the 5% threshold	***93***	RWA density (weighted average)	***36.4%***

LR exposure composition

Breakdown by exposure classes

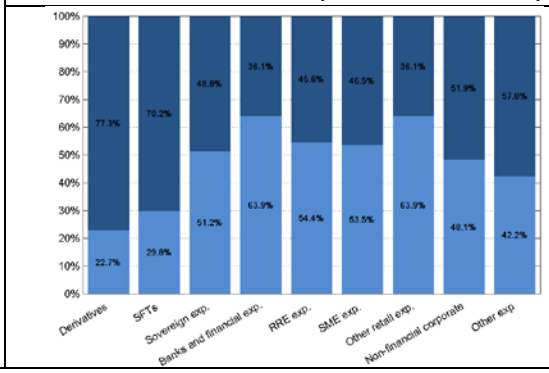


Legend pie chart (left)



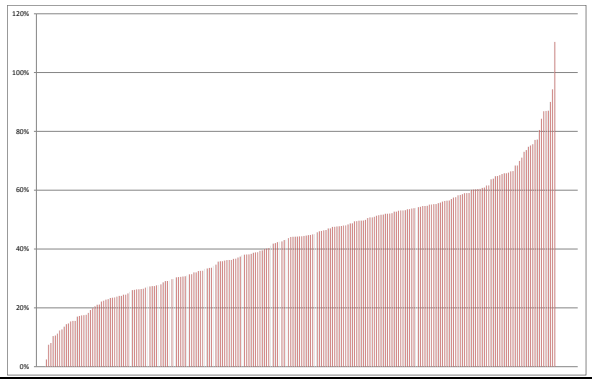
Legend bar chart (right)

Shares of this business model's exposures of the total sample

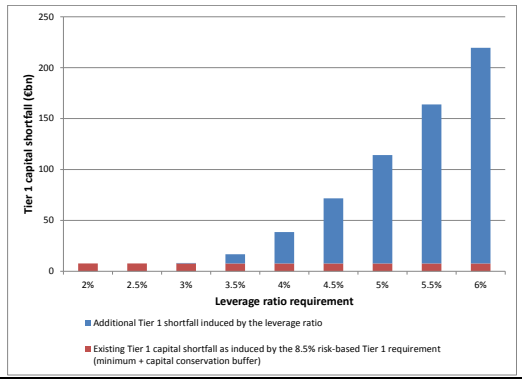


RWA density and Tier 1 capital shortfalls

Distribution of RWA densities



Tier 1 capital shortfall at different calibrations of the LR

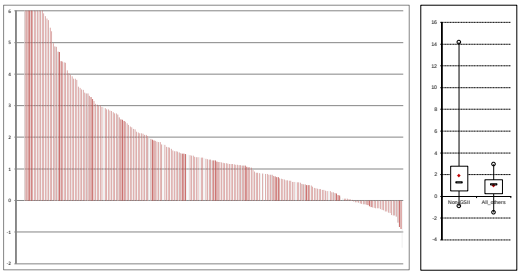


REL conclusions

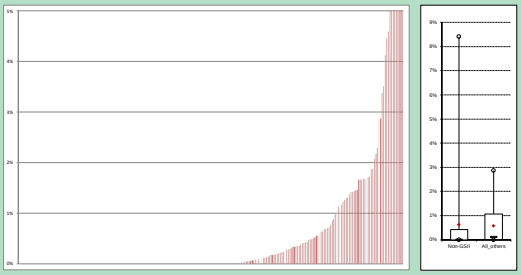
Dimension 1	Dimension 2	Dimension 3	Dimension 4
Level and stability of profitability	Stability of funding	Stability of business activity	Concentration
Less exposed to R.E.L.	Less exposed to R.E.L.	Less exposed to R.E.L.	More exposed to R.E.L.

Risk indicators

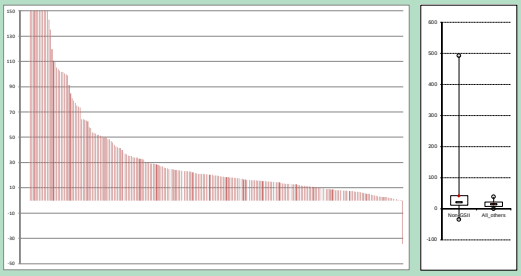
ROA (Sharpe ratio)



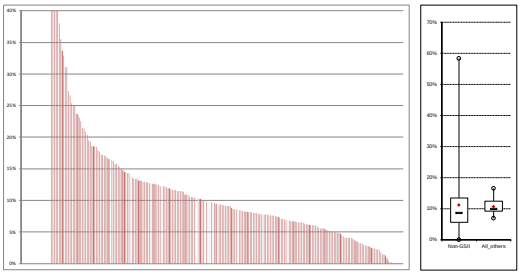
Peak loss



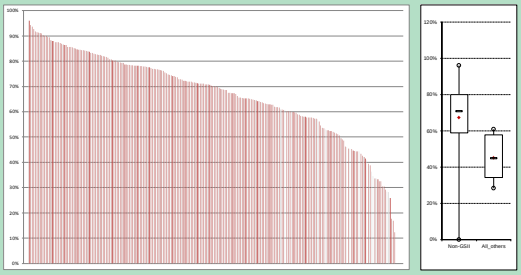
Z-score



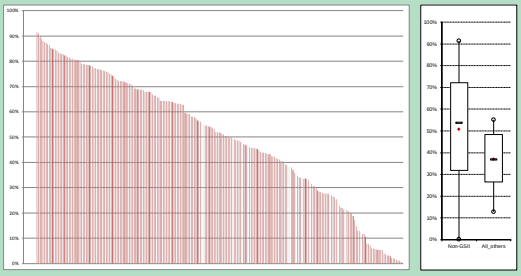
HQLA to assets (mean)



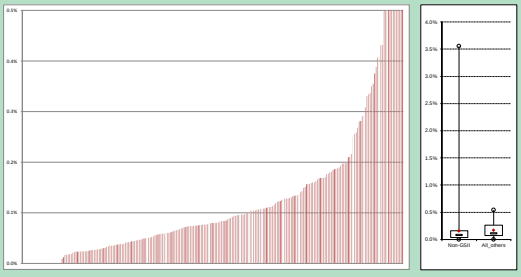
ASF to asset (mean)



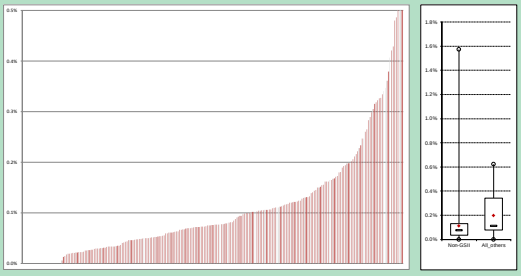
Deposit to asset (mean)



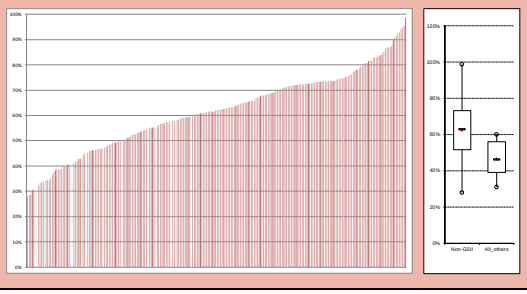
Growth rate of loans (std dev)



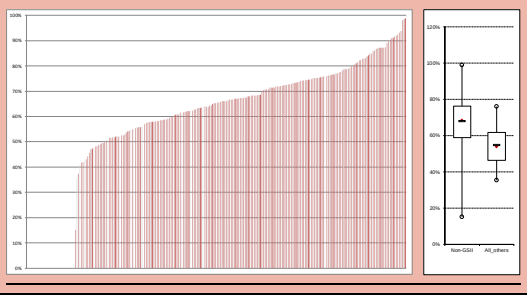
Growth rate of assets (std dev)



Primary class of asset (mean)



Primary source of income (mean)



Source: EBA QIS (June 2015)

4. Interactions between the LR and other prudential requirements

4.1 Summary section

OBJECTIVES OF THE SECTION

- Pursuant to Article 511(4)(b) of the CRR, the purpose of this section is to assess the interactions of the LR with other regulatory requirements, including the risk-based own funds requirements, the LCR and the NSFR liquidity.

METHODOLOGY

- A descriptive statistical analysis focusing on correlations between the LR and different metrics such as the risk-based Tier 1 ratio, the LCR and the NSFR is employed to investigate whether meeting all the LR and other requirements simultaneously poses significant challenges for a large number of EU credit institutions. The analysis relies on data based on the EBA QIS as of June 2015.

KEY FINDINGS

- The results reveal a moderate positive correlation between the LR and the (risk-based) Tier 1 ratio with a correlation coefficient and almost no correlation between the LR and the LCR as well as the NSFR.
- The overall results indicate that well-capitalised credit institutions tend to perform strongly under both approaches to prudential capital, i.e. risk-based Tier 1 ratio and LR. However, the findings are different for the most leveraged institutions which appear to have a concentration of exposures in asset segments with very low risk-weights.
- Overall, the results seem to support the case for complementarity of the prudential requirements. While interactions exist and certain strategies pursued by credit institutions that are beneficial to one type of requirements may be constrained by another type of requirement (e.g. accumulating HQLA improves the LCR, has a limited impact on risk-based capital if these HQLA benefit from low risk weights, but reduces the LR if this is liability-funded), the vast majority of the analysed credit institutions manage to meet all requirements simultaneously.
- Since correlations between the LCR/NSFR and the LR are very weak, holding buffers on top of the prudential minimum requirements for a particular ratio, such as the LCR or NSFR, is not necessarily accompanied by a low LR; in contrast, the results provide evidence that many institutions manage to hold significant buffers on top of all prudential requirements at the same time.

4.2 Objectives of the analysis

Article 511(4)(b) of the CRR requires the EBA to assess the interaction of the LR with the risk-based own funds requirements and liquidity requirements for the report on LR calibration and impact.

It is to be noted that the extension of the prudential framework after the financial crisis through a range of interacting requirements (in particular the addition of the LCR, NSFR and LR to the risk-based capital requirements) represents a deliberate choice by regulators around the globe. This choice was influenced by the experience that a single approach on its own, such as the risk-based Tier 1 ratio, may not sufficiently guard against all relevant risks. Also, the scope for regulatory arbitrage through optimisation of a particular prudential ratio may be smaller in a framework of multiple interacting constraints. However, since credit institutions are expected to meet all prudential requirements simultaneously, appropriate design and calibration remains crucial. The analysis presented in this chapter is meant to inform the calibration of the LR in view of the requirements for (risk-based) Tier 1 ratio, the LCR and the NSFR.

The issue of interactions of the LR with other prudential requirements is closely related to the potential impact of the LR on institutions and markets through adjustment actions (see section 5) because requirements such as the LCR, the NSFR and the risk-based Tier 1 ratio limit the set of possible adjustment actions by institutions, since all prudential requirements have to be met simultaneously. For example, an institution which does not yet meet a certain required LR level could be constrained from adjusting to this requirement by reducing a large proportion of its stock of HQLA in order to increase the LR, since such a strategy would result in violating the LCR requirement at some point.

Considering the CRR mandate for this report, the focus of the analysis is the interaction of the LR with each individual other requirement, but not the interactions between the other requirements (e.g. risk-based Tier 1 ratio and LCR or NSFR). More specifically, the objectives of the analysis are:

- to assess how ‘strong’ the interactions of the LR with the other prudential ratios generally are (i.e. do institutions which perform strongly on a particular other prudential ratio tend to perform strongly on the LR?); and

- focusing on institutions that are not yet compliant with the LR, to examine whether they have ‘headroom’ with regard to other capital and liquidity requirements or whether these requirements constrain the adjustment strategies for achieving compliance with the LR.

4.3 Results

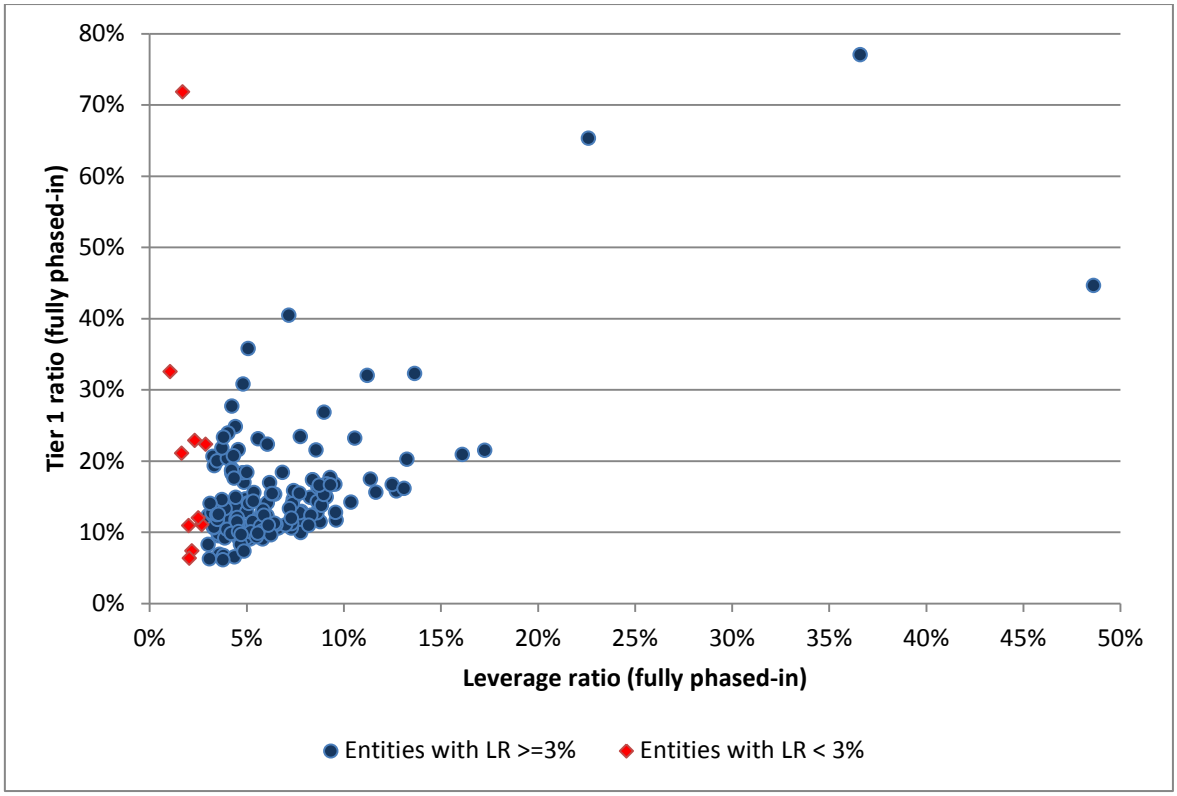
The results reveal a moderate positive correlation between the LR and the (risk-based) Tier 1 ratio with a correlation coefficient of 52.5% for the sample of 172 institutions. For institutions with an LR of 3% or higher, the correlation coefficient is 66.1%. For the institutions with an LR of below 3%, the correlation coefficient is -41.8%. Overall, the results seem to indicate that well-capitalised institutions tend to perform strongly under both approaches to prudential capital, i.e. the risk-based Tier 1 ratio and LR. However, the findings are different for the most leveraged institutions

which appear to have a concentration of exposures in asset segments with very low risk-weights. It is worth noting that any adjustment actions by the institutions with LRs below 3% which directly aim at improving LR (exposure reductions or capital increases) would also improve the Tier 1 ratio, unless the discharged assets benefit from a 0% risk-weight, in which case the effect on the Tier 1 ratio would be neutral.

The results suggest almost no correlation between the LR and the LCR, with a correlation coefficient of -4.2% for a sample of 116 institutions. The results for the LR and NSFR correlation are very similar as for the LR and LCR and suggest almost no correlation between the LR and the NSFR, with a correlation coefficient of -0.7% for a sample of 158 institutions.

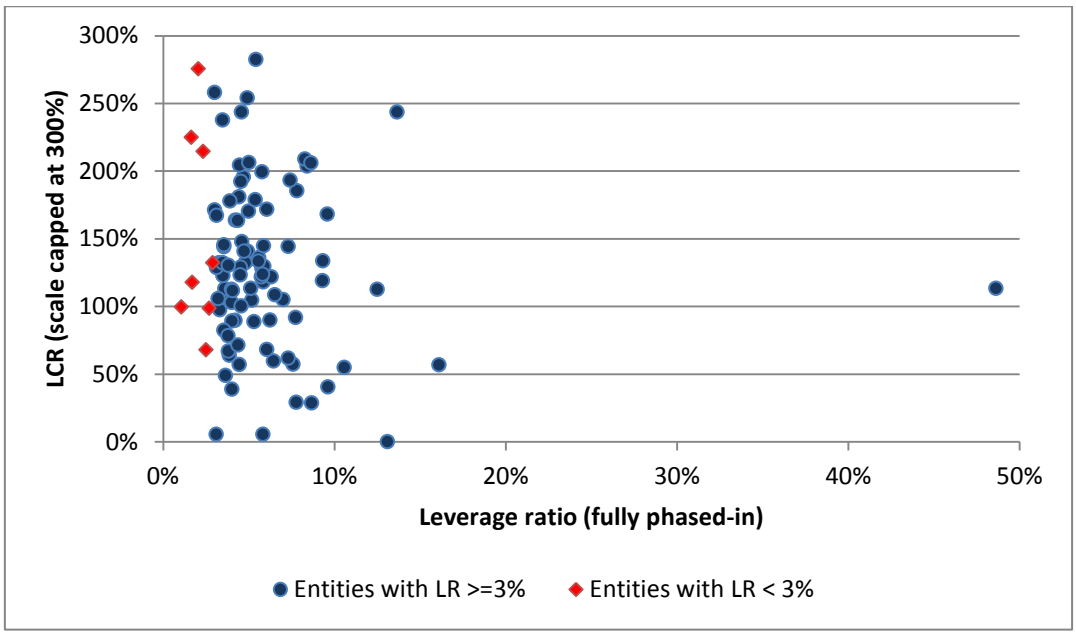
Figures 31–33 display the LR and the risk-based Tier 1 ratio, the LCR and NSFR separately for those credit institutions that already meet a 3% LR (blue circles) and those which do not (yet) meet this level (red diamonds). The figures also illustrate how that LR, as a supplementary measure to risk-based requirements, provides supervisors with a new risk perspective, in particular also for outliers.

Figure 31: Interaction of LR and (risk-based) Tier 1 ratio



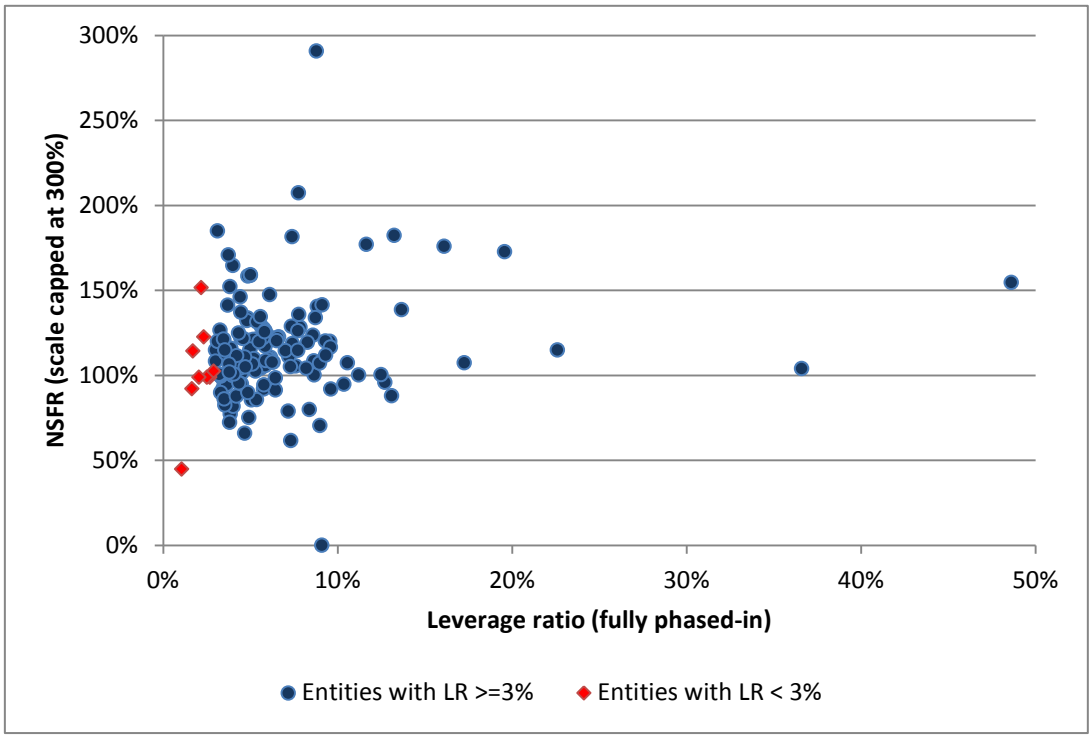
Source: EBA QIS (June 2015)

Figure 32: Interaction of LR and LCR



Source: EBA QIS (June 2015)

Figure 33: Interaction of LR and NSFR



Source: EBA QIS (June 2015)

4.4 Conclusion

Overall, the results seem to support the case for complementarity of the prudential requirements. While interactions exist and certain strategies that are beneficial to one type of requirement may be constrained by another type of requirement (e.g. accumulating HQLA improves the LCR, has a limited impact on risk-based capital if these HQLA benefit from low risk weights, but reduces the LR if it is liability-funded), most credit institutions still manage to meet all requirements simultaneously. Moreover, since correlations between the LCR/NSFR and the LR are very weak, holding buffers on top of the prudential minimum requirements for a particular ratio, such as the LCR or NSFR, is not necessarily accompanied by a low LR; in contrast, the results indicate that many institutions manage to hold significant buffers on top of all prudential requirements at the same time.

Despite these results, the interactions between the requirements may yet constrain the adjustment actions of credit institutions which do not meet certain LR levels, such as 3%. For example, where those credit institutions decide to reduce exposures in order to improve their LR, they may not do so in exposures classes that contain assets which count as HQLA, especially in cases where this would jeopardise compliance with the LCR. Against this background, the interaction between the LR and the LCR is taken into account in the simulations performed in section 5.

While not mandated for investigation in this report, it worth noting that any potential interaction between the LR and a minimum requirement for own funds and eligible liabilities (MREL) will be addressed in the report that the EBA is mandated to submit to the Commission by 31 October 2016 by way of Article 45(19) of the BRRD. Particularly, pursuant to Article 45(20)(b) of the BRRD, the MREL report shall take account of 'the interaction of the minimum requirements with […] leverage ratio […] requirements laid down in Regulation (EU) No 575/2013 and in Directive 2013/36/EU'.

5. Impact on the provisioning of financing by credit institutions

5.1 Summary section

OBJECTIVES OF THE SECTION

- Pursuant to Article 511(4)(a)(iii) of the CRR which requires the EBA to assess the impact that the LR may have on 'the business models and the balance-sheet structures of institutions; in particular as regards low-risk areas of business, such as promotional credit by public development banks, municipal loans, financing or residential property and other low-risk areas regulated under national law', the present section aims to estimate the potential marginal impact of imposing a mandatory Pillar 1 LR requirement on banking activities.

- One of the key methods used to perform this assessment is a scenario-based simulation of institutions' paths to compliance with potential LR requirements. The simulation results should be seen as a rough, indicative estimate of the potential marginal impact of imposing a LR requirement. In particular, this impact is measured and quantified in terms of estimated potential reductions of exposures. Rather than interpreting the figures at their face value, the main benefit of the results is to obtain an indication of:

- the types of markets and business models that may be most affected by different potential LRs, and;
- whether the impacts are large compared to the overall size of these activities.

METHODOLOGY

HYPOTHESIS FOR THE SIMULATION

- For the purpose of the analysis, different combinations of capital increases and exposure reduction are investigated when simulating how non-compliant institutions could eliminate the capital shortfalls induced by the imposition of hypothetical LR requirements at various calibrations:

- Scenario 1 (benign adjustments): capital increase accounting for 66% of the elimination and exposure reduction accounting for 34% of the elimination;
- Scenario 2 (baseline adjustments): capital increase accounting for 50% of the elimination and exposure reduction accounting for 50% of the elimination;
- Scenario 3 (adverse adjustments): capital increase accounting for 33% of the elimination and exposure reduction accounting for 67% of the elimination;

- Scenario 4 (extreme adjustments): no capital increase and only exposure reduction.

- The baseline scenario that assumes neutrality between both adjustment strategies with a shortfall reduction through a 50% increase in capital and a 50% reduction of exposures. It is slightly more pessimistic than experience on the improvements in LRs between 2010 and 2014 has indicated.

- The simulations assumes that non-compliant institutions reduce their exposures in the following way:

- institutions reduce assets in the order of the lowest to highest risk weights;
- institutions reduce exposures conditional on meeting minimum LCR constraints; and
- institutions reduce exposures in their non-core business activities before they reduce their exposures in their core business (disregarding the risk-weighting ranking of exposure types).

SCOPE OF THE SIMULATION

- In total, 149 institutions are included in the simulations analysis. Of the 12 business models identified in this report, all except merchant banks and leasing and factoring banks are represented in the simulations analysis. Of the 14 EU GSIIs in the sample, 13 are captured in the analysis.

- Based on data availability, nine specific exposure types and one residual category for other exposures are examined, namely: trading book, banks & financials, SME exposures, non-financial corporates, sovereigns, residential real estate, other retail, covered bonds, securitisations and other exposures.

DATA SOURCE AND COVERAGE

- The analysis uses Basel QIS data as of June 2015 only, e.g. for data on institutions' leverage exposures, RWA, end-point Tier 1 capital and LCR. Regulatory data from CoRep returns are used to approximate the average risk weights applied to different exposure classes.

KEY FINDINGS

- The results of the simulations-based analysis suggest that the potential impact of introducing an LR requirement of 3% on the provision of financing by credit institutions would be relatively moderate when put into the context of the overall size of the banking sector:

    - The estimated potential reduction of exposures in the baseline adjustments scenario is EUR 54 billion. This is equivalent to 0.1–0.4% of the aggregate exposures of all institutions in the sample.

    - Moreover, those credit institutions in the sample which already meet an LR

requirement of 3% are shown to have excess capacity equal to approximately EUR 13 billion, which suggests that a certain share of potential exposure reductions may be absorbed by other entities within the EU banking system.

- The results of the simulations-based analysis also suggest that the estimated exposure reductions at a level of 3% primarily have the potential to affect sovereign exposures (which may include lending to municipalities, local authorities, regional governments and PSEs) and securitisation exposures if institutions would make adjustments as assumed in the adverse or extreme scenario, i.e. raising little to no capital to meet a potential shortfall. However, under any scenario tested, the estimated exposure reductions are very small compared to the aggregate volume of these exposures in the total sample of institutions. The simulations-based analysis results do not suggest a substantial impact of the LR on exposure classes such as SME exposures, non-financial corporates, residential real estate and other retail exposures as long as the calibration of the LR requirement does not exceed a level of 4% for all institutions.

- In terms of business models, the simulations-based analysis results suggest that at an LR requirement of 3%, exposure reductions may be carried out mainly by public developments banks and mortgage banks, some of which are below this threshold. At the same time, the results reveal that those public development banks and mortgage banks which already meet an LR of 3% would have substantial capacity to increase their exposures without falling below the level of 3% and could, therefore, potentially absorb some of the exposures. However, caution is warranted due to local specificities of these market segments which may complicate a smooth reshuffling of exposures amongst credit institutions in certain cases.

- While the simulations suggest an overall relatively moderate impact in terms of exposure reductions when applying an LR of 3%, the estimated potential reduction of exposures in the baseline adjustments scenario is considerably higher if an LR calibrated at 3.5% is applied to all institutions in the sample. The estimated impact increases further for LR calibration levels beyond 3.5% if applied to all institutions.

5.2 Methodology

Article 511(4)(a)(iii) of the CRR requires the EBA to assess the impact that the LR may have on different areas of the financial markets and banking activities. One of the key methods used to perform this assessment is a scenario-based simulation of institutions' paths to compliance with potential LR requirements. LRs within an interval of 2% to 6% are considered to ensure that the impact assessment is informative irrespective of the exact calibration decisions. Differentiated calibrations are also taken into account for certain business models and for GSIIs versus non-GSIIs.

The simulations are made using institution-specific balance-sheet data, rather than aggregate data, which allows for granular results and insights in terms of impact on institutions' exposures, as well as the difference between business models. It should be noted that the primary focus of the analysis is on the impact on the balance sheet. The analysis should not be considered a 'general equilibrium analysis', given that it only looks at partial impacts generated from the institutions' adjustments. Any 'second-round effects' of capital raising and exposures reductions are not captured by the model, which means that the potential impact on the provision of products and services due to changes in banks' funding costs is not considered.

A mandatory LR requirement(s) would require institutions which currently report a ratio below the level(s) of such a requirement to improve their LR. The simulations assume that institutions that hold less capital than required could meet this shortfall either by increasing their eligible regulatory capital (i.e. increasing the LR numerator) and/or by reducing their leverage exposures (i.e. reducing LR denominator). In all scenarios, the estimated capital shortfall that non-compliant institutions have to eliminate is the shortfall that would still exist after institutions have increased capital to a level which ensures minimum compliance with the risk-based own funds requirement. This way, the capital shortfall in the simulations can be fully attributed to the marginal effect of introducing an LR requirement, and not to existing CRD IV requirements.

The degree to which institutions raise capital or reduce exposures has different implications for an institution's balance sheet. To take account of this, different combinations of capital increases and exposure reduction were investigated when simulating how non-compliant institutions would eliminate the capital shortfalls induced by the imposition of hypothetical LR requirements at various calibrations:

- Scenario 1 (benign adjustments): capital increase (accounting for 66% of the elimination) and exposure reduction (accounting for 34% of the elimination);
- Scenario 2 (baseline adjustments): capital increase (accounting for 50% of the elimination) and exposure reduction (accounting for 50% of the elimination);
- Scenario 3 (adverse adjustments): capital increase (accounting for 33% of the elimination) and exposure reduction (accounting for 67% of the elimination);
- Scenario 4 (extreme adjustments): no capital increase and only exposure reduction.

(Note that a 100% capital raising scenario would not fit within the nature of the simulations as they rely on some degree of exposure reduction.)

Scenario 1 derives from an analysis of the improvements in LRs between 2010 and 2014 of institutions that displayed a LR below 3% at the beginning of this period. The results suggested that, on average, these institutions improved their LRs by approximately 5% p.a. through increasing Tier 1 capital and by approximately 2% p.a. through reducing exposures. Hence, this would have improved their LRs by approximately 7% p.a., of which 71% (5/7) is due to the capital increase. For simplicity and because a proxy measure of leverage exposures was used, 67% capital raising was taken as an approximation.

Capital raising is assumed to take place through the issuance of capital, or retained earnings. Scenario 2, where institutions eliminate shortfalls through a 50% increase in capital and a 50% reduction of exposures, has been chosen as the baseline scenario for showing results, mainly to reach neutrality between the preferred adjustment strategies. This is also to take account of uncertainty around institutions' capability to raise capital going forward, compared to their ability to do so in the period 2010-2014.

The simulation results should be seen as a rough, indicative estimate of the potential marginal impact of imposing a LR requirement. In particular, this impact is measured and quantified in terms of estimated reductions of exposures. Rather than interpreting the figures at face value, the main benefit of the results is that they indicate what types of markets and business models are likely to be most affected and whether the impacts are large compared to the overall size of these activities. In order to assess the estimated exposure reductions in terms of significance, they are compared to the aggregate exposure levels and to the 'excess capacity' of capital resources of the entities in the sample. The excess capacity is the amount of additional exposures which could, in theory, be taken on by those institutions that already meet a given LR calibration level. For example, if the calibration of the LR requirement is 3%, then an institution with an LR of 4% could, in theory, take on additional exposures discharged by those institutions with LRs below 3% without violating the LR requirement.

It should be noted, however, that institutions may not be able to adjust their balance sheet very easily, e.g. it takes time to issue capital or retain profits and many banking book exposures cannot be sold, moved or rolled off the balance sheet. Such factors will vary between institutions and potentially between business models and, therefore, the results should be interpreted as indicative, longer-term estimates.

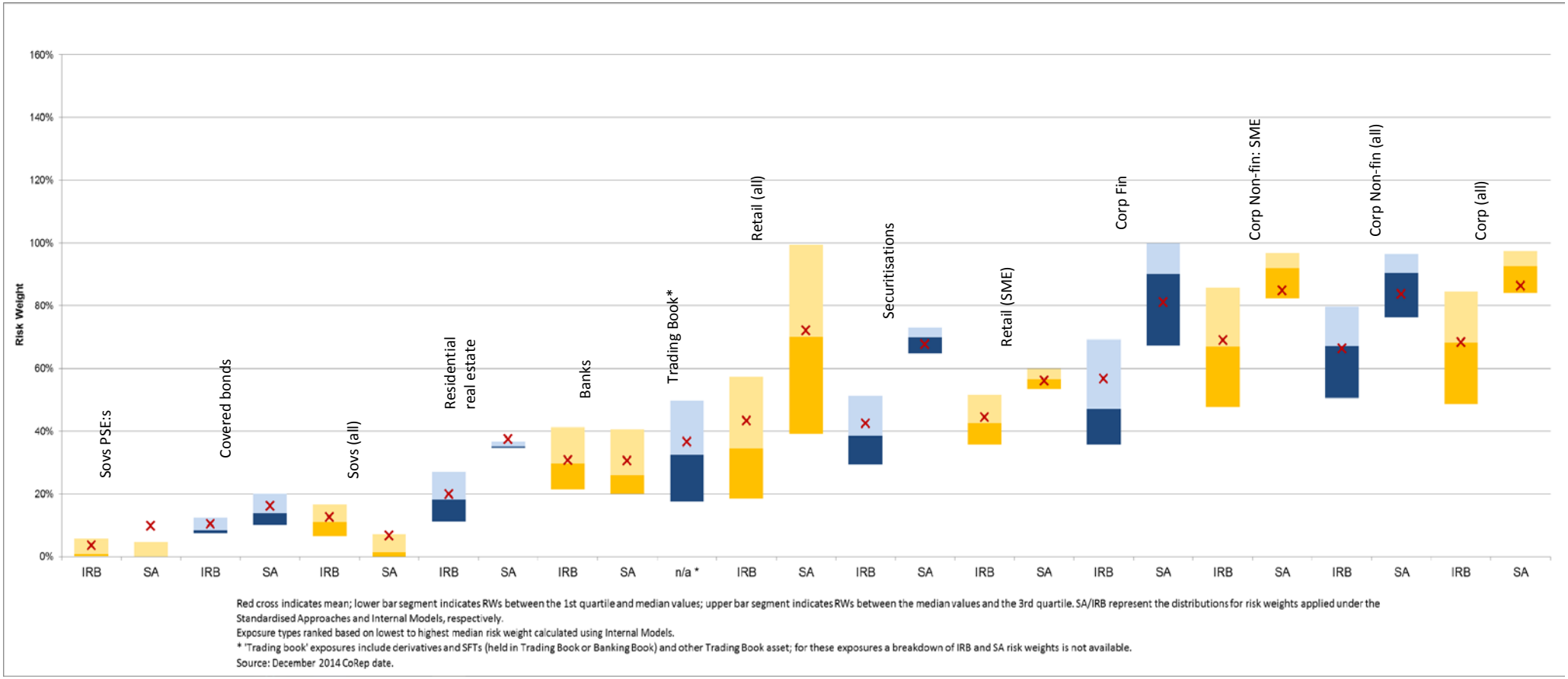
For the portion of adjustment to compliance that comes through exposure reduction (as determined by Scenarios 1–4), it is necessary to have a basic framework to model how institutions achieve this. The simulation assumes that institutions would like to reduce exposures that receive low risk weights before they reduce high risk-weight exposures. The logic behind this is driven by the potential for 'risk-shifting', i.e. institutions increasing their risk-taking in response to the introduction of LR requirements (see section 7 which provides some empirical evidence for this phenomenon and also discusses its impact in terms of robustness).

In theory, there are many ways an institution could increase their risk-taking. It could simply reduce assets with low risk weights, it could replace assets of low risk weights with assets of higher risk weights (while maintaining the overall size of its balance sheet), or it could do a combination of these things by reducing some assets and replacing others. However, the LR will only increase when exposures are reduced. Therefore, the simulations assume that the potential adjustments to compliance that come through exposure reductions focus on a reduction in assets with low risk weights (with some regard to business-model restrictions; see below). However, it should be noted that there could be second-round impacts due to balance-sheet optimisations which are not captured by the analysis.

The simulations assume that institutions that hold less capital than required entities would generally prioritise exposures with low-risk weights when/if engaging in exposure reductions for improving the LR. However, additional business-model considerations and interactions with other requirements are taken into account as well (see below).

Figure 34 depicts the average risk weights for different asset classes. For all asset classes except trading book exposures, the figure depicts the average risk weights assigned using a standardised and an internal model-based approach. The average risk weights for trading book exposures are only available on an aggregate basis (see further details on the trading book data below). The average risk weights are estimated using CoRep data as of 31 December 2014. The red crosses indicate the mean of the sample, while the lower bars indicate the risk weights between the first quartile and the median and the upper bars indicate the risk weights between the median and the third quartile). As Figure 34 shows, sovereign exposures, covered bonds and other residential real estate exposures receive low risk-weights on average, compared to overall retail exposures and corporate exposures, and this holds even under the Standardised Approach. Both retail and corporate SME lending exposures receive high risk weights on average, compared to other exposures, indicating that these exposures are not likely to be reduced as institutions increase their risk-taking.

Figure 34: Average Density Ratios under Internal Models and Standardised Approaches



Source: EBA CoRep data as of 31 December 2014

At the institution level, the simulations take into account an institution's first to third largest exposure classes (as a proportion of their total exposures). In order to take into account the specific business model of each credit institution, it is assumed that there is a general inclination to protect so-called 'core assets' and, therefore, the three main exposure types are moved to the lowest priority for exposure reduction if certain thresholds are exceeded.

The simulations take additional prudential requirement constraints into account. Article 511(4)(b) of the CRR requires the EBA to assess the interactions of the LR with prudential (risk-based) own funds and liquidity requirements. There is a certain interaction between the LR and risk-based requirements in the basic framework for exposure reduction since it relates to the incentive to risk-shift when a bank is not constrained by risk-based requirements. In addition, an institution which does not yet meet a certain future LR level could be constrained from adjusting to the LR by deleveraging a large proportion of its stock of HQLA since such a strategy would result in violating the LCR requirement at some point.

The links between exposures and HQLA are explicitly explored in the simulations. As an institution reduces its exposures, it does so conditionally on holding sufficient HQLA to meet liquidity requirements (exposures assumed to fulfil HQLA constraints are sovereign exposures, covered bonds; securitisations and non-financial corporate exposures). The approximate relationship between a change in an exposure category and HQLA is calibrated using QIS data. As an additional control, the simulation is also run without taking the LCR constraint into account.

While the LCR requirement is explicitly captured in the simulations scenarios, it has not been possible to take direct account of the anticipated forthcoming NSFR requirement in the quantitative analysis.[110] However, it can be noted that the ASF does not deteriorate for any institutions in the sample as they adjust to the LR. Due to data limitations some simplifications and proxies (e.g. for the measure of the exposures that constitute HQLA in the liquidity requirements) have been used.

In summary, the simulations assume that non-compliant institutions reduce their exposures (to various degrees depending on scenarios) in the following way:

- institutions reduce assets in the order of the lowest to highest risk weights;
- institutions reduce exposures conditional on meeting minimum LCR constraints; and
- institutions reduce exposures in their non-core business activities before they reduce their exposures to their core business (disregarding the risk-weighting ranking of exposure types).

The simulations analysis uses Basel QIS data only, e.g. for data on institutions' leverage exposures, RWA, end-point Tier 1 capital and LCR. Data are for end-June 2015. Regulatory data from CoRep returns have been used in order to approximate the average risk weights applied to different exposure classes; December 2014 CoRep data was used to estimate these values.

[110] Both interaction between capital/exposures and net outflows (with respect to the LCR), and exposures and required stable funding (with respect to the NSFR) has been investigated; however, these interactions are highly exposure-specific and very data intensive, making it difficult to take account of them.

In total, 149 institutions are included in the simulations analysis. Of the 12 business models identified in this report, all except merchant banks, leasing and factoring banks are represented in the simulations analysis. Of the 14 EU GSIIs in the sample, 13 are captured in the analysis.

In this analysis, it is ensured that there is no double-counting between subsidiaries and their EU broader group. Entities that are subsidiaries of an EU parent are not taken into account in the simulations below.

It is only possible to model the effect on a limited number of exposure types. The specifications of Article 511(4)(a) of the CRR are very granular; many relate to very particular types of activities which could only be assessed on the basis of very specific and detailed datasets. However, the EBA's analyses have to be performed within the constraints of data availability as determined by the CoRep and QIS templates as well as by information which is publicly accessible. Additional data collections for the EBA report would increase the burden/costs for institutions.

Based on data availability, nine specific exposure types are examined plus one residual category for other exposures, namely: trading book, banks & financials, SME exposures, non-financial corporates, sovereigns, residential real estate, other retail, covered bonds, securitisations, other exposures.

It should be noted that specific limitations apply to exposures that are held in the trading book. These are captured as an aggregate business line, as the LR QIS data is much less granular with respect to trading book than banking book exposures. The trading book exposures in this sample ignore differences between different trading exposures and positions.

Figure 35: Business models and number of institutions included in the simulation analysis

Business model	# entities
Cross-border universal banks	27
Local universal banks	35
Automotive, consumer credit banks	4
Building societies	8
Locally active savings and loan associations, cooperative banks	51
Private banks	3
Custody banks	1
Public development banks	7
Mortgage banks including passthrough financing mortgage banks	2
Other specialised banks	11
TOTAL	**149**

Figure 36: Coverage across countries, simulations

	Total assets (€ bn) of the Quantitative Impact Study (QIS) sample	Total assets (€ bn) of Total monetary and financial sector*	Coverage (%)
Austria	150	870	17%
Belgium	455	1116	41%
Germany	4956	7799	64%
Spain	2429	2901	84%
France	6654	8184	81%
United Kingdom	5019	9739	52%
Greece	111	386	29%
Hungary	37	113	33%
Ireland	41	1058	4%
Italy	2312	3984	58%
Luxembourg	43	997	4%
Netherland	2336	2524	93%
Poland	94	397	24%
Portugal	240	463	52%
Sweden	1446	1316	110%
Total	**26323**	**41847**	**63%**

Source: EBA QIS, ECB

5.3 Aggregate results

Based on the assumptions that institutions bound by the LR at 3% would reduce their shortfall by a 50% raising of capital and a 50% exposure reduction (baseline scenario – see section5.2.), the estimated reduction of exposures by such institutions would be EUR 54 billion (EUR 37 billion if more capital is used, i.e. the benign adjustments scenario, EUR 72 billion if a larger part of the shortfall is met by reduction of exposures, i.e. the adverse adjustments scenario, and EUR 108 billion the extreme adjustments scenario where the entire shortfall is met by reduction of exposures and the institutions does not raise capital at all). As a point of reference, the aggregate LR exposure of all institutions in the sample is EUR 27.381 billion, indicating that these estimated exposure reductions are relatively small at an aggregate level, ranging from 0.1% to 0.4% of the total exposure.

Based on the assumptions in the simulations, the analysis suggest that the exposure reductions at a level of 3% would primarily come from sovereign exposures, trading book exposures (which include also large shares of repos and derivatives) and 'other' exposures in the baseline scenario. In the adverse and extreme scenarios where institutions are assumed to reduce exposures to a larger extent, covered bonds and lending to banks and financials would be affected as well. However, in any scenario tested, the estimated exposure reductions would be small compared to the aggregate volume of these exposures in the overall sample of institutions. If the LR was calibrated at a level of 4% for all institutions, the simulations analysis results suggest that the impact in the aforementioned exposure classes would be more substantial and extend to covered bonds as well as residential real estate and non-financial corporates, although on a very small scale.

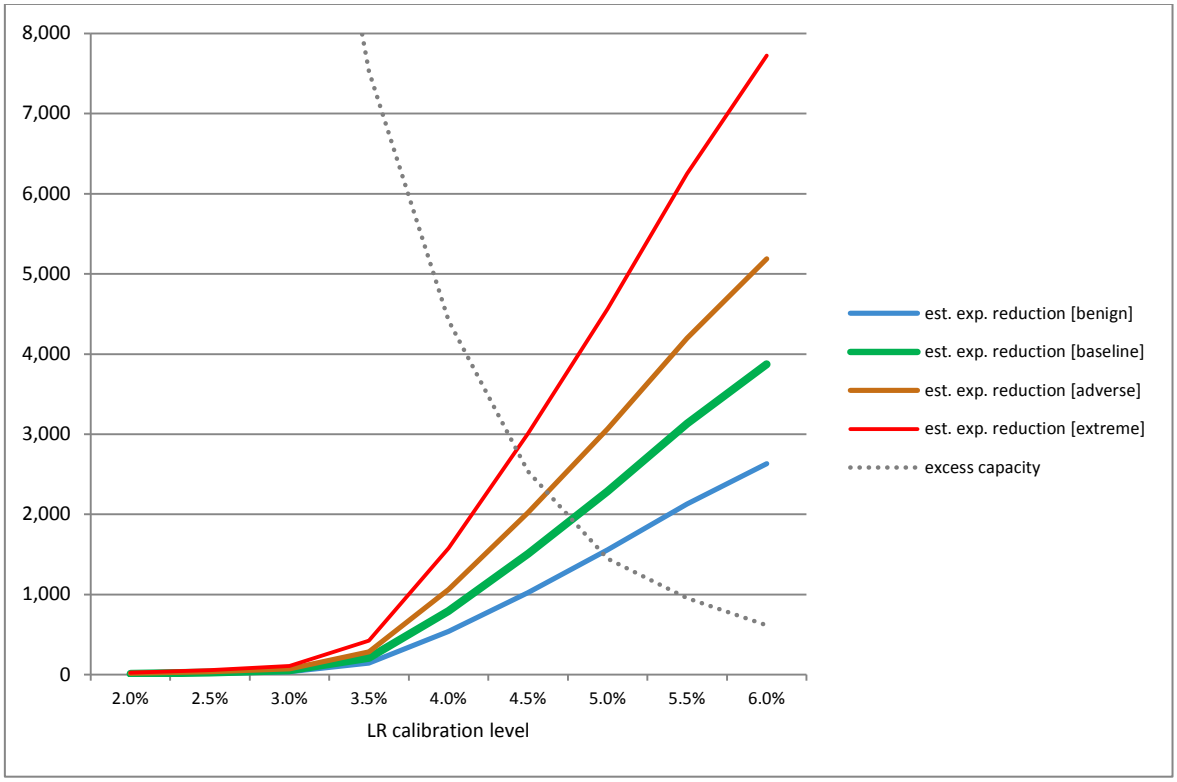
Under any scenario tested, the simulation analysis results do not suggest a substantial impact of the LR on exposure classes such as SME exposures, non-financial corporates, residential real estate and other retail exposures as long as the calibration of the LR does not exceed a level of 4%, apart from under the most adverse scenario where institutions would not raise any capital and only meet the requirement through exposure reductions. This holds under differentiated calibration options as well, where e.g. some institutions would be subject to higher LR requirements than others.

Although these results are an effect of the design of the simulations, they help inform the estimated impact a LR could have on the exposures defined in Article 511(4)(a), more specifically: sovereign exposures (which include exposures to local authorities, regional governments and PSEs), trading activities (which includes repos and derivatives, although the effect on each market cannot be singled out – see section 4.3.1), covered bonds, financing of residential property and bank lending to SMEs.

The estimated aggregate exposure reductions under the four scenarios tested in the simulations are presented in Figure 37 and Table 23. The results reveal that the estimated exposure reductions (and hence the impact) increase exponentially, especially for LR calibrations above 3.5% when applied to all institutions. Figure 37 also contains the aggregate excess capacity available in the system for different levels of LR calibration. However, one should be very careful when comparing the estimated aggregate exposure reductions to the aggregate excess capacities

since it should not be assumed that those institutions with excess capacity would in any case be willing and able to absorb the exposure reductions of other institutions. A range of constraints, such as differences in business models, geographical reach and other prudential requirements not considered in the analysis may, in reality, limit the capacity for the absorption of exposure reductions through EU credit institutions. The additional capacity for absorptions of potential exposure reductions through EU entities which are not credit institutions or non-EU banks was not investigated due to data limitations.

Figure 37: Estimated reductions in LR exposures (billion EUR) under different LR calibrations and adjustment scenarios



Source: EBA QIS (June 2015)

Table 23: Estimated reductions in LR exposure under different calibrations and scenarios

	Baseline adjustments scenario (50% shortfall elimination through capital increases)	**Benign** adjustments scenario (66% shortfall elimination through capital increases)	**Adverse** adjustments scenario (33% shortfall elimination through capital increases)	**Extreme** adjustments scenario (0% shortfall elimination through capital increases)
LR calibration at **2%**	EUR 12 billion (0.0% of aggregate exposure)	EUR 8 billion (0.0% of aggregate exposure)	EUR 17 billion (0.1% of aggregate exposure)	EUR 25 billion (0.1% of aggregate exposure)
LR calibration at **3%**	EUR 54 billion (0.2% of aggregate exposure)	EUR 37 billion (0.1% of aggregate exposure)	EUR 72 billion (0.3% of aggregate exposure)	EUR 108 billion (0.4% of aggregate exposure)
LR calibration at **4%**	EUR 793 billion (2.9% of aggregate exposure)	EUR 539 billion (2.0% of aggregate exposure)	EUR 1 062 billion (3.9% of aggregate exposure)	EUR 1 579 billion (5.8% of aggregate exposure)
LR calibration at **5%**	EUR 2 289 billion (8.4% of aggregate exposure)	EUR 1 557 billion (5.7% of aggregate exposure)	EUR 3 067 billion (11.2% of aggregate exposure)	EUR 4 566 billion (16.7% of aggregate exposure)
LR calibration at **6%**	EUR 3 871 billion (14.1% of aggregate exposure)	EUR 2 632 billion (9.6% of aggregate exposure)	EUR5 187 billion (18.9% of aggregate exposure)	EUR 7 725 billion (28.2% of aggregate exposure)

Source: EBA QIS (June 2015)

5.4 Detailed results for each scenario

5.4.1 Results of the baseline adjustment scenario

a. General results for different LR levels

The majority of institutions in the sample across all business models have enough capital to meet a LR at 3% in the baseline scenario, and the estimated exposure reduction by certain institutions at 3% (under the baseline scenario) is very small in relation to both institutions' total exposures and the 'excess capacity in the system' to absorb any such reductions. Institutions from a larger number of different business models are affected by a LR at 4%, but excess capacity in other institutions – both at a system-wide level and within business models – to absorb any reduction in exposures remains larger than potential reductions. At 5%, some institutions within all business models, except within 'Automotive, consumer credit banks' and custody banks are bound by the LR to some extent.[111] At the system-wide level, i.e. across all credit institutions in the sample, the estimated exposure reductions by some institutions in the baseline scenario start to exceed the excess capacity of capital resources by other institutions at LR calibration levels of 5% and above. With a LR of 4.5% for all banks, there is, however, still excess capacity on aggregate compared to the amount of exposure reduction, at a relation of 1/1.7.

b. Shortage compared to excess at a 3% LR level

More specifically, some institutions hold less capital than required at a LR of 3%. These institutions are categorised within the business models: public development banks, mortgage banks and 'other specialized banks'. The simulation estimates that if these institutions would meet their shortfall by 50% exposure reduction and 50% raising of capital (baseline scenario), they might reduce exposures equivalent to an amount of EUR 54 billion (see Table 24 on exposure reduction (in billion euros) and excess capacity, per business model). This can be contrasted with the excess capacity that institutions in the sample that already meet the LR at 3% would have to absorb those exposures. The total excess capacity in the system at 3% is EUR 12.917 billion, indicating that any reduction in exposures could, in principle, be absorbed by other institutions as the relation between exposure reduction against excess capacity is 1/240.

Institutions that already meet the LR at 3% and that fall into the same business-model category as the institutions that need to reduce a capital shortfall have so much capital that they may be able to absorb any exposure reduction by other institutions within their business-model category. This assumption is only based on balance-sheet size, however, and does not take stickiness of assets into account. It does indicate, however, that even if it is assumed that only similar institutions would be able or willing to absorb exposure reductions, there are institutions that, in principle, hold enough capital to absorb such reductions.

[111] Article 511(4) of the CRR states that the impact of a leverage ratio requirement on custody activities should be investigated. Only one custody-focused institution is included in the sample (see section 4.3.1 for data coverage). The institution in the sample is not bound by the leverage ratio at any level of calibration.

The relation between estimated exposure reduction and estimated excess capacity within business models is 1/19 on average. Another point of reference is the aggregate LR exposure of all institutions in the sample, which stands at EUR 27 381 billion, indicating that the estimated exposure reductions are very small on an aggregate level (0.2% of total exposures). It should be noted, however, that some local exposures might prove more difficult to transfer through the system.

c. Results by exposure class

Exposures that might be most affected by potential exposure reduction at 3%, according to the simulations, are sovereign and 'other' exposures. The potential reductions amount to the equivalent of 1% of institutions' total sovereign exposures and 0.4% of institutions' exposures towards 'other' asset classes (see Table 24 and Figure 38, as well as Figure 39, on the overall impact on market segments). Given the assumptions made in the simulations and the low risk weights of sovereign and trading exposures, it is estimated that these assets are reduced under all tested levels of calibration. The impact then ranges from 0.3% to 29% of institutions in the sample's total sovereign exposures, depending on how extreme the exposure reduction assumptions on which the simulations are based are, and from 0.02% to 26% of institutions' total trading book exposures. The simulation results give an indication about the impact a potential leverage could have on covered bonds which start to be affected at a LR calibration of 3.5% and above and the simulations estimate that institutions start to reduce exposures to 'banks and financials' to a larger extent at calibration levels of 4% and higher.

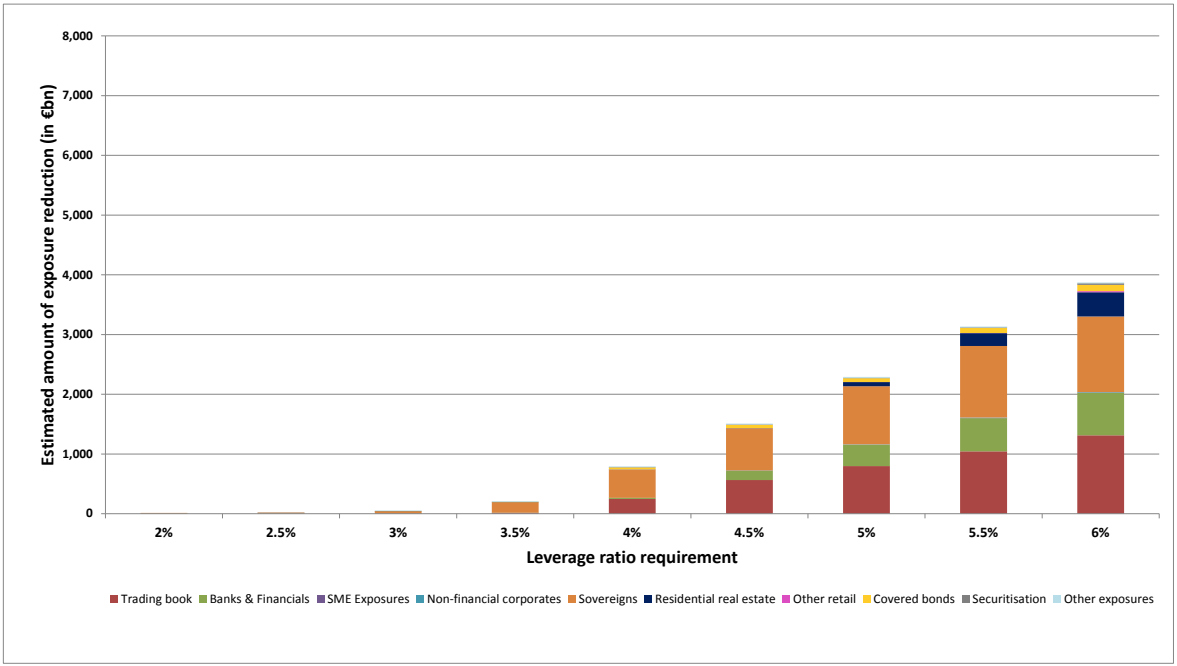
The simulations analysis results do not suggest a substantial impact of the LR on exposure classes such as SME exposures, non-financial corporates, residential real estate and other retail exposures, as long as the calibration of the LR does not exceed a level of 4–4.5%.

Table 24: Amount of exposure reduction, broken down by asset classes, given several LR requirements (billion EUR) – baseline adjustments scenario

	LR requirement								
Asset class	**2%**	**2.5%**	**3%**	**3.5%**	**4%**	**4.5%**	**5%**	**5.5%**	**6%**
Trading book	1	1	1	15	246	563	797	1,044	1,314
Banks & Financials	1	1	1	1	20	158	359	557	706
SME Exposures	-	-	-	-	-	2	3	3	4
Non-financial corporates	-	1	1	1	1	1	4	7	10
Sovereigns	11	20	41	177	475	706	972	1,196	1,267
Residential real estate	-	-	0	0	2	5	69	214	407
Other retail	-	-	-	-	-	-	1	3	18
Covered bonds	-	-	0	5	32	53	63	85	104
Securitisation	-	1	1	4	6	9	9	9	26
Other exposures	-	5	9	11	11	11	11	13	14
TOTAL EXPO REDUCTION	**12**	**28**	**54**	**213**	**793**	**1,508**	**2,289**	**3,132**	**3,871**

Source: EBA QIS (June 2015)

Figure 38: Amount of exposure reduction per assets class, assuming banks adjust by 50% capital raising, 50% exposure reduction (billion EUR) – baseline adjustments scenario



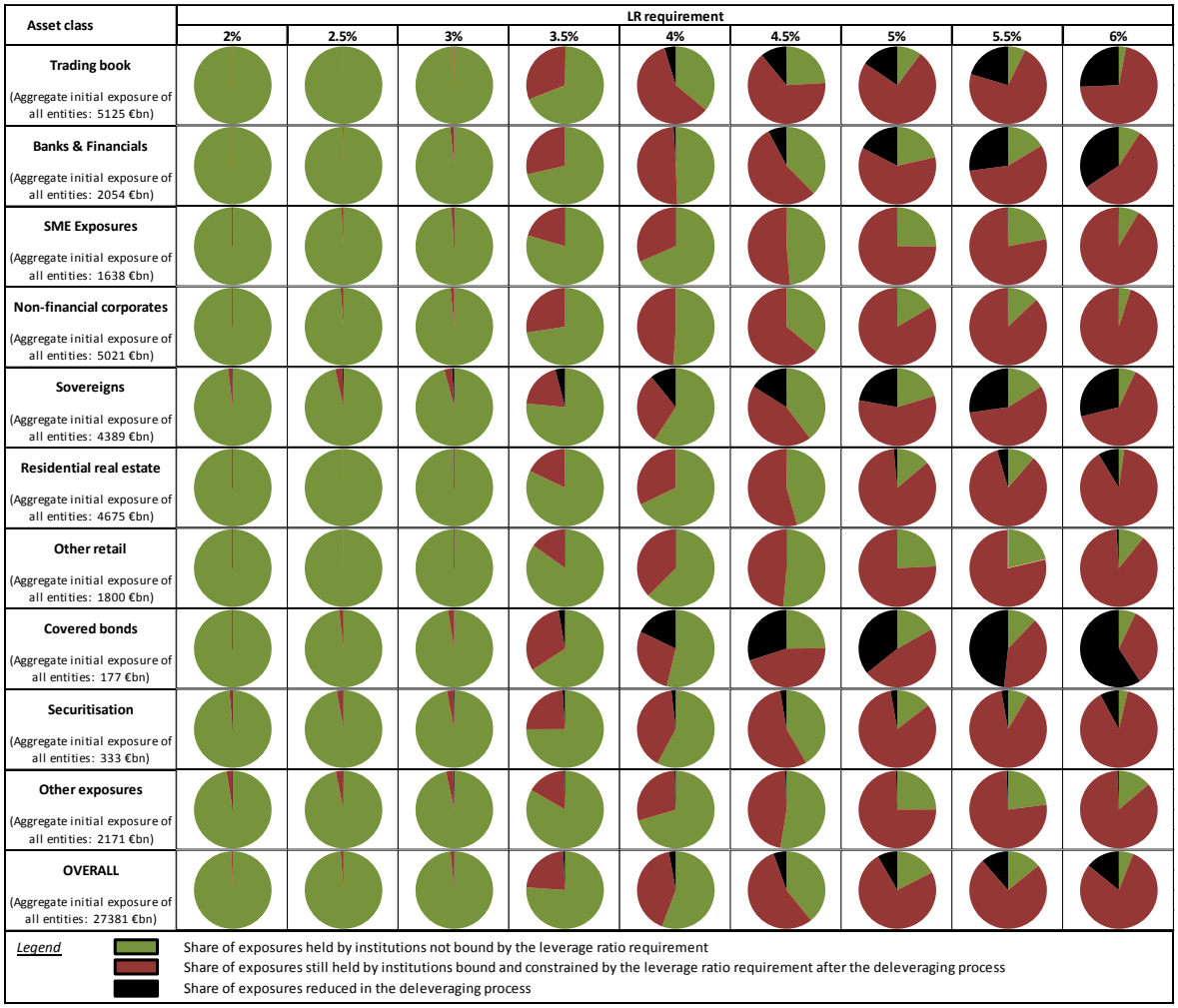
Source: EBA QIS (June 2015)

Table 25: Amount of exposure reduction and excess capacity, broken down by business models, given several LR requirements (billion EUR) – baseline adjustments scenario

Business models		LR requirement								
		2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%
Cross-border universal banks	Expo. reduction	-	-	-	86	525	1,076	1,686	2,336	2,902
	Excess capacity	22,245	13,879	8,302	4,491	2,379	1,158	519	298	163
Local universal banks	Expo. reduction	-	-	-	35	102	187	280	406	521
	Excess capacity	6,581	4,317	2,807	1,800	1,129	686	377	220	106
Automotive, consumer credit banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	713	534	414	329	265	215	175	142	115
Building societies	Expo. reduction	-	0	0	3	5	19	39	55	69
	Excess capacity	477	293	170	87	25	3	1	0	-
Locally active savings and loan associations, cooperative banks	Expo. reduction	-	-	-	1	7	18	33	46	57
	Excess capacity	917	617	417	276	185	125	87	58	35
Private banks	Expo. reduction	-	-	-	-	-	1	1	1	2
	Excess capacity	44	30	20	13	8	5	3	1	-
Custody banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	176	139	114	96	83	73	64	58	52
Public development banks	Expo. reduction	12	28	47	62	78	90	101	109	116
	Excess capacity	888	632	479	371	300	246	202	166	137
Mortgage banks including passthrough financing mortgage banks	Expo. reduction	-	-	2	5	7	9	13	17	20
	Excess capacity	68	42	26	15	6	-	-	-	-
Other specialised banks	Expo. reduction	-	-	5	21	70	107	137	162	184
	Excess capacity	677	366	168	54	39	28	19	12	9
TOTAL	**Expo. reduction**	**12**	**28**	**54**	**213**	**793**	**1,508**	**2,289**	**3,132**	**3,871**
	Excess capacity	**32,787**	**20,849**	**12,917**	**7,531**	**4,419**	**2,537**	**1,447**	**956**	**617**

Source: EBA QIS (June 2015)

Figure 39: Overall impact of estimated exposure reductions on market segments – baseline adjustments scenario



Source: EBA QIS (June 2015)

d. LCR constraint

The simulations take the LCR as an additional prudential requirement into account. This limits institutions' 'willingness' to reduce exposures that qualify as HQLA (mostly sovereign exposures and covered bonds). This is because the underlying assets are needed to maintain compliance with the LCR. The impact of the LCR constraint holds especially for calibration levels of 3.5% and above for sovereign exposures and 4.5% and above for covered bonds. Controlling for a scenario in which institutions would adjust without taking the LCR into account suggests that institutions scale back more on trading activities and interbank lending in the baseline scenario than they would if they did not take LCR into account, especially at levels of 4% and beyond.

5.4.2 Results of the benign adjustment scenario

a. General results for different LR levels

The results of the benign adjustment scenario are similar to the results of the baseline adjustment scenario. Assuming that institutions meet the LR requirement by raising a larger share of capital of course reduces the impact on exposure reductions. The estimated exposure reduction by some institutions at 3% is thus smaller both in relation to institutions' total exposures and in relation to the 'excess capacity in the system' to absorb any such reductions compared to the baseline adjustment scenario. At system level, i.e. across all institutions in the sample, the estimated exposure reductions by some institutions in the benign scenario start to exceed the excess capacity of capital resources at LR calibration levels of 5% and above. As in the baseline scenario there is, however, still excess capacity on aggregate compared to the amount of estimated exposure reduction at a LR of 4.5%, at a relation of 1/2.5.

b. Shortage compared to excess at a 3% LR level

As in the baseline scenario, some institutions hold less capital than required at a LR of 3%. In the benign scenario, the simulation estimates that those institutions could reduce their exposures by up to EUR 37 billion (see Table 26 on exposure reduction (in billion euros) and excess capacity, per business model) giving a total exposure reduction equivalent of 0.1% of the aggregate LR exposure of all institutions in the sample, which stands at EUR 27 381 billion. The relation between total estimated exposure reduction and excess capacity among institutions that already meet the LR to absorb such exposures in the system is 1/350. The relation between exposure reduction by bound institutions and excess capacity within the business models that those institutions are categorised within is 1/30 on average at a LR of 3%.

c. Results by exposure class

Apart from covered bonds and exposures to banks and financials, the impact and relation of estimated exposure reductions at different levels of calibration is the same as under the baseline scenario; it is only the magnitude that differs (see section 4.3.2 for more details). In the benign scenario, the potential reductions amount to the equivalent of 0.7% of institutions' total sovereign exposures and 0.2% of institutions' exposures towards 'other' asset classes under a 3% calibration (see Table 27 and Figure 40, as well as Figure 41 on the overall impact on market segments). At calibration levels beyond 3%, the estimated impact on sovereign and trading exposures under the assumptions made regarding exposure reductions range from 3% to 28% of total sovereign exposures and from 0.03% to 19% of institutions' total trading book exposures. Covered bonds start to be affected at a LR calibration of 3.5% in the benign scenario, similarly to in the baseline scenario.

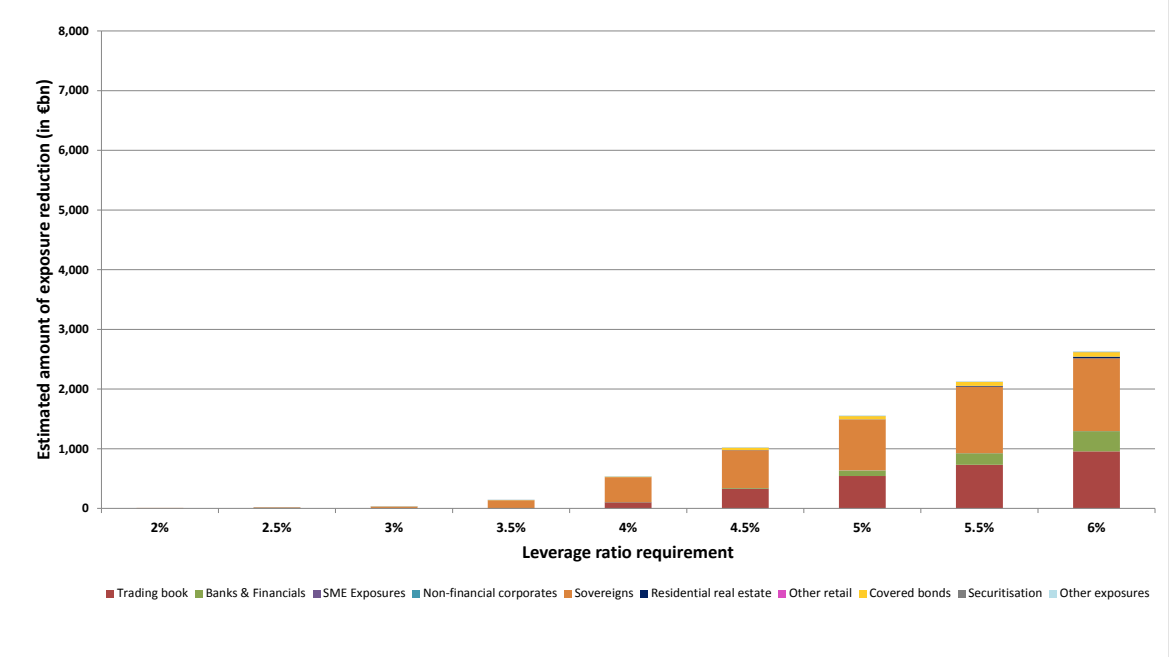
In the benign scenario, the simulations analysis results suggest no SME exposure reductions or exposures to other retail exposures at any level of calibration. Non-financial corporates are impacted only marginally throughout, while a small reduction in residential real estate exposures is observed at LR calibrations of 5% and above.

Table 26: Amount of exposure reduction, broken down by asset classes, given several LR requirements (billion EUR) – benign adjustments scenario

	LR requirement								
Asset class	**2%**	**2.5%**	**3%**	**3.5%**	**4%**	**4.5%**	**5%**	**5.5%**	**6%**
Trading book	-	1	1	2	102	326	542	731	957
Banks & Financials	-	1	1	1	1	11	93	192	337
SME Exposures	-	-	-	-	-	-	-	-	-
Non-financial corporates	-	1	1	1	1	1	1	1	1
Sovereigns	8	15	30	134	420	638	855	1,116	1,221
Residential real estate	-	-	-	-	-	0	3	13	26
Other retail	-	-	-	-	-	-	-	-	-
Covered bonds	-	-	0	1	8	40	54	64	77
Securitisation	-	1	1	1	1	1	1	1	3
Other exposures	-	1	4	6	7	8	9	10	11
TOTAL EXPO REDUCTION	**8**	**19**	**37**	**145**	**539**	**1,025**	**1,557**	**2,130**	**2,632**

Source: EBA QIS (June 2015)

Figure 40: Amount of exposure reduction per asset class, assuming banks adjust by 50% capital raising, 50% exposure reduction (billion EUR) – benign adjustments scenario



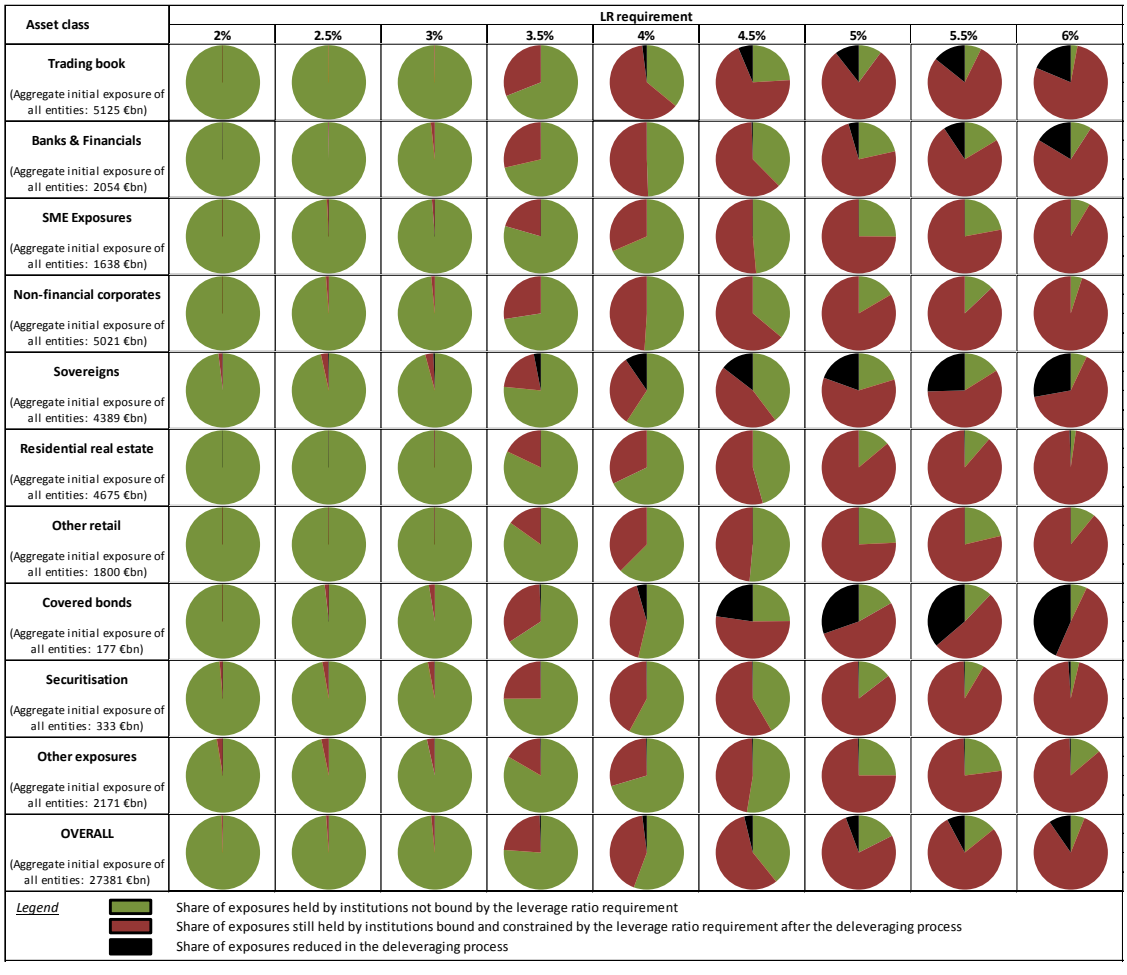
Source: EBA QIS (June 2015)

Table 27: Amount of exposure reduction and excess capacity, broken down by business models, given several LR requirements (billion EUR) – benign adjustments scenario

Business models		LR requirement								
		2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%
Cross-border universal banks	Expo. reduction	-	-	-	59	357	731	1,146	1,588	1,974
	Excess capacity	22,245	13,879	8,302	4,491	2,379	1,158	519	298	163
Local universal banks	Expo. reduction	-	-	-	24	69	127	190	276	354
	Excess capacity	6,581	4,317	2,807	1,800	1,129	686	377	220	106
Automotive, consumer credit banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	713	534	414	329	265	215	175	142	115
Building societies	Expo. reduction	-	0	0	2	3	13	26	38	47
	Excess capacity	477	293	170	87	25	3	1	0	-
Locally active savings and loan associations, cooperative banks	Expo. reduction	-	-	-	1	5	12	22	31	39
	Excess capacity	917	617	417	276	185	125	87	58	35
Private banks	Expo. reduction	-	-	-	-	-	0	1	1	1
	Excess capacity	44	30	20	13	8	5	3	1	-
Custody banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	176	139	114	96	83	73	64	58	52
Public development banks	Expo. reduction	8	19	32	42	53	62	68	74	79
	Excess capacity	888	632	479	371	300	246	202	166	137
Mortgage banks including passthrough financing mortgage banks	Expo. reduction	-	-	1	3	5	6	9	11	13
	Excess capacity	68	42	26	15	6	-	-	-	-
Other specialised banks	Expo. reduction	-	-	3	15	47	73	93	110	125
	Excess capacity	677	366	168	54	39	28	19	12	9
TOTAL	**Expo. reduction**	**8**	**19**	**37**	**145**	**539**	**1,025**	**1,557**	**2,130**	**2,632**
	Excess capacity	**32,787**	**20,849**	**12,917**	**7,531**	**4,419**	**2,537**	**1,447**	**956**	**617**

Source: EBA QIS (June 2015)

Figure 41: Overall impact of estimated exposure reductions on market segments – benign adjustments scenario



Source: EBA QIS (June 2015)

5.4.3 Results of the adverse adjustment scenario

a. General results for different LR levels

The results of the adverse adjustment scenario are somewhat similar to the results of the baseline adjustment scenario, although exposure reductions are larger. Assuming that institutions meet the LR requirement by raising a smaller share of capital of course amplifies the impact on exposure reductions. At system level, i.e. across all credit institutions in the sample, the estimated exposure reductions in the adverse scenario start to exceed the excess capacity of capital resources at LR calibration levels of 5% and above. Just as in the baseline scenario, there is, however, still some excess capacity on aggregate compared to the amount of exposure reduction at a LR of 4.5%, with a relation of 1/1.25.

b. Shortage compared to excess at a 3% LR level

As in the baseline scenario, some institutions hold less capital than required at a LR of 3%. The estimated total reduction of exposures of these institutions at a 3% LR is EUR 72 billion (see Table 28 on exposure reduction (in billion EUR) and excess capacity, per business model). This gives a relation between total estimated exposure reduction and excess capacity among institutions that already meet the LR to absorb such exposures in the system of 1/179. The relation between exposure reduction by bound institutions and excess capacity in the business models within which those institutions are categorised is 1/15, on average, for a LR of 3%. Estimated total exposure reduction is equivalent of 0.3% of the aggregate LR exposure of all institutions in the sample, which stands at EUR 27 381 billion.

c. Results by exposure class

The impact and relation of exposure reductions at different levels of calibration are quite similar to those under the baseline scenario; it is only the magnitude that differs (see section 4.3.2 for more details). In the adverse scenario, the potential reductions amount to the equivalent of 1% of institutions' total sovereign exposures and 0.5% of institutions' exposures towards 'other' asset classes under a 3% calibration (see Table 29, Figure 42, as well as Figure 43, on the overall impact on market segments). At calibration levels above 3%, the estimated impact on sovereign and trading exposures under the assumptions made regarding exposure reductions range from 5% to 29% of total sovereign exposures and from 1% to 30% of institutions' total trading book exposures.

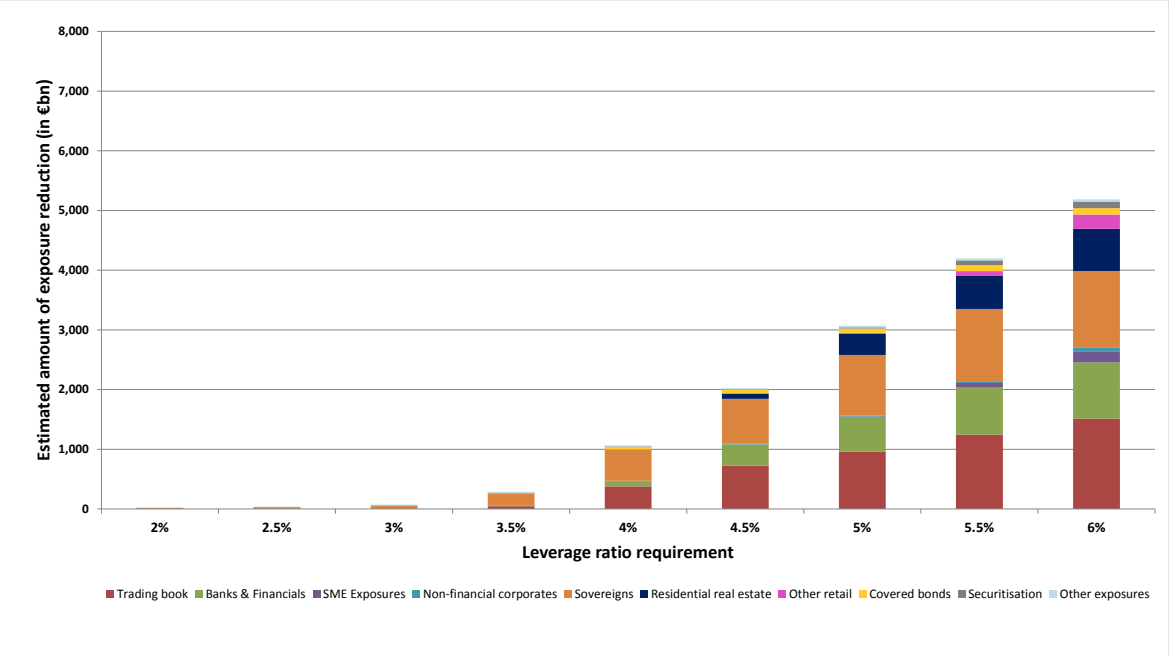
Just as in the baseline scenario, the simulation analysis results do not suggest a substantial impact of the LR on exposure classes such as SME exposures, non-financial corporates, residential real estate and other retail exposures as long as the calibration of the LR does not exceed a level of 4-4.5%. Residential real estate exposures are, however, estimated to be reduced at calibrations of 4.5% and beyond in the adverse adjustment scenario. Under differentiated calibrations, residential real estate starts to be affected at calibrations of 3.5% [+/- 1%] in the adverse adjustment scenario.

Table 28: Amount of exposure reduction, broken down by asset classes, given several LR requirements (billion EUR) – adverse adjustments scenario

	LR requirement								
Asset class	**2%**	**2.5%**	**3%**	**3.5%**	**4%**	**4.5%**	**5%**	**5.5%**	**6%**
Trading book	1	1	2	47	378	728	961	1,247	1,514
Banks & Financials	1	1	1	7	88	352	580	785	941
SME Exposures	-	-	-	-	3	3	8	77	177
Non-financial corporates	1	1	1	1	5	10	12	16	67
Sovereigns	13	24	50	204	514	752	1,018	1,224	1,289
Residential real estate	-	0	0	1	6	89	356	554	705
Other retail	-	-	-	-	0	3	15	81	240
Covered bonds	-	-	1	5	43	56	73	99	106
Securitisation	1	1	5	8	9	9	17	80	109
Other exposures	1	9	11	13	16	20	27	33	39
TOTAL EXPO REDUCTION	**17**	**37**	**72**	**286**	**1,062**	**2,021**	**3,067**	**4,197**	**5,187**

Source: EBA QIS (June 2015)

Figure 42: Amount of exposure reduction per assets class, assuming banks adjust by 50% capital raising, 50% exposure reduction (billion EUR) – adverse adjustments scenario



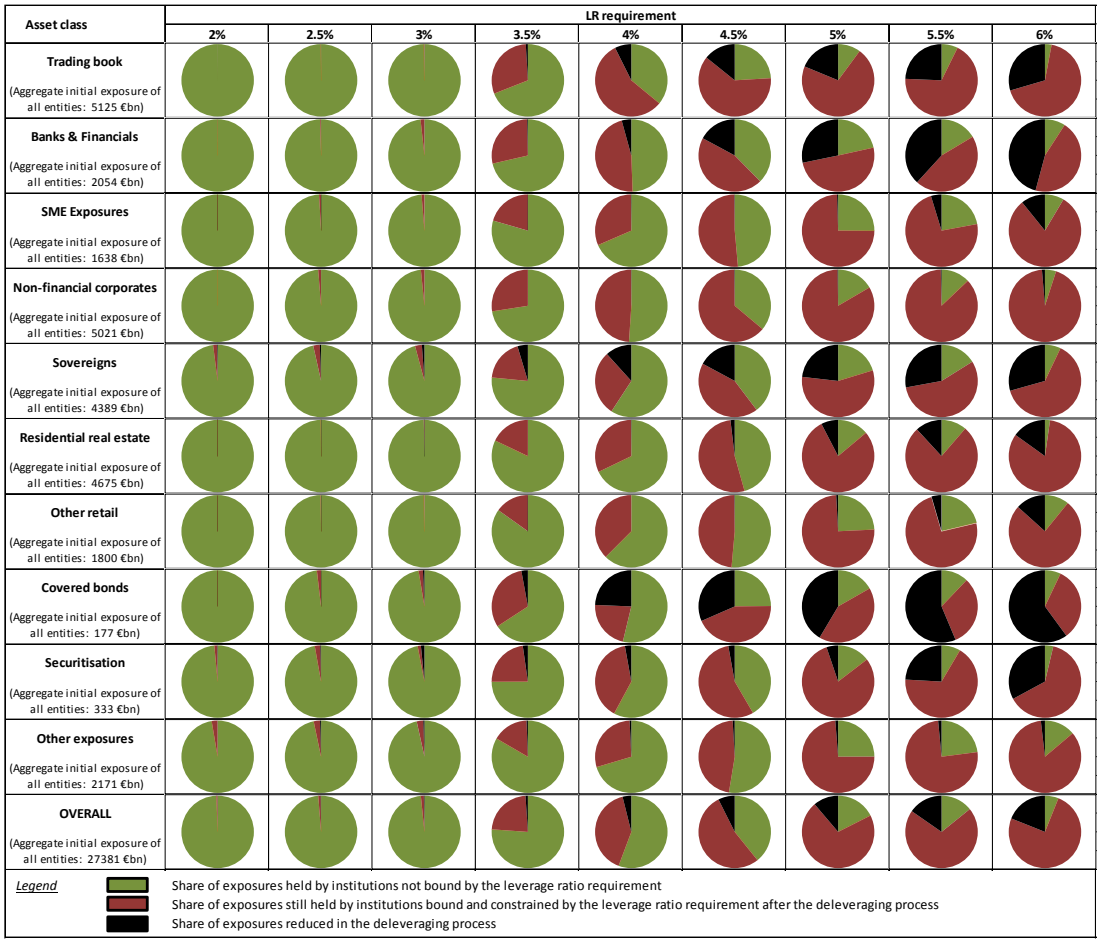
Source: EBA QIS (June 2015)

Table 29: Amount of exposure reduction and excess capacity, broken down by business models, given several LR requirements (billion EUR) – adverse adjustments scenario

Business models		LR requirement								
		2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%
Cross-border universal banks	Expo. reduction	-	-	-	116	703	1,441	2,259	3,130	3,889
	Excess capacity	22,245	13,879	8,302	4,491	2,379	1,158	519	298	163
Local universal banks	Expo. reduction	-	-	-	47	136	251	375	544	698
	Excess capacity	6,581	4,317	2,807	1,800	1,129	686	377	220	106
Automotive, consumer credit banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	713	534	414	329	265	215	175	142	115
Building societies	Expo. reduction	-	0	0	3	6	26	52	74	93
	Excess capacity	477	293	170	87	25	3	1	0	-
Locally active savings and loan associations, cooperative banks	Expo. reduction	-	-	-	2	10	24	44	61	77
	Excess capacity	917	617	417	276	185	125	87	58	35
Private banks	Expo. reduction	-	-	-	-	-	1	1	2	3
	Excess capacity	44	30	20	13	8	5	3	1	-
Custody banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	176	139	114	96	83	73	64	58	52
Public development banks	Expo. reduction	17	37	63	83	104	121	135	146	155
	Excess capacity	888	632	479	371	300	246	202	166	137
Mortgage banks including passthrough financing mortgage banks	Expo. reduction	-	-	3	7	10	13	18	23	26
	Excess capacity	68	42	26	15	6	-	-	-	-
Other specialised banks	Expo. reduction	-	-	6	29	93	143	184	217	247
	Excess capacity	677	366	168	54	39	28	19	12	9
TOTAL	**Expo. reduction**	**17**	**37**	**72**	**286**	**1,062**	**2,021**	**3,067**	**4,197**	**5,187**
	Excess capacity	**32,787**	**20,849**	**12,917**	**7,531**	**4,419**	**2,537**	**1,447**	**956**	**617**

Source: EBA QIS (June 2015)

Figure 43: Overall impact of estimated exposure reductions on market segments – adverse adjustments scenario



Source: EBA QIS (June 2015)

5.4.4 Results of extreme adjustments scenario

a. General results for different LR levels

The results of the maximum exposure reduction scenario (assuming only exposure reduction without raising any capital) show a more adverse impact on exposure reductions compared to other adjustment scenarios. At a system level, i.e. across all institutions in the sample, the estimated exposure reductions in the maximum exposure reduction scenario start to exceed the excess capacity of capital resources at LR calibration levels of 4.5%. Even in this scenario, however, there is excess capacity at an LR calibration of 4%, meaning that institutions that are not bound by the LR could, in principle, absorb expected exposure reductions (assuming no friction in transfers of exposures). The relation between expected exposure reduction and excess capacity at a 4% LR is 1/2.8.

b. Shortage compared to excess at a 3% LR level

As in all scenarios, some institutions hold less capital than required at a LR of 3%. The estimated total reduction of exposures of these institutions, at a 3% LR is EUR 108 billion (see Table 30 on exposure reduction (in billion EUR) and excess capacity, per business model). This gives a relation between total estimated exposure reduction and excess capacity among institutions that already meet the LR to absorb such exposures in the system of 1/120. The relation between exposure reduction by bound institutions and excess capacity within the business models that those institutions are categorised within is 1/10 on average for a LR of 3%. The estimated total exposure reduction is the equivalent of 0.4% of the aggregate LR exposure of all institutions in the sample, which stands at EUR 27 381 billion.

c. Results by exposure class

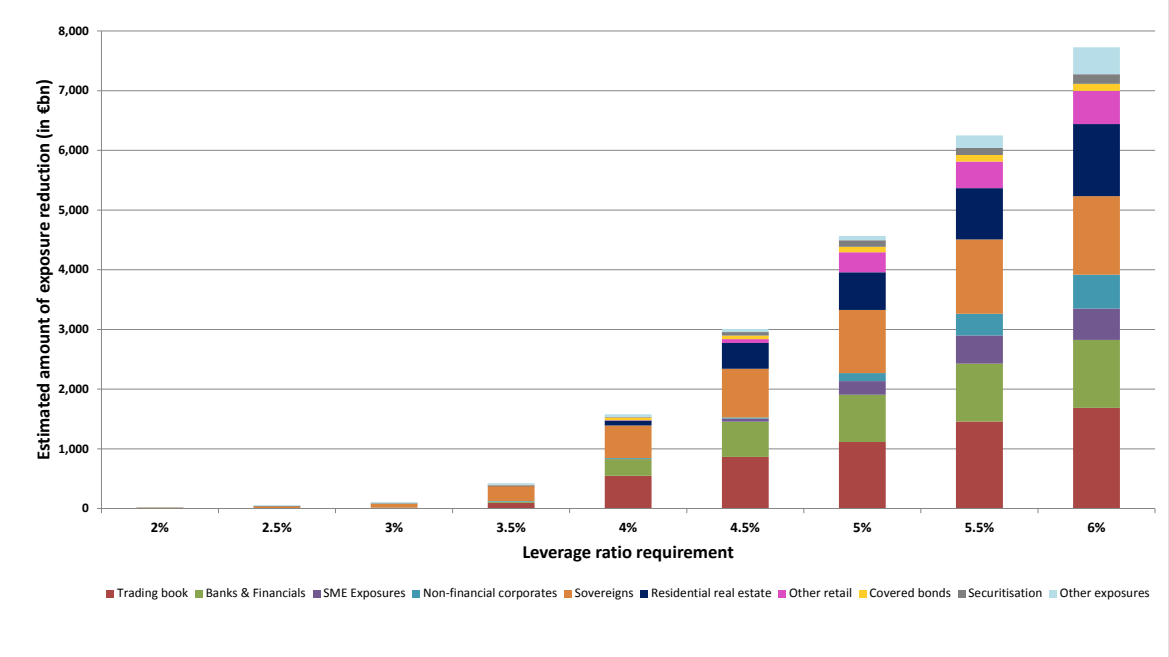
The impact and relation of exposure reductions at different levels of calibration are quite similar to those under the baseline scenario, but the magnitudes are much larger (see section 4.3.2 for more details). Assuming that bound institutions only adjust by reducing exposure gives a potential reduction amount equivalent to 1.5% of institutions' total sovereign exposures and 0.9% of institutions' exposures towards 'other' asset classes under a 3% calibration (see Table 31 and Figure 44, as well as Figure 45, on the overall impact on market segments). At calibration levels beyond 3%, the estimated impact on sovereign and trading exposures range from 6% to 30% of total sovereign exposures and from 1.8% to 33% of institutions' total trading book exposures. Covered bonds start to be affected at a LR calibration of 3% in the extreme adjustment scenario. One difference to the baseline scenario is that all exposures are estimated to be affected at calibrations of 4%, and residential real estate exposures are estimated to be significantly reduced at calibrations of 4.5% and beyond. Institutions' estimated reductions of exposures to 'banks and financials' are also quite significant beyond calibrations of 4% in the extreme adjustment scenario. Even in the most adverse adjustment scenarios, institutions are not estimated to make any significant reductions of their SME exposures below calibrations of 4%.

Table 30: Amount of exposure reduction, broken down by asset classes, given several leverage requirements (billion EUR) – extreme adjustments scenario

	LR requirement								
Asset class	**2%**	**2.5%**	**3%**	**3.5%**	**4%**	**4.5%**	**5%**	**5.5%**	**6%**
Trading book	1	2	7	93	548	866	1,114	1,457	1,687
Banks & Financials	1	1	4	21	280	589	792	971	1,137
SME Exposures	-	-	-	3	5	52	227	473	527
Non-financial corporates	1	1	1	10	12	19	136	360	567
Sovereigns	16	35	65	248	545	814	1,056	1,246	1,315
Residential real estate	-	0	0	7	84	434	632	860	1,207
Other retail	-	-	-	0	5	63	335	444	558
Covered bonds	-	-	3	6	47	61	92	111	118
Securitisation	1	5	6	9	10	58	109	120	160
Other exposures	5	12	20	28	44	50	72	208	450
TOTAL EXPO REDUCTION	**25**	**56**	**108**	**425**	**1,579**	**3,006**	**4,566**	**6,249**	**7,725**

Source: EBA QIS (June 2015)

Figure 44: Amount of exposure reduction per assets class, assuming banks adjust by 50% capital raising, 50% exposure reduction (billion EUR) – extreme adjustments scenario



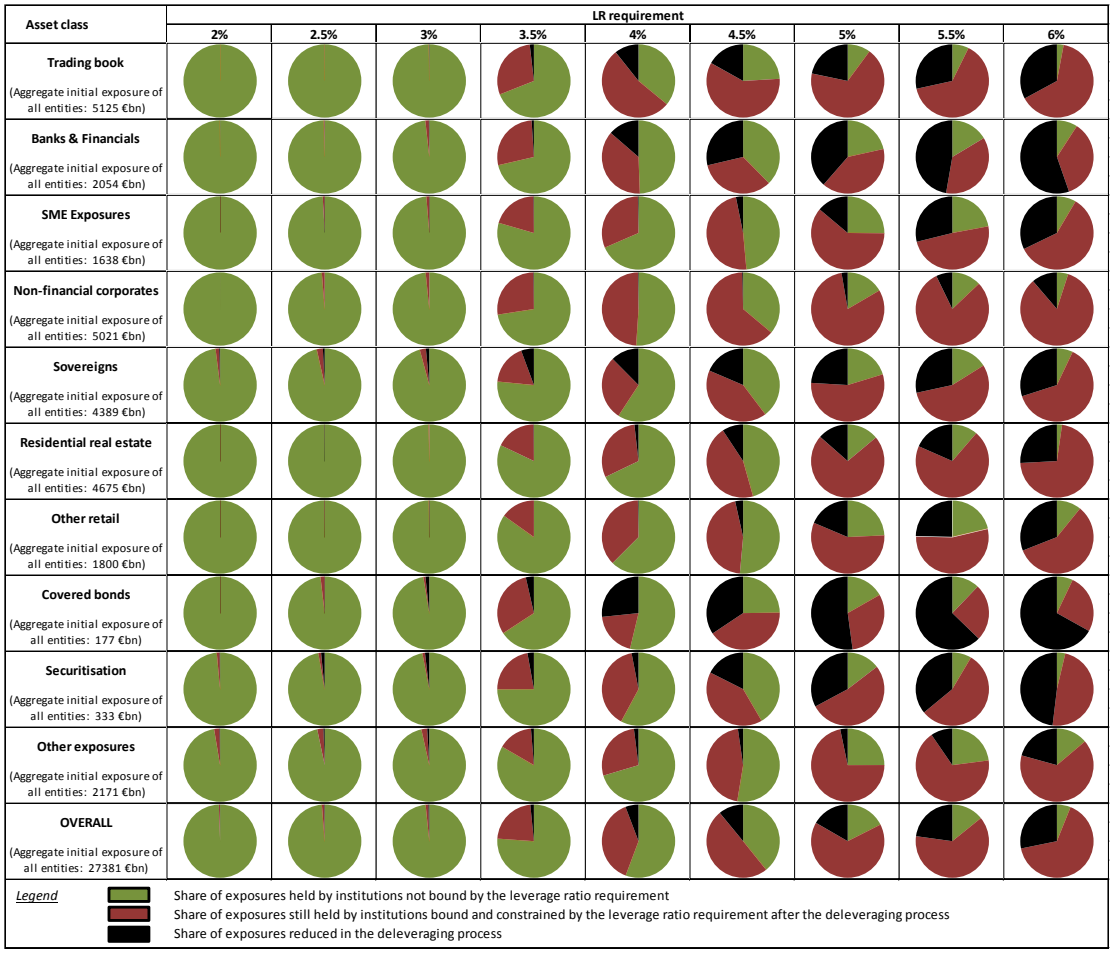
Source: EBA QIS (June 2015)

Table 31: Amount of exposure reduction and excess capacity, broken down by business models, given several LR requirements (billion EUR) – extreme adjustments scenario

Business models		LR requirement								
		2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%
Cross-border universal banks	Expo. reduction	-	-	-	173	1,049	2,151	3,371	4,672	5,805
	Excess capacity	22,245	13,879	8,302	4,491	2,379	1,158	519	298	163
Local universal banks	Expo. reduction	-	-	-	70	203	375	559	812	1,042
	Excess capacity	6,581	4,317	2,807	1,800	1,129	686	377	220	106
Automotive, consumer credit banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	713	534	414	329	265	215	175	142	115
Building societies	Expo. reduction	-	0	0	5	9	39	78	111	139
	Excess capacity	477	293	170	87	25	3	1	0	-
Locally active savings and loan associations, cooperative banks	Expo. reduction	-	-	-	2	15	36	66	92	115
	Excess capacity	917	617	417	276	185	125	87	58	35
Private banks	Expo. reduction	-	-	-	-	-	1	2	3	4
	Excess capacity	44	30	20	13	8	5	3	1	-
Custody banks	Expo. reduction	-	-	-	-	-	-	-	-	-
	Excess capacity	176	139	114	96	83	73	64	58	52
Public development banks	Expo. reduction	25	56	94	122	149	171	188	203	214
	Excess capacity	888	632	479	371	300	246	202	166	137
Mortgage banks including passthrough financing mortgage banks	Expo. reduction	-	-	4	10	14	19	27	34	39
	Excess capacity	68	42	26	15	6	-	-	-	-
Other specialised banks	Expo. reduction	-	-	9	43	139	214	274	324	368
	Excess capacity	677	366	168	54	39	28	19	12	9
TOTAL	**Expo. reduction**	**25**	**56**	**108**	**425**	**1,579**	**3,006**	**4,566**	**6,249**	**7,725**
	Excess capacity	**32,787**	**20,849**	**12,917**	**7,531**	**4,419**	**2,537**	**1,447**	**956**	**617**

Source: EBA QIS (June 2015)

Figure 45: Overall impact of estimated exposure reductions on market segments – extreme adjustments scenario



Source: EBA QIS (June 2015)

6. Impact on trade finance

6.1 Summary section

OBJECTIVES OF THE SECTION

- Article 511(4)(a)(ix) of the CRR requires the EBA to assess the impact of the LR on trade finance.

METHODOLOGY

- As trade finance is particularly hard to capture quantitatively – it is a collection of different types of exposures and the CoRep reporting framework does not have the granularity to isolate trade finance from non-trade finance – this report describes this category and the impact of the LR by qualitative means.

KEY FINDINGS

- In terms of impact of the LR on trade finance, there are no data available to perform an informative analysis, including exposures of credit institutions backed by ECAs. However, on the basis of interaction with representatives of the trade finance industry, it was understood that trade finance products typically carry risk weights which imply that the LR would not have a constraining effect on trade finance activities in general. One exemption may be ECA-backed exposures, which typically attract a very low risk weight.

6.2 Description of trade finance

Chapter 6 of the EBA report on NSFR requirements under Article 510 of the CRR (EBA/Op/2015/22) of 15 December 2015 provides an overview of the various types of trade finance and their characteristics.[112] Based on feedback after its publication from some industry representatives, the following comments can be added:

Regarding section 6.2.1 of the NSFR report (the definition of 'Trade credit insurance'), the qualification can be made that 'trade credit insurance' is not a product per se, but instead refers to a structure where a trade asset is 'insured' by trade credit insurance (credit risk mitigation with unfunded credit protection).

Regarding section 6.2.3 of the NSFR report (the definition of 'Bank guarantee'), the definition could be narrowed by clarifying that it only relates to trade-related guarantees.

Regarding section 6.2.4 of the NSFR report (the definition of 'Loans for export/import'), the qualification is made that letter of credit discounting, instead of being a form of loans for export, could also be considered separately.

Regarding section 6.2.5 of the NSFR report (the definition of 'Factoring/Forfaiting'), an additional point that could be mentioned is the 'Standard Definitions for Techniques of Supply Chain Finance'.[113] This outlines industry-agreed definitions for factoring and forfeiting and describes techniques used for supply chain finance.

6.3 Treatment of trade finance in the LR

In terms of the treatment of trade finance products for the purposes of the LR as under the CRR, the on-balance-sheet part of these products are fully reflected in the LR exposure measure. To the extent that the trade finance products are off-balance sheet, Article 429(10) clarifies that the conversion factors (CCF) of Article 111(1) of the CRR apply subject to a floor equal to 10% of their nominal value. This means that off-balance-sheet items classified as 'Medium risk' in Annex 1 of the CRR (e.g. 'trade finance off-balance sheet items, namely documentary credits issued or confirmed and shipping guarantees, customs and tax bonds' and 'undrawn credit facilities […] with an original maturity of more than one year') receive a 50% CCF, and items classified as 'Low/Medium risk' in Annex 1 of the CRR (e.g. 'documentary credits in which underlying shipment acts as collateral and other self-liquidating transactions', 'warranties […] and guarantees not having the character of credit substitutes', 'irrevocable standby letters of credit not having the character of credit substitutes') receive a 20% CCF.

[112] http://www.eba.europa.eu/documents/10180/983359/EBA-Op-2015-22+NSFR+Report.pdf.

[113] Standard Definitions for Techniques of Supply Chain Finance. Bankers Association for Finance and Trade (BAFT), the Euro Banking Association, Factors Chain International (FCI), Internationanl Chamber of Commerce (ICC) and the International Trade and Forfaiting Association (IFTA). 2016

It is noteworthy that these CCFs, including those relating to trade finance, are also applied under the CRR within the Standardised Approach for credit risk to adjust the exposure measure before the application of risk weightings for the purposes of calculating RWA.

6.4 Specific characteristics of ECA financing

One category of trade finance exposures is those guaranteed by state-backed ECAs. ECA financing (as also discussed in section 6.9 of the NSFR report) serves the purpose of providing credit protection or, in some cases, direct financing (along with other primary lenders) for projects or export transactions. In 2015, the total commitments of European ECAs at year end amounted to USD 330 billion, of which 0.04% consists of direct financing.[114] ECA instruments include guarantees, credit insurance and loans provided to foster the manufacturing and export of goods.

It is also noteworthy that an ECA-covered transaction (before being fully on balance sheet) is usually committed from the first day the transaction is made, although the payout happens over time. It is understood that this initial phase can easily take 2 to 3 years, during which time a CCF of 50% applies to the commitment for the purposes of the LR calculation (given the long-term nature of these transactions the original maturity is greater than 1 year).

The type of risk protection can vary. ECAs usually cover the political risk in a high proportion and also cover commercial risks.

The percentage taken into account for a comprehensive cover is the minimum percentage covered under political risk and commercial risk. It should be noted that there are additional technical differences between insurance and guarantees which may impact the level of coverage and the mechanisms to trigger and collect a claim. The protection provided by an ECA not only extends to principal payments but also to interest payments due under the transaction.

6.5 Conclusion

In terms of the impact of the LR on trade finance, there are no data available to perform an informative analysis, including exposures of credit institutions backed by ECAs. However, on the basis of interaction with representatives of the trade finance industry, it is understood that trade finance products typically carry risk weights which imply that the LR (including the applicable CCFs which are aligned with those used within the Standardised Approach for credit risk) would not have a constraining effect. One exemption may be ECA-backed exposures, which typically attract a very low risk weight.

[114] Berne Union estimates as provided to the EBA.

7. Impact on risk-taking and the robustness of institutions

7.1 Summary section

OBJECTIVES OF THE SECTION

- Article 511(4)(a)(ii) of the CRR requires the EBA to assess the impact of introducing an LR requirement on the 'robustness of institutions'. Furthermore, Article 511(4)(a)(iv) of the CRR requires the EBA to assess the impact of introducing an LR requirement on 'institutions' risk-taking behaviour'. This section addresses both these concerns and, in particular, assesses the relative importance of these potential impacts.

METHODOLOGY

MAIN METHODOLOGICAL STEPS

- A methodology similar to that of Grill et al. (2015) is used in order to investigate the impact of a LR requirement on both robustness and risk-taking. The methodology proceeds in three stages:
    - In the first stage, a unique dataset of bank distress events is used in a logit model to analyse the relationship between the LR and risk-taking (proxied by the RWA to total assets ratio) on bank stability.
    - In the second stage, the impact of an LR requirement on risk-taking is analysed. A key methodological concern was to identify whether shifts in risk can be attributed to an LR requirement. This is achieved via a difference-in-difference type analysis.
    - The last stage of the empirical exercise takes the results from the two previous stages and performs a counterfactual simulation. The simulation asks whether if banks increase both their risk and LRs at the same time, which effect dominates?

DATA SOURCE AND COVERAGE

- The dataset covers approximately 300 institutions from 27 EU countries for the period 2005-2014. The sample of institutions is determined by data availability across the variables required for the analysis. The database is an unbalanced panel, meaning that institutions drop into and out of the dataset at different time periods depending on data availability and the entry or exit of some institutions over the period.
- The annual dataset combines information from various sources. Institution-specific variables from publicly available annual balance-sheet and income-statement data are

obtained through SNL Financial and Bloomberg. Banking sector aggregate variables are obtained from the ECB Statistical Data Warehouse. Data on macrofinancial variables which appear as controls in the regression models are also sourced from the ECB's Statistical Data Warehouse. The dataset of bank distress events captures all incidents of institution bankruptcies, debt defaults, liquidations, distressed mergers and state-aid recipients as identified in Betz et al. (2014).

KEY FINDINGS

IMPACT ON RISK-TAKING

- The empirical results reveal a very moderate increase in risk-taking at credit institutions with LR levels below 3% after 2010, the year when the BCBS announced the LR as a new prudential measure and communicated 3% as a tentative target. At the same time, the LR, in combination with other prudential measures, initiated a substantial strengthening in the capital position of these entities.

IMPACT ON ROBUSTNESS

- In terms of overall robustness, the results also suggest that the positive effects of an increase in bank LRs significantly outweigh the negative effects of the observed increase in risk-taking and should therefore lead to more stable credit institutions overall. The positive effects on overall bank stability were observed for calibration levels of the LR ranging from 2% to 5%.

7.2 Methodological motivation – theoretical channels and literature

Article 511(4)(a)(ii) of the CRR requires the EBA to assess the impact of introducing the LR as a requirement on the 'robustness of institutions'. Furthermore, Article 511(4)(a)(iv) of the CRR requires the EBA to assess the impact of introducing the LR as a requirement on 'institutions' risk-taking behaviour'. This section addresses both these concerns, and in particular assesses the relative importance of these potential impacts.

The proportion of institutions whose minimum capital requirements increase on the introduction of an LR requirement depends on the relative calibration of the LR and risk-weighted capital requirements. Assuming that the LR requirement is calibrated at such a level that it increases the capital requirement for some institutions, one effect of introducing an LR requirement for these institutions would be an increase in their loss-absorbing capacity, meaning that they are likely to be able to withstand greater negative shocks while remaining a going concern. Furthermore, by the nature of capital, any losses that do occur bear more on the bank's capital holders rather than depositors. In this way, an LR requirement should increase the resilience of institutions with relatively low capital requirements at present. Empirical evidence has shown that banks with higher capital levels are more likely to survive a financial crisis (Berger and Bouwman, 2013) and that capital ratio levels are an important indicator of bank distress (e.g. Estrella et al., 2000; Betz et al., 2013). Haldane and Madouros (2012) shows that simple-weighted measures such as a LR have greater pre-crisis predictive power than risk-weighted alternatives.

However, there is also some literature on the possibility of an LR requirement incentivising banks to take on more risk, since it is costly for them to raise or retain capital (relative to debt financing); see for example Grill et al. (2015) and Kiema and Jokivoulle (2014). An institution's business model and the strategic decisions of its management will influence its portfolio decisions and the composition of its exposures. In economic theory, the objectives of a bank's management are usually summarised as a desire to maximise profits subject to various constraints. This is clearly a simplification of the objectives of individual banks; however, it is possible to make economic models more realistic through the specification of the constraints within which the institution is acting.[115] All banks, building societies and investment institutions that are within the scope of the CRR also operate subject to regulatory constraints, including regulatory capital requirements. Assuming that it is costly for an institution to issue or retain capital, in a system in which regulatory capital requirements are only determined by a risk-weighted capital framework, there exists an incentive for an institution to maximise profits in such a way that exposes them to the least amount of risk in order to minimise capital requirements. On the other hand, in a system in which regulatory capital requirements are only determined by a non-risk-weighted framework (i.e. an LR requirement), there is no advantage to minimising the amount of risk an institution takes on, since it has to have a certain amount of capital for a given sized balance sheet, regardless of the riskiness of its assets. Instead, if an institution wants to maximise its profits or

[115] For example, it would be possible to model the asset-side limitations of an institution which has a commitment to offering its client base certain kinds of services.

profitability subject to constraints including an LR requirement, it would have an incentive to invest in more risky assets, since these often yield greater returns and there would be no additional regulatory capital requirement. In a capital framework that uses both a risk-weighted and an LR requirement, theoretically the incentive would be for an institution to increase risk-taking while it is constrained by the LR requirement but to minimise it once the risk-weighted capital requirement becomes the constraining requirement. In fact, there may be a sweet spot at which both requirements are equal.

Several papers have suggested that there exists a positive relationship between capital and bank risk-taking (see, for example, Shrieves and Dahl (1992), Aggarwal and Jacques (2001), Rime (2001) and Jokipii and Milne (2011)). Nevertheless, capital and risk are inextricably linked and, thus, identification is not easy. As such, the picture is not clear; for instance, Jacques and Nigro (1997) find a negative relationship between risk and capital.

These two potential effects on institutions constrained by an LR requirement – increased capital and therefore resilience to losses, but increased investment in risky activities by the institution's management – act in opposite directions on the probability that an institution makes losses that exceed its capital.

Furthermore, the simplified description/modelling of banks' behaviour outlined above ignores other behavioural effects which have been identified in other areas of the literature on bank behaviour and more broadly in corporate finance. For example, there is a well-known 'skin-in-the-game' effect, whereby institutions take fewer risks when they put up a greater amount of investment capital or believe there is a high chance of potential future returns if the institution continues to exist as a going concern (see Hellman et al. (2000) and Repullo (2004)). To the extent that an LR requirement increases an institution's capital base, an institution will be able to withstand greater losses and continue to function. According to the 'skin-in-the-game' effect, theoretically, the institution's management should put more weight on the potential returns the institution can generate in future periods and therefore should have a lower incentive to take big risks to maximise expected profits in the short-term. Also, there is a natural limit to the amount of risk a bank can take before it will become constrained by the risk-weighted framework rather than the LR requirement. These additional effects could reduce any risk-taking incentives of an LR requirement.

There is another relevant branch of the theoretical literature which suggests that the risk insensitivity of the LR requirement can be beneficial when not all parties can perfectly assess the riskiness of a bank's assets. For example, if institutions have more information on the riskiness of their assets than regulators, some literature suggests that the LR requirement has a positive effect on institutions' incentives to disclose the true riskiness of their assets, thereby improving bank stability. For example, Blum (2008) sets up an 'adverse selection' model in which institutions know the true level of risk of their investments, which they must report to the regulator; as the regulator is able to inspect their balance sheets, banks are more likely to report their true risk levels. Should it be determined that a bank has understated its risk (in order to benefit from a lower risk-adjusted capital ratio), the regulator is able to fine the bank. Blum shows that truth telling increases in line with probability of inspection and the size of the potential fine. He then shows that introducing a non-risk-based capital ratio improves truth telling incentives because it

reduces the marginal benefit of concealing risk-levels. Rugemintwari (2011) similarly expands on this truth-telling idea to suggest that a LR can be used as a supplement to risk-adjusted capital ratios when the regulator's ability to detect bank misreporting and its sanction enforcement is relatively weak.

It is also possible that the insensitivity of an LR requirement can improve bank stability when assets' true riskiness is not known by institutions or regulators. Kiema and Jokivoulle (2014) build a model of a competitive banking sector with a risk-weighted capital requirement combined with a LR requirement. They show that the introduction of a LR requirement can induce formerly low-risk banks to increase risk-taking because equity is costly; however, in the presence of model risk, which arises if some loans get incorrectly rated, a LR can improve stability due to the presence of a greater capital buffer should these mispriced loans become toxic. Grill et al. (2015) argue similarly. They show that because equity is costly, imposing a non-risk-based LR requirement can incentivise greater risk-taking, because it effectively lowers the cost of taking risk. Nevertheless, they also show that this increase in risk-taking should be relatively small and outweighed by enhanced loss-absorbing capacity.

Overall, therefore, introducing an LR requirement could potentially improve system resilience. To consider this in more detail, this section looks for empirical evidence on the size of the different channels, ultimately to see which dominates in practice. The analysis presented here builds on the work of Grill et al. (2015) who were the first to explicitly try and measure/take account of both the resilience and risk-taking channels empirically.

7.3 Methodology and data

A methodology similar to that of Grill et al. (2015) is used in order to investigate the impact of a LR requirement on both robustness and risk-taking. The methodology proceeds in three stages. In the first stage, a unique dataset of bank distress events is used in a logit model to analyse the relationship between the LR and risk-taking (proxied by the RWA to total assets ratio) on bank stability. To ensure the relationship is properly estimated, various relevant bank-specific and country-level variables are controlled for.

In the second stage, the impact of an LR requirement on risk-taking is analysed. A key methodological concern of the study was to ensure that shifts in risk appetite that are caused by the LR can be captured in isolation, without being influenced by other factors (e.g. macroeconomic or adjustment in the measurement of RWA). This has been achieved via a difference-in-difference type approach in which the introduction of an LR is taken as a treatment. In particular, the methodology groups institutions that have been above or below a certain LR threshold (e.g. 3%) as those that will be affected by an LR introduction (i.e. treated) and those that will not (non-treated). Since those above the threshold are less likely to be affected by the introduction of the LR, they form a ready control group against which the other treated group (which are affected by the LR introduction) can be compared.

The last stage of the empirical exercise takes the results from the two previous stages and performs a counterfactual simulation. Using the model from the first stage, distress probabilities for banks below the LR threshold are simulated using the underlying data. For these banks, the following exercise is then performed: (1) their LRs are increased to the required minimum; (2) their RWA ratio is increased by the amount estimated in stage two (and up to six times this amount for robustness). New distress probabilities are then simulated and the before and after adjustment probabilities are compared to see if on average distress probabilities significantly decline when banks are forced to increase their LRs, but at the same time, they increase their risk. This exercise is performed for a 2%, 3%, 4% and 5% LR minimum.

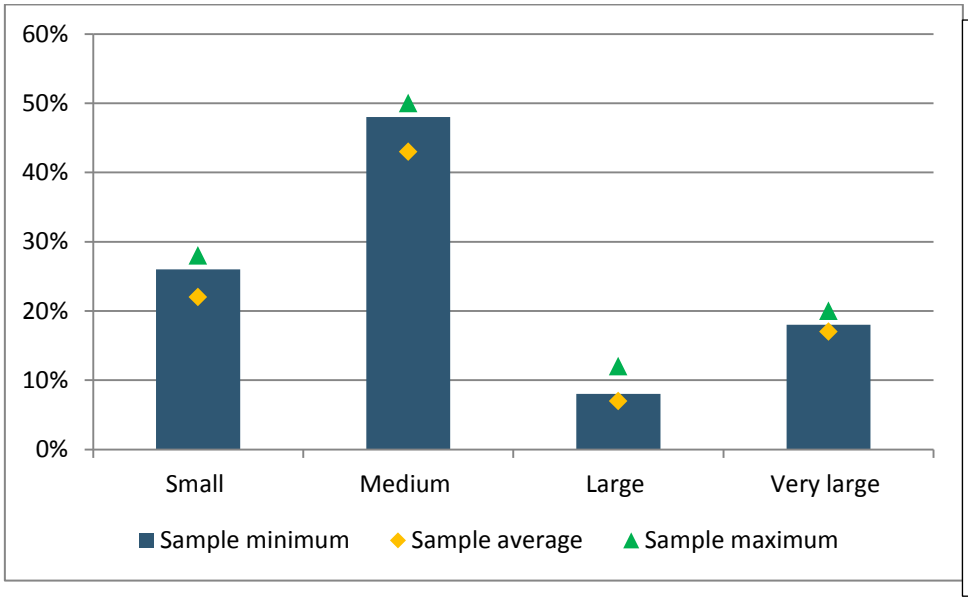
The results suggest firstly that the LR is a much more important indicator of bank distress than risk-taking, secondly that the risk-shifting incentives imposed by a LR are small, and thirdly that banks can increase risk-taking by much more than estimated and distress probabilities will decline significantly.

7.3.1 Data

A dataset of approximately 300 institutions from 27 EU countries for the period 2005-2014 has been used. The sample of institutions is determined by data availability across the variables required for the analysis. The database is an unbalanced panel, meaning that institutions drop into and out of the dataset at different time periods depending on data availability and the entry or exit of some institutions over the period.

Figure 46 shows the composition of institutions in the sample based on their balance-sheet size. The chart shows that the majority of institutions are medium-sized or small, with a significant number of very large institutions.

Figure 46: Sample composition by balance-sheet size



Asset-based criteria for size classifications

Small:
Assets ≤ €10 Bn

Medium:
€10 Bn < Assets ≤ €100 Bn

Large:
€100 Bn < Assets ≤ €200 Bn

Very large:
Assets ≥ €200 Bn

Source: Banks' financial statements

The dataset combines information from various sources. Institution-specific variables from publicly available annual balance-sheet and income-statement data are obtained through SNL Financial. Banking sector aggregate variables are obtained from the ECB Statistical Data Warehouse. Data on macrofinancial variables which appear as controls in the regression models are also sourced from the ECB's Statistical Data Warehouse. The dataset of bank distress events captures all incidents of institution bankruptcies, debt defaults, liquidations, distressed mergers and state-aid recipients identified as in Betz et al. (2013).

It was not possible to use the BCBS QIS reporting data for this part of the impact analysis. The QIS data returns are available only from June 2011, which gives an insufficient time series for the analysis proposed here. In order to assess whether risk-taking behaviour has changed significantly for banks that are below a certain LR, it is necessary to have data before the occurrence of any LR announcements in order to account for pre-announcement behaviour that is unrelated to the introduction of an LR. Furthermore, in order to perform the statistical tests described in Sections 7.4 and 7.5 it was necessary to use institution-level data which are not available in the QIS dataset, most notably, the information on institution failures and distress events. Since the QIS data are submitted to the BCBS in an anonymised format, it would not have been possible to match institutions across datasets. Furthermore, due to these data limitations, it was not possible to use the BCBS 2014/CRR DA definition of leverage exposures in calculating the LR. Instead, the ratio of Tier 1 capital to total accounting assets is used as the closest possible proxy for EU institutions.

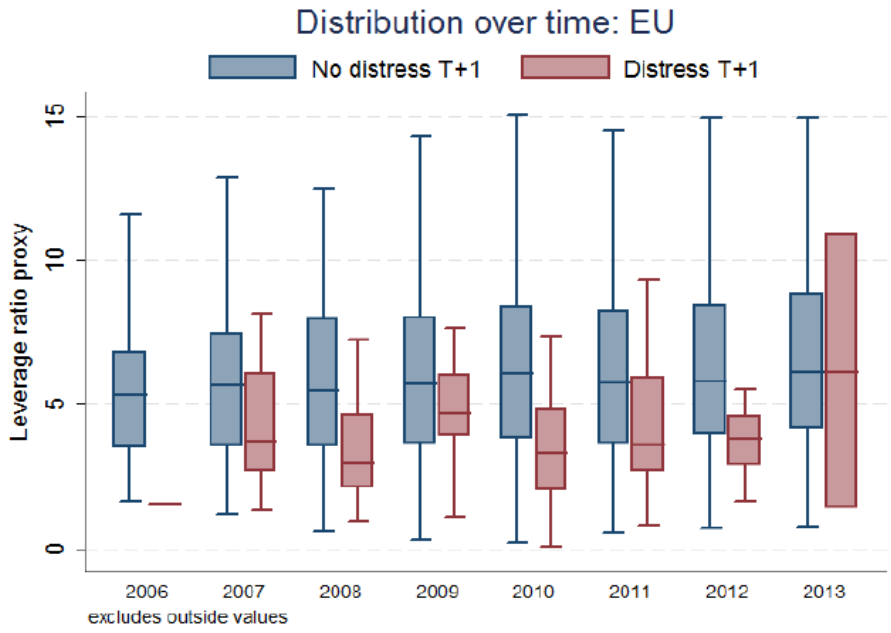
7.3.2 Control variables

In order to identify the potential LR impact on robustness and risk-taking, it is necessary to control for other potential determinants so as not to wrongly attribute changes in risk-taking or robustness to the LR. Broadly, it is necessary to control for factors that capture institution-specific variation and for macrofinancial factors that capture environmental factors for all institutions in an economy. In all regressions, control variables are lagged by one period to avoid endogeneity concerns, in case variation in the dependent variable leads to variation in the independent variables rather than vice versa. For indicator variables (which take the value 1 or 0), the control is based on the value of the variable in the previous period, again to prevent endogeneity concerns. The following institution-specific variables are included in each regression: balance-sheet size (measured via the logarithm of total assets), since it is assumed that the size of the institution may impact its riskiness; profitability (measured via pre-tax return on assets), since it is anticipated that there is a relationship between an institution's recent profitability and its risk; the liquid asset ratio (liquid assets to liabilities) which is a simple proxy of an institution's LCR and which is included to capture any relationship between a liquid balance sheet and distress; and the LR (measured as Tier 1 capital to total assets) to control for the amount of leverage on an institution's balance sheet. Aside from the potential impact of being bound by the target LR, it could be expected that changes in leverage are correlated with changes in risk, for instance, if institutions improve their capitalisation when they take on additional risk. In the risk-taking analysis, it is also introduced as a squared value to allow for a non-linear impact on risk-taking. The following macrofinancial variables are also included in all regressions to control for the environment: year-on-year real GDP growth, the nominal yield on 10-year government bonds as a measure of the monetary environment, and stock market growth. Other bank-specific controls, such as variables to capture different business models (e.g. proportion of domestic versus foreign loans) were also experimented with, but were limited by data availability across the sample of institutions.

7.4 Robustness of institutions

In order to analyse the resilience of institutions, the relationship between a bank's LR and the probability of its subsequent distress or failure was investigated. Figure 47 compares the distribution of LRs in each year between institutions that experienced distress in the following period and those that did not. It suggests that the distributions are different and that, on average, institutions with lower LRs faced distress more frequently than those with higher LRs.

Figure 47: Distribution of LRs for institutions which experienced distress in the following period and those which did not



Source: Banks' financial statements

However, it is not possible to draw conclusions from Figure 47 since there are many factors other than the LR which may have driven the difference between the outcomes and thus helped to determine the likelihood that they will face distress or failure in the near future. As a result, a discrete choice modelling framework, a logit regression model, is used to analyse the joint effects of the LR and risk-taking on bank stability. To ensure this relationship is properly estimated, we control for several bank-specific and country-level variables and also include country and time fixed effects. This allows the relationship between the binary variable (i.e. whether an institution is distressed or not) and other variables to be modelled, in particular whether the LR affects the probability that an institution will face distress.

A total of five model specifications were estimated. Models 1 and 2 are the most parsimonious models and use very similar control variables as the risk-taking model in the next section. Model 2 is the same as Model 1 but contains an additional variable, namely the interaction between the LR and a GSIB indicator variable. Model 3 is a more complete specification for Model 1; it includes more controls for other variables that could potentially impact distress probabilities. Model 4 is

the same as Model 3 except that it looks at the impact of including the Tier 1 risk-weighted capital ratio (RWCR) rather than the LR. Model 5 includes both the LR and RWCR; this allows for a comparison of the explanatory power of the two solvency measures (a so-called 'horse race').

Table 32: Global results

Dependent variable: Logarithm of the odds ratio for bank distress or failure[116]					
VARIABLES	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
LR	-0.308***	-0.383***	-0.404***		-0.294***
	(0.117)	(0.128)	(0.149)		(0.0933)
LR interacted with GSIB indicator		-0.138			
		(0.148)			
Tier 1 RWCR				-0.196**	-0.103
				(0.0999)	(0.0909)
RWA/TA	0.00956	0.00740	0.00865		
	(0.0150)	(0.0163)	(0.0189)		
Balance-sheet size proxy	0.398***	0.393***	0.341***	0.368***	0.328***
	(0.101)	(0.0950)	(0.0976)	(0.0925)	(0.0960)
Liquid assets to liabilities	-0.0167*	-0.0263***	-0.0219**	-0.00871	-0.0184*
	(0.0100)	(0.0100)	(0.0111)	(0.0104)	(0.0111)
Non-performing loans/Total loan		0.0235	0.0255	0.00745	0.0207
		(0.0212)	(0.0201)	(0.0207)	(0.0195)
Interest expenses to liabilities			0.105*	0.0983*	0.103*
			(0.0602)	(0.0567)	(0.0592)
Pre-tax Return on Assets	-0.194***	-0.137**	-0.129*	-0.147**	-0.0985
	(0.0638)	(0.0695)	(0.0706)	(0.0745)	(0.0785)
Amortised loans/Deposits			0.00135*	0.00184***	0.00154**
			(0.000706)	(0.000709)	(0.000734)
Real GDP growth	-0.219**	-0.317***	-0.277*	-0.245*	-0.270*
	(0.105)	(0.123)	(0.148)	(0.145)	(0.149)
10-year yield	-0.0251	-0.0665	-0.245**	-0.245**	-0.232*
	(0.0891)	(0.104)	(0.125)	(0.117)	(0.129)
Stock market growth	-0.00253	0.0114	9.97e-05	-0.00187	0.00251
	(0.0115)	(0.00985)	(0.0106)	(0.0104)	(0.0109)
Change in unemployment rate			0.628***	0.676***	0.617***
			(0.205)	(0.186)	(0.198)
Growth in credit to GDP			0.0390	0.0409	0.0386
			(0.0296)	(0.0288)	(0.0296)
Inflation			-0.443**	0.368*	-0.469**
			(0.196)	(0.212)	(0.215)
Constant	-	-4.545**	-5.597**	-5.400***	-4.710***

[116] The odds ratio = $p/(1-p)$, where p is the probability of bank distress or failure and, therefore, $1-p$ is the probability of no distress or failure. A higher odds ratio therefore represents a higher probability of distress or failure. The dependent variable is the logarithm of the odds ratio due to the nature of the set-up of logit regression models.

	4.373***				
	(1.305)	(1.780)	(2.402)	(1.460)	(1.729)
Observations	1 656	1 394	1 363	1 383	1 361
Pseudo R2	0.268	0.294	0.330	0.323	0.337

Notes: All regressors are lagged by one period. Robust standard errors in brackets
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

The results suggest that the LR is a good measure and predictor of institution resilience. In all models, the LR appears to be a very important explanatory variable for distress probability (both statistically and economically). For example, taking the results from Model 3, they suggest that increasing a bank's LR by 1 percentage point is associated with a 33% reduction in the relative probability of distress or failure (the odds ratio). Furthermore, as can be seen from models 4 and 5, while the Tier 1 risk-based capital ratio is negative and significant without a simple LR (model 4), once a simple LR is introduced into the regression, the Tier 1 risk-based capital ratio ceases to play an important role as an indicator of distress; its coefficient becomes insignificant. This seems to support previous findings (such as Betz et al. (2013) and Haldane and Madouros (2012)) which have suggested a simple LR is a more important indicator of bank distress than risk-based capital ratios.

Nevertheless, the results also point to a potential concern from an LR requirement. In all models in which it is included[117], RWA/TA is positively associated with distress probabilities, i.e. institutions with higher RWA/TA ratios may be more likely to face distress or fail. This suggests that if forcing banks to have higher LRs also incentivises them to increase their risk-taking, it may be that the benefit to resilience from higher LRs is outweighed by this counteracting effect. This risk-taking channel thus warrants a closer analysis and hence this section will now investigate whether there is evidence of this risk-taking channel in the EU since the LR was proposed as a capital and disclosure requirement.

[117] RWA/TA is not included in the models in which RWCR is also included due to multicollinearity.

7.5 Risk-taking

The aim is to see whether imposing a non-risk-based LR requirement increases banks' risk-taking. To test this, an innovative strategy has been employed which borrows from an area of the statistical literature which deals with 'programme evaluation' – the assessment of data to answer questions about the effectiveness of different policies, projects and programmes. The main premise is to control access to the policy of interest and then compare the outcomes of a group of participants (depending on the project, these could be individuals, institutions, countries, etc.) that was subject to the policy and a group that was not. The group subject to the policy is often referred to as the 'treatment' group, and the group which is not subject to the policy is referred to as the 'control' group. In this case, having to adapt to a LR requirement is the 'treatment'. Using the kinked structure of capital requirements under a combined risk-based and LR framework, it is possible to carve out treatment and control groups:

- institutions with LRs below the target make up the treatment group;
- institutions with LRs above the target make up the control group.

In this way, the target LR is the threshold determining the two groups. Since the LR requirement is not yet a mandatory requirement, it is necessary to rely on the assumption that institutions anticipate forthcoming requirements and react/adjust their behaviour in advance; market and supervisory intelligence and data appear to support this for many EU institutions. It has been assumed that banks started to factor in a future LR requirement and to adjust their balance sheets, if necessary, from the time that policymakers' desire to introduce an LR standard became clear. Specifically, in the baseline case, a treatment start date of 2010 and Tier 1 LR target of 3% is used, in reference to the initial Basel rules and press releases and the decision to test a minimum Tier 1 LR of 3% until 1 January 2017.[118] This is the baseline case, however, and to test the robustness of the results to this assumption, different start dates and target LRs have also been tested.

The outcome of interest is to measure the change in an institution's risk-taking, in particular whether they increase their risk-taking behaviour (i.e. 'risk-shift'). There is not a unique indicator of institution risk-taking or a definite way to capture it empirically; as a result, the most direct measure of a bank's risk-taking, namely the change in the ratio of an institution's RWA to total assets (RWA/TA) (an estimate of the institution's portfolio average risk weight), is used. This will capture whether institutions are, on average, investing in assets that are identified in regulatory capital models[119] as relatively more or less risky. This is used as the main indicator of risk-taking as risk-taking decisions will immediately show up in the accounts by the year end. Nevertheless, to test the robustness of the results, other potential measures of risk-taking (i.e. the proportion of non-performing loans and non-performing assets) are also investigated.

[118] http://www.bis.org/publ/bcbs189.pdf.

[119] Regulatory models (the Standardised Approaches framework) or institutions' own models.

A central ('baseline') model is estimated for which the main conclusions feed into the third stage of the analysis in which the impact of the LR requirement on bank resilience is further investigated. The variables in the baseline model and the results are discussed next. Several alternative versions of the model are also estimated to check the results are not sensitive to variable choice or the baseline assumptions about how and when institutions may have started to adapt to an LR target; these are summarised in the additional sensitivity analyses section.

Baseline results

In the baseline regression, a 'difference-in-difference' model is used to estimate over the panel dataset of EU institutions. Institutions are classified into treatment and control groups on the assumption that they started to adapt to an LR target of 3% in 2010. Due to data limitations, it is not possible to use the BCBS 2014/CRR LR DA definition of the LR to assign institutions to the treatment and control groups. Instead, the closest possible proxy for this sample of EU institutions is used, namely the ratio of Tier 1 capital to total accounting assets. While this does not capture the detail of the recently agreed definitions of leverage, testing the correlation between the BCBS 2014 LR and the proxy definition for institutions for which data is available on both measures shows the correlation to be around 0.92. On average, across the sample from 2010 onwards, 14% are assigned to the treatment group and 86% are assigned to the control group on the basis of a 3% LR.

As well as including the treatment indicator variable, two variables where the treatment interacts with (is multiplied by) other variables in the regression are also included. This is done to test whether the value of these variables affects the impact of being below the target LR. In the baseline model, an LR-treatment interaction term is included to see whether institutions further away from the target LR act differently from those closer. A GSIB treatment interaction term is also included to pick up whether the impact on risk-taking of being below the LR target is different for GSIBs.

An additional indictor variable (0 or 1 if it meets the criterion) called the Tier 1 risk-weighted requirement threshold indicator is also included. This captures whether an institution is meeting its forthcoming higher risk-weighted capital requirements and buffers (minimum Tier 1 requirement, conservation buffer and GSIB surcharge[120]) or whether it would still need to adjust to meet them. This is included since it is possible that changes in risk-taking are correlated with this indicator, as one way to satisfy higher risk-weighted capital requirements is through balance sheet de-risking. For simplicity, voluntary buffers that institutions may seek to have above regulatory requirements are not taken into account but institutions are being held to the steady-state value of the new risk-weighted requirements.

The dependent variable used is the change in the ratio of the RWA to total assets ratio. This is used as a proxy for risk-taking. While the RWA ratio is an imperfect measure of true risk-taking, it

[120] The GSIB surcharges applied are those from 2014. Note that while the GSIB framework was announced in December 2010, it was not finalised until November 2011. Therefore, there is an implicit assumption in applying 2014 GSIB surcharges that institutions anticipated the amount of additional loss-absorbing capacity they would be expected to have, perhaps based on an understanding of their relative significance.

is the most direct measure of risk-taking and should be the measure that is affected by the introduction of a LR requirement.

Table 33: Results (impact on change in RWAs)

Dependent variable: Change in RWA/TA	
Variable	**Coefficients**
Treatment indicator (LR ≤ 3%, yr ≥ 2010)	0.754***
	(0.288)
LR interacted with treatment indicator	-0.120
	(0.217)
GSIB indicator interacted with treatment indicator	-0.126
	(0.434)
LR	0.689**
	(0.275)
LR^2	-0.0424***
	(0.0143)
Tier 1 risk-weighted requirement threshold indicator	-1.192***
	(0.286)
Balance-sheet size measure	0.140
	(0.426)
Pre-tax Return on Assets	0.0656
	(0.0947)
Liquid assets/Liabilities	0.0385**
	(0.0186)
Real GDP growth	-0.874
	(1.130)
10-year yield	-0.255
	(0.971)
Stock market growth	-0.0832
	(0.0743)
R^2	0.2774
Observations	1553
Constant, Fixed and Time effects	Yes
Note: All regressors are lagged by one period. Robust standard errors in brackets *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.	

A significant impact of being below target LR on risk-taking is found. Bound institutions increase RWA/TA by almost 1 percentage point more than those not bound by a 3% LR.

The interaction term between the treatment and the lagged change in the LR is insignificant, although only marginally, at a 10% significance level in a test in which the hypothesis is that institutions that are furthest from the target threshold increase risk-taking the most. Moreover, there is no significant impact from being below the target LR depending on whether or not an institution is a GSIB (they do not increase risk more or less).

Institutions with higher LRs in general take on greater risk, although this probably captures the fact that institutions hold more capital in case they make greater losses due to riskier activities. This effect reduces as the LR gets higher, however, as indicated by the negative coefficient on the LR^2 term (there is not a linear relationship between being better capitalised and taking on greater risk).

In addition, the results suggest that institutions with relatively high amounts of liquid assets to liabilities increase risk-taking more, perhaps reflecting a requirement to maximise the return on their less liquid assets since liquid assets tend to be relatively low yielding (cash, government bonds).

7.6 Additional sensitivity analyses

In order to ensure the robustness of the results, various sensitivity analyses are performed on the baseline model shown above. First, alternative measures of risk-taking are analysed, as one would expect the effect to also be visible in alternative indicators of risk-taking. Second, the baseline model is run excluding all banks with LRs between 3% and 5% since it may be that these banks are fuzzy in the sense that they could be control group banks, but also might be treated banks. Third, institutions who are constrained by the LR, but not bound by it, are excluded, since this may skew the figures. Fourth, different LR levels and start dates are tested for.

In order to assess whether the results are sensitive to the use of RWA/TA as a risk-taking proxy, two alternative risk-taking proxies that have been previously used in the literature are used: non-performing assets to total assets (NPA) and non-performing loans to total loans (NPL). Since it takes longer for any risk-taking decisions to show up in non-performing ratios, the 2-year lag is used to define all indicator variables and for the control variables. Table 34 illustrates that the results hold for both NPAs and NPLs. Indeed, the order of magnitude is similar. Both proxies suggest that banks bound by a 3% LR increase risk-taking by more than they otherwise would have, but the effect is not too large. The effects are subdued.

Table 34: Results (impact on change in NPA and NPL)

Dependent variable	NPA	NPL
Treatment indicator (LR ≤ 3%, yr ≥ 2010)	1.587* (0.898)	1.941* (1.169)
Observations	1 414	994
Additional bank-specific controls	Yes	Yes
Additional macrofinancial controls	Yes	Yes
Constant, Fixed & Time effects	Yes	Yes

Note: All variables regressors are lagged twice. Robust standard errors in brackets
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

A robustness test is run in which all banks with LRs between 3% and 5% are excluded from the sample. The rationale behind this exercise is that given the LR minimum level is as yet undecided, it may be that banks with LRs above 3% also started to react to the upcoming LR requirement. As a result, they may be inappropriately classified in the control group. Hence, the exercise excludes all banks for which this could reasonably have been the case – i.e. banks with LRs between 3% and 5%. The baseline model is then run on this new sample. As can be seen, the results remain robust to excluding this sample and, indeed, even the magnitude of the coefficient is very similar.

Although the BCBS is currently testing a minimum level of 3% until 2017, given the uncertainty around the minimum level, it may be that 4% or 5% is a more appropriate cut-off level. There is weaker evidence at the 4% and 5% level.

Table 35: Robustness test

Dependent variable	Exclude 3-5%	4% cut-off	5% cut-off	Exclude constrained, non-bound
Treatment indicator	0.769**	0.550*	0.685**	0.741**
	(0.355)	(0.310)	(0.328)	(0.347)
LR interacted with treatment indicator	-0.0528	-0.151	0.029	-0.0965
	(0.292)	(0.093)	(0.089)	(0.375)
Observations	1037	1553	1553	1331
Additional bank-specific controls	Yes	Yes	Yes	Yes
Additional macrofinancial controls	Yes	Yes	Yes	Yes
Constant, Fixed & Time effects	Yes	Yes	Yes	Yes

Note: All variables regressors are lagged twice. Robust standard errors in brackets
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Whether institutions reacted to the anticipation of a future LR disclosure and/or capital requirement, but with a delay or if their peak response came with a delay, was also tested. Table 36 shows the results of the baseline model with everything else identical except the start date of the delayed treatment.

Table 36: Results taking into account potential impact of LR disclosure

Dependent variable	2011	2012	2013	2014
Treatment indicator (LR ≤ 3%)	0.937***	1.214***	1.368*	1.124
	(0.303)	(0.392)	(0.708)	(2.093)
LR interacted with treatment indicator	-0.280	-0.309	-0.413	0.131
	(0.217)	(0.249)	(0.334)	(1.236)
Observations	1 553	1 553	1 553	1 553
Additional bank-specific controls	Yes	Yes	Yes	Yes
Additional macrofinancial controls	Yes	Yes	Yes	Yes
Constant, Fixed & Time effects	Yes	Yes	Yes	Yes

Note: All variables regressors are lagged twice. Robust standard errors in brackets
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

7.7 Combined effect

The results suggest that the imposition of the LR requirement will to some extent increase risk-taking where the LR requirement is the binding constraint. However, the effect seems to be quite small. This increase in risk-taking appears to be a potential 'cost' to introducing an LR requirement (although it may also apply to a disclosure requirement to some extent). But does this cost outweigh the beneficial impact on institution resilience that was found in the previous section? To assess this, the trade-off is considered.

The previous two exercises suggest that while banks bound by an LR requirement increase risk-taking more than they otherwise would have, at the same time this seems to be less important relative to the effects of increased institution resilience. To further assess this trade-off, the results from the previous two stages are taken and used in a counterfactual simulation similar to that of Grill et al. (2015). The results from model 3 (the most complete model) in section 7.5 are used, and using the coefficient estimates, the following exercise is performed. For all banks below the LR minimum, the change in distress probability is simulated, assuming these banks increase their LRs by the required amount to reach the minimum, while at the same time increase their RWA ratio by the estimated amount of 1 percentage point. For robustness, this estimated increase in the RWA ratio is increased by up to 6-fold. Thus, an estimate of the effects from a 2, 4 and 6 percentage point increase for the same increase in the LR is obtained. This is also done for a 3%, 4% and 5% LR minimum. This allows for the analysis of forcing banks to increase their LRs, but at the same time taking into account the fact they may increase risk-taking.[121]

[121] The odds ratio = $p/(1-p)$, where p is the probability of bank distress or failure and, therefore, $1-p$ is the probability of no distress or failure. A higher odds ratio therefore represents a higher probability of distress or failure. The dependent variable is the logarithm of the odds ratio due to the nature of the set-up of logit regression models.

[121] RWA/TA is not included in the models in which RWCR is also included due to multicollinearity.

[121] http://www.bis.org/publ/bcbs189.pdf.

[121] Regulatory models (the Standardised Approaches framework) or institutions' own models.

[121] This to some extent alleviates concern for what is known in the literature as the 'Lucas Critique' (the problem being that the resilience model is tested during a period in which LR requirements were not applied in the EU). For this reason, institutions' decisions and behaviours may not have been influenced by the LR to the same extent. As a result, rather than simply saying a higher LR is beneficial for stability because the coefficient on the LR is negative in the distress logit model, a direct attempt is made to capture the negative effect the LR requirement might also bring about: greater risk-taking.

Table 37: Proportionate change in the probability of distress if bound banks increase their LR and risk-taking simultaneously

	Bank increases LR to x%			
Bank increases risk-taking Δ(RWA/TA) by y percentage points	x = 2%	x = 3%	x = 4%	x = 5%
y =1 p.p.	-0.119***	-0.216***	-0.289***	-0.362***
y =2 p.p.	-0.113***	-0.211***	-0.284***	-0.357***
y =4 p.p.	-0.100***	-0.199***	-0.273***	-0.347***
y =6 p.p.	-0.087***	-0.187***	-0.262***	-0.337***

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

The numbers show the average percentage change in the probability of distress for banks in the sample. The average effect is derived by estimating the effect for each individual bank and then taking the sample average.

Table 23 reports mean estimated figures. Since the risk-taking analysis suggested an increase in RWA/TA of 1 percentage point, the first row is highlighted. The numbers show the average percentage change in the probability of distress from increasing RWA/TA by y percentage points while at the same time increasing banks' LRs to meet an x% minimum, for example, supposing the LR minimum (or target) level is 3% and banks increase their RWA ratio by 1 percentage point. The results above suggest that the probability of distress should decline by 21.6%. Hence, if a bank's distress probability equalled 0.02, a 3% minimum (taking account of the 1 percentage point higher RWA ratio) would see this number decline to 0.0157. Even if it is supposed that banks increase their RWA ratios by 6 percentage points, distress probabilities still decline significantly, and a bank with a 0.02 probability of distress would see it decline to 0.0163. Since all of the estimates are negative and significant, this shows that for any of these indicative LR calibrations and the upper-bound degree of increased risk-taking, the benefits of additional resilience outweigh the additional risk-taking both statistically and economically.

8. Impact on the cyclicality of capital requirements

8.1 Summary section

OBJECTIVES OF THE SECTION

- The section aims at covering Article 511(4)(a)(ix) of the CRR which states that 'The report […] shall take account of […] the impact of introducing the leverage ratio, determined in accordance with Article 429, as a requirement that institutions would have to meet on […] the cyclicality of the capital measure and the total exposure measure of the leverage ratio'.

METHODOLOGY

METHODOLOGICAL BASIS

- The empirical specification used in the next section adapts the model used in Brei and Gambacorta (2014) at the global level to the European banking sector and assesses whether the authors' results would be confirmed in Europe. In particular, the dynamic panel regression used in this work was adapted from this model and broken down by country and by bank to test how the different capital ratios correlate to the cycle, taking into account bank-specific characteristics.

DATA SOURCE AND SAMPLE

- The analysis used different sources of data including Bankscope (balance-sheet and income-statement data), the OECD online database (Country GDP), the ECB consolidated banking data database (country by country accounting and prudential data) and the EU QIS data (LR data).

- The sample covers 114 institutions from 17 European countries that submitted reports to the QIS on the implementation of the LR, namely, Austria, Belgium, the Czech Republic, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Spain, Slovakia, Sweden and the United Kingdom.

- The reference period covers 2000-2014.

KEY FINDINGS

- The empirical results confirm the findings observed at the global level for EU credit institutions: the LR is somewhat more sensitive to the economic cycle than risk-based capital requirements thus being the first capital requirement to signal the need for corrective action from credit institutions during booms, i.e. when perceived risk levels

are low. In this sense, the LR would be a relatively tighter constraint in booms and a relatively looser constraint in recessions. This empirical observation is also intuitive because the LR exposure measure is not influenced by risk estimates, which may tend to be relatively optimistic during booms and relatively pessimistic during recessions.

- Given these statistical properties of the risk-based Tier 1 ratio and the LR, it is expected that the combined application of both requirements will reduce the overall cyclicality of capital requirements since the LR would limit the expansion of exposures on the basis of low risk estimates during booms while risk-based requirements would curb risk-taking in high-risk environments.

8.2 Background

Article 511(4)(a)(ix) of the CRR states that 'The report […] shall take account of […] the impact of introducing the leverage ratio, determined in accordance with Article 429, as a requirement that institutions would have to meet on […] the cyclicality of the capital measure and the total exposure measure of the leverage ratio'.

The cyclicality of the components of the LR can be assessed vis-à-vis different cycle indicators, like banks' total assets, economic cycle or financial cycle (like the credit-to-GDP gap). Naturally, all those aggregates are interdependent, since banks' balance sheets expand when economic activity augments and the credit gap also tends to widen, although not necessarily in a simultaneous manner.

The key aspect in this regard is that, based on the findings in the literature, bank leverage appears to behave cyclically. Procyclical leverage can be seen as a consequence of the active management of balance sheets by financial intermediaries who respond to changes in prices and measured risk.[122] In fact, if there was no active management of the balance sheet and assets prices are marked to market, leverage would automatically decrease when asset prices increase.

By the same token, if banks' assets and liabilities management decisions are constrained by risk-adjusted regulatory capital adequacy requirements, when banks try to maintain a constant volume of RWA through the cycle, bank leverage will vary with the cycle. In this context, a regulatory LR requirement may limit cyclicality of bank leverage.

Moreover, the rate of growth of aggregate balance sheets can be regarded as the provision of liquidity to the economy.[123] As such, the individual profit maximising behaviour of institutions will have a broader impact, in particular if institutions deleverage simultaneously, curtailing the provision of credit to the economy.

When used as a backstop to risk weighted capital requirements, the LR not only improves resilience at institution level but also reduces systemic cyclical risk. In fact, from a financial stability perspective, introducing limits in bank leverage not only limits each bank's balance-sheet size, but also automatically reduces the build-up of leverage in the financial system, which is central to limiting systemic risk. This effect is enhanced if bank leverage is cyclical.

Moreover, creating a countercyclical automatic stabiliser will reduce the economic costs associated with aggressive deleveraging in the downturn,[124] which typically follow the excessive growth of leverage in periods of economic expansion.

However, one cannot exclude that restrictions on banks' leverage will also have unintended consequences, inducing a shift of activities with low measured risk to less regulated sectors.[125]

[122] Adrian and Shin (2008).

[123] Adrian and Shin (2008).

[124] Hence, the REL as defined in this report, will be reduced.

[125] Acharya et al. (2012).

The cyclicality of the capital measure, on the other hand, has been less studied and appears to be acyclical, at least during expansions, which means that banks do not accumulate capital in good times.

8.3 Literature review and published empirical studies' results

The bulk of economic literature mostly uses the 'total assets/capital' ratio as a proxy for bank leverage, although some authors have tested the inclusion of off-balance-sheet items, specifically securitisations.[126] Most empirical studies conclude that bank leverage is indeed procyclical, in particular for determined business models (investment banks[127] or banks particularly involved in securitisations[128]) or banks' size (larger banks[129]). In this regard, only Brei and Gambacorta's (2014) work is explicitly designed to study the cyclical behaviour of the regulatory LR components.

Adrian and Shin (2008) analysed the leverage of American investment banks, which keep mainly marked to market balance sheets, and their results support the hypothesis that leverage is procyclical and that its main determinant is banks' borrowing conditions, namely the haircuts on repo transactions. Additionally, the authors find a link between financial intermediaries' balance-sheet management and the markets' perception of aggregate risk, measured by volatility.[130] When market asset prices rise and the aggregate perception of risk is low, financing conditions are favourable and banks expand their balance sheets, mostly with recourse to very short-term debt. The rate of growth of the aggregate financial sector balance sheets can be understood as the supply of aggregate liquidity; hence, the individual balance-sheet management of financial intermediaries translates into credit growth (as more borrowers get credit when the banks' balance sheets expand) and credit crunches (when financial intermediaries need do reduce their balance sheet size). As a consequence, there are negative externalities from this profit-seeking individual behaviour.

In Adrian and Shin (2013), the link between the VaR per unit of capital disclosed by banks and their leverage fluctuations is explored. Since VaR is determined for a given probability of failure (usually 1%), a capital stock and the underlying characteristics of assets (volatility, correlations), leverage behaviour can be mimicked assuming that financial intermediaries try to keep this probability constant, perhaps in order to keep external ratings and creditworthiness. Hence, when volatility is low, the VaR per unit of assets ('unit VAR') decreases and banks have 'space' to grow their balance sheets. They do so by increasing their short-term financing (repos, hedge funds cash management) and applications (reverse repos). It should also be noted that the 'unit VAR' can be interpreted as the required capital for banks per unit of asset, which corresponds to the medium risk weight in solvency regulation.

[126] Becalli et al. (2014).

[127] Adrian and Shin (2008) and Baglioni et al. (2011).

[128] Becalli et al. (2014).

[129] Kalemli-Ozcan et al. (2012).

[130] For which the authors use as proxy the innovations of the VIX index for the main American stocks.

As the supply of credit increases, riskier projects get financing. This dynamic is further enhanced by the existence of moral hazard, which arises due to limited liability, since banks' shareholders get only the upside of increasing risk-taking and thus have an incentive for this behaviour.[131]

The study by Baglioni et al. (2011) uses a sample of 77 major European banks[132] and builds on the analysis of Adrian and Shin (2008). In Europe, the predominant type of bank is 'universal'; hence, the authors have distinguished between 'investment banks' and 'commercial banks' by using the median ratio between interest income and net revenues (56%). Banks were classified as 'commercial banks' if their ratio was above the median. The authors conclude that (mainly) 'investment banks' respond to a change in their assets value by changing leverage in the same direction, that is, leverage is procyclical.

In a 2014 paper, Becalli et al. approach the present definition of the leverage exposure measure, incorporating off-balance-sheet items (in particular securitisation) on their measure of 'effective leverage', compared with 'formal' leverage (on balance-sheet assets). Among other findings, the authors conclude that formal leverage underestimates effective leverage, and that not only investment banks but also commercial banks which are more involved in securitisation have procyclical leverage.

Aggregate leverage can also be studied under a general equilibrium model, which allows exploring the relationship between bank leverage, GDP and capital. Galo and Thomas (2013) conclude that the volatility and procyclicality of leverage can be understood as the result of the interplay between collateralised bank debt, moral hazard[133] and changes in uncertainty. It is assumed that investors monitor banks' LRs; in particular, if the uncertainty regarding banks' assets returns increases, banks have an incentive to invest in riskier projects and investors will require a lower target leverage in order to prevent them from doing so. This deleveraging forces banks to contract their balance sheets, which leads to a fall in intermediated credit.

Further research on the leverage cycle using a general equilibrium model[134] concludes that the conditions of credit to financial intermediaries determine their leverage; in particular, haircuts applied to collateral will increase if volatility, which can be regarded as a proxy to uncertainty, increases, hence triggering adjustments on banks' leverage and on the provisioning of credit to the economy. In particular, the authors conclude that the demand for collateral can cause bubbles in asset prices,[135] which reinforce the leverage cycle, which is up when volatility is low; hence, in specific conditions, leverage can be determined endogenously.

[131] Merton (1973) derives the same conclusion by using option pricing to the value of an enterprise with an underlying price equal to its debt.

[132] The Stoxx600 banks index, from 2000 to 2009.

[133] Since a significant share of banks' liabilities has limited liability, banks enjoy the upside risk in their assets, leaving the institutional investors to bear the downside, which is a classic moral hazard problem that induces banks to increase their debt and invest in riskier assets.

[134] Fostel and Geanakoplos (2013).

[135] *Inter alia* financial assets and real estate.

The paper by Brei and Gambacorta (2014) is the first empirical investigation[136] of how the new LR behaves over the cycle. The paper establishes an empirical framework to compare the cyclical properties of different capital ratios. Given this empirical specification, the authors conclude that the Basel III LR is significantly more countercyclical than the RW capital ratio: it is a tighter constraint in booms and a looser constraint in recessions. In terms of the components included in the exposure measure definition, the study concludes that off-balance-sheet items (OFS), like guarantees and other elements (credit lines, acceptances and items related to securitisations), are the items that give rise to the more procyclical behaviour of the Basel III exposure measure, which is in line with the findings of Becalli et. al. (2014) regarding the inclusion of securitisations in the 'effective leverage'.

By introducing in their empirical specification a binary variable that accounts for the financial crises and the subsequent regulatory reform,[137] Brei and Gambacorta (2014) conclude that results are different in 'normal times' compared with in crisis periods and that, specifically, all capital ratios tend to be less countercyclical (more procyclical) during the crisis period.

The cyclicality of capital, however, has been less studied and appears to be acyclical, at least during expansions, which means that banks do not accumulate capital in 'good times'[138] (Brei and Gambacorta (2014)). In this work, the authors disentangle the effects on the ratio between those driven by the denominator and the numerator and conclude that in normal times Tier 1 capital is weakly correlated with GDP and credit; hence, one can conclude that banks do not accumulate capital in expansions and tend to smooth capital consumption in recessions.[139] Consequently, banks' leverage management is performed by adjustments in the balance sheets, leading to periods of rapid credit growth and periods of aggressive deleveraging, with costly social impacts.

The empirical specification used in the next section adapts the model used in Brei and Gambacorta (2014) to the European banking sector and assesses whether the authors' results hold.

[136] The authors use data from 14 countries, including 9 from the EU.

[137] This variable takes the value 1 for the period 2008-2012 and zero in all the other years.

[138] Brei and Gambacorta (2014).

[139] Adrian and Shin (2010).

8.4 Empirical specification, sample and data

Brei and Gambacorta (2014) analyses how the Basel III LR (Tier I Capital/exposure) behaves over the cycle and proposes a setup to test for the cyclical properties of several bank capital ratios:

i. the Basel III LR (Tier 1 capital/Basel III exposure);

ii. the accounting LR (Tier 1 capital/total assets); and

iii. the capital-to-RWA ratio (Tier 1 capital/RWA).

The empirical specification follows Ayuso et al. (2004) and can be derived from a model in which a representative bank minimises its intertemporal costs of capital.

The dynamic panel regression used in this work was adapted from the specification in Brei and Gambacorta (2014). It is broken down by country and by bank and was designed to test how the different capital ratios correlate to the cycle, taking into account bank-specific characteristics to avoid endogeneity:

$$L_{ijt} = \alpha_i + \alpha_j + \theta \mathbf{C}_t + \beta_1 L_{ijt-1} + \beta_2 L_{ijt-2} + \chi Y_{jt} + \delta X_{ijt-1} + \varepsilon_{ijt}$$

The dependent variable, L_{ijt}, is the capital ratio in year t, of bank i, headquartered in country j. The same three capital ratios in the Brei and Gambacorta study are tested: the Basel III Leverage; the accounting LR and the capital-to-risk-weighted-assets ratio (Tier 1/RWA); α_i is a bank-specific constant which measures time invariant fixed effects, and α_j is a country-specific constant which measures time invariant fixed effects; C_t is a dummy variable that accounts simultaneously for the financial crisis and more demanding regulatory requirements and enhanced supervisory standards; the dummy has been attributed a value of 1 from 2008 to 2012. The inclusion of L_{it-1} and L_{it-2} acknowledges the persistence in capital ratios, that is to say, the existence of short-term adjustment costs. Y_t is the cycle explanatory variable, which is the yearly growth rate of real GDP for each country in the sample.

X_{it-1} is a vector of bank-specific control variables, which are typically used in studies that explain banks' choice of target capital ratios: bank size (S_{it-1}) is measured by the log of total assets; bank's provisions over loans (P_{it-1}) measure the relative riskiness of the bank and the return on assets (ROA_{it-1}) measures the cost of remunerating capital.

Hence, if the LR is a countercyclical capital requirement the results will yield a negative value for χ. As a consequence, when GDP growth is positive, the LR will decrease and may become binding, thus requiring the bank to decrease its leverage exposure or increase its capital.

In addition, if the more countercyclical of the capital ratios is being tested, $\chi_{\text{Tier1/Leverage Exposure}} < \chi_{\text{Tier1/Total Assets}} < \chi_{\text{Tier1/RWA}}$, which means that the LR is more sensitive to the cycle, thus being the first capital requirements to signal the need for corrective action from the bank. In this sense, it would be a tighter constraint in booms and a looser constraint in recessions.

Finally, the effect of the crisis and the posterior change in banks' capital requirements are also tested (by testing the statistical significance of θ).

As referred to above, one possible identification problem is endogeneity, originating either from mis-specification of the model (omitted variables) or from simultaneity among variables, since the state of the banking sector could also affect the business cycle and the credit cycle.

To minimise the first effect, the estimator that is used, the dynamic System Generalized Method of Moments (S-GMM), is intended to reduce endogeneity bias and takes into account the heterogeneity in the data caused by unobservable factors affecting individual banks. Hence, the estimator comprises a two-step approach using the model in first-differences in step 1.

In order to address the second question, different lags of the endogenous variables are also used, since instrumental bank-specific characteristics are lagged by one-quarter in order to mitigate the possible endogeneity problem.

The set of annual data used covers 114 institutions from 17 European countries that submitted reports to the QIS on the implementation of the LR, namely, Austria, Belgium, the Czech Republic, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Spain, Slovakia, Sweden and the United Kingdom. Country GDP data is readily available in the OECD online database. The reference period is 2000-2014.

The abovementioned QIS results were used to replicate the Basel III leverage exposure, in particular those from the last quarter of 2014, which convey the latest LR exposure specification[140]. The QIS data allowed coefficients at a country level to be estimated, which were then applied to on-balance-sheet values in order to obtain long-term series for the leverage exposure. The balance-sheet and income-statement data for consolidated banking groups' financial statements was retrieved from Bankscope.

Sampling was performed using the ECB consolidated banking database, which includes country-by-country accounting and prudential data. For each country, a total asset coverage of at least 80% was envisaged.

Nonetheless, data availability differs among institutions, which translates into an unbalanced panel database. Table 38 presents a summary characterisation of the main variables, namely, capital ratios and business cycle measures.

[140] Please refer to Gambacorta (2014), Annex A for a detailed exposure of how to calculate a proxy for the exposure measure. Although the coefficients differ from the empirical study presented in this report, the methodological approach is the same.

Table 38: Summary characterisation of the main variables

Variable	Description	Average	Std. Dev.	Min	Max
LR	Tier 1 capital/Basel III exposure	4.45%	3.23	-4.10	45.29
Accounting LR	Tier 1 capital/total assets	5.54%	10.58	-4.20	202.80
Risk-weighted-assets ratio	Tier 1 capital/RWA	9.84%	4.60	-6.70	66.80
GDP growth rate	-	1.59%	2.72	-7.11	10.65

Source: EBA QIS

8.5 Estimation results for the capital ratios

Table 39 presents the results for the baseline regression, including as explanatory variables for the evolution of the different capital ratios (L (t)), the economic cycle (Y (t)), the financial crisis and more stringent regulatory requirements, as well as a bank-specific constant (not reported).

Table 39: Baseline results

Dependent variable L (t)	Expected Sign	Tier 1/Total Exposure LR		Tier 1/Total Assets		Tier 1/RWA	
		Coeff.	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**
L (t-1)	+	0.951***	*0.182*	0.732***	*0.110*	0.599***	*0.145*
L (t-2)		-0.093*	*0.055*	0.319**	*0.146*	0.009	*0.068*
Y (t) = Real GDP growth	-	-0.092***	*0.031*	-0.088**	*0.037*	-0.059**	*0.027*
Crisis/Regulation	+	0.188	*0.173*	0.424	*0.294*	1.243***	*0.315*
Constant		0.772***	*0.000*	–-0.118***	*0.000*	3.524***	*0.000*

All estimations are based on the Arellano and Bover (1995) system GMM estimator. ***, **, * indicate significance at the 1%, 5%, and 10% level. Bank fixed effects are not reported.

On the basis of the data in Table 39, it can be concluded that:

- All the capital ratios vary in opposite relation with GDP and are statistically different from zero, which is to say that $\chi<0$.
- Addition, $\chi_{\text{Tier1/Leverage Exposure}} < \chi_{\text{Tier1/Total Assets}} < \chi_{\text{Tier1/RWA}}$, which means that the LR is more sensitive to the cycle, thus being the first capital requirement to signal the need for corrective action from the bank. In this sense, it would be a tighter constraint in booms and a looser constraint in recessions.
- As expected, the crisis and tougher regulatory requirements had a positive effect on all the capital ratios ($\theta > 0$), although it is only statistically different from zero in the case of the RWA ratio.
- Despite a slightly different specification, these results are broadly in line with the ones in Brei and Gambacorta (2014), in particular regarding the conclusions drawn regarding the countercyclical properties of the different capital ratios.

The inclusion of bank-specific control variables does not significantly change the conclusions drawn in the baseline regression, namely that all the capital ratios vary in opposite relation with GDP, which is to say that $\chi<0$ is statistically different from zero. In addition, $\chi_{\text{Tier1/Leverage Exposure}} < \chi_{\text{Tier1/RWA}}$, which means that the LR is more sensitive to the cycle, thus being the first capital requirement to signal the need for corrective action from the bank.

Once again the results obtained are in line with those observed in Brei and Gambacorta (2014).

Table 40: Results with bank-specific control variables

Dependent variable L (t)	Expected Sign	Tier 1/Leverage Exposure (LR)		Tier 1/Total Assets		Tier 1/RWA	
		Coeff.	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**
L (t-1)	+	0.739***	*0.182*	0.969***	*0.066*	0.627***	*0.124*
L (t-2)		-0.133***	*0.048*	0.469	*0.323*	-0.056	*0.081*
Y (t) = Real GDP growth	-	-0.101***	*0.030*	-0.067*	*0.040*	-0.050	*0.034*
Crisis/Regulation	+	0.102	*0.264*	-0.005	*0.374*	1.002***	*0.265*
Ln_Assets (t-1)		-0.292	*0.265*	0.620	*0.587*	-0.510	*0.550*
% Impaired Loans (t-1)		0.263***	*0.050*	–-0.268	*0.308*	-0.025	*0.115*
ROA (t-1)		-0.199*	*0.108*	-0.453***	*0.112*	-0.666**	*0.301*
Constant		4.493	*3.168*	-7.684	*6.997*	10.285*	*6.253*

In addition, $\chi_{\text{Tier1/Leverage Exposure}} < \chi_{\text{Tier1/RWA}}$, which means that the LR is more sensitive to the cycle, thus being the first capital requirement to signal the need for corrective action from the bank.

Given that all capital ratios tested have the same numerator (Tier 1), one can conclude that it is the definition of the exposure measure of the LR that causes the more procyclical behaviour. To support this conclusion, it is also useful to test the cyclical features of both the capital and exposure measures, which is performed in the next section of the report.

8.6 Disentangling the ratio components

Disentangling the separated effect on the ratio that results from the denominator and numerator of the capital ratios is of relevance to fulfil the mandate in Article 511(4)(a)(ix). Table 41 below depicts the estimation results for the dependence of Tier1, LR exposure, total assets and RWA from the cycle variable.

Table 41: Disentangling the ratio components (A)

Dependent variable L (t)	Tier 1 (growth)		Total Exposure (growth)		Total Assets		RWA	
	Coeff.	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**
L (t-1)	-0.260***	*0.069*	-0.201***	*0.062*	0.040	*0.094*	-0.089	*0.078*
L (t-2)	-0.120***	*0.045*	-0.160***	*0.048*	0.035	*0.071*	0.031	*0.075*
Y (t) = Real GDP growth	-0.009**	*0.004*	0.008**	*0.003*	0.007***	*0.003*	0.004	*0.004*
Crisis/Regulation	-0.079***	*0.032*	-0.150***	*0.034*	-0.088***	*0.024*	-0.161***	*0.032*
Constant	0.168***	*0.000*	0.165***	*0.000*	0.102***	*0.000*	0.115***	*0.000*

When disentangling the components of the different types of regulatory capital ratios, it can be observed that both types of denominators (RWAs as well as leverage exposure) are procyclical, but that the leverage exposure has the higher coefficient. Hence, given that both capital ratios use the same numerator (Tier 1 capital), the observation that the LR tends to be a tighter constraint during booms and a looser constraint in recessions is driven by its denominator.

Table 42 below presents the result of the estimation, including bank-specific control variables (as detailed in section 7.4) and it can be observed that the main conclusions derived above also hold in this specification.

Table 42: Disentangling the ratio components (B)

Dependent variable L (t)	Tier 1 (growth)		Total Exposure (growth)		Total Assets		RWA	
	Coeff.	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**	**Coeff.**	**Std. err**
L (t-1)	-0.255***	*0.080*	-0.247***	*0.055*	0.007	*0.100*	-0.154	*0.074*
L (t-2)	-0.139***	*0.047*	-0.185***	*0.040*	0.015	*0.078*	0.010	*0.078*
Y (t) = Real GDP growth	-0.008**	*0.004*	0.008***	*0.003*	0.008***	*0.003*	0.005	*0.004*
Crisis/Regulation	-0.105***	*0.042*	-0.143***	*0.034*	-0.067***	*0.025*	-0.162***	*0.031*
% Impaired Loans (t-1)	-0.015	*0.010*	-0.010**	*0.004*	-0.012	*0.008*	-0.006	*0.008*
ROA (t-1)	-0.039	*0.027*	0.012	*0.010*	0.007	*0.012*	0.024	*0.011*
Constant	0.268***	*0.053*	0.191***	*0.033*	0.127***	*0.037*	0.122***	*0.031*

9. Annexes

Annex I – Risk indicators applied in the benchmarking

REL dimension n°1 - **Level and stability of profitability**
Return on Assets (ROA) Rationale: This ratio indicates how much net income is generated per euro of assets and as such is an indication of the profitability of the bank's investments. If profitability is strong and stable over time, the likelihood that an institution will have to take corrective actions, such as engaging in selling of distressed assets during crisis situations, is considered smaller. The stability of the ROA is also an important aspect because instability of a bank's profitability can be seen as a major source of risk.[141] This is all the more the case when a bank uses a high leverage, since a slight decrease in asset profitability (and ultimately negative returns) will mechanically have more severe consequences on its equity due to the leverage, which can endanger its solvency. At the same time, leveraged investments in safe assets (which generate comparatively low returns) are not considered problematic per se: a low ROA associated with very low volatility is not regarded as a sign of REL.[142] Measure: The ROA is defined as the bottom line of profit and loss divided by total assets. As both its level and its stability are considered to be important, two aspects are combined in a single measure, namely a *risk-adjusted ratio* (or Sharpe ratio) that divides the mean of the ROA by its standard deviation. The higher this ratio, the lower REL is supposed to be.
Peak loss relative to total assets Rationale: This measure can be seen as an indicator of how much capital is needed to absorb exceptionally severe losses. Business models which historically realised higher losses than others may be considered to be more exposed to REL since more capital is needed to absorb these losses. In addition, where losses are especially high relative to total assets, the risk of having to engage in corrective measures, such as sudden deleveraging, may be seen as elevated.[143] Measure: This indicator measures the *weakest annual negative result* over the longest period of time available for each bank (up to 11 years), relative to its total assets. Scaling peak loss by total assets is a way to measure what fraction of the balance sheet is needed in capital to absorb this historically large loss.
Z-score Rationale: The Z-score is a proxy of the distance to default. The higher the ratio, the smaller the risk of default as well as possible pressures to engage in corrective measures such as sudden deleveraging.[144] Measure: this indicator is defined as follows:

[141] See, for example, Cole and White (2012) and Ötker-Robe and Podpiera (2010).

[142] See, for example, Betz et al. (2013).

[143] See, for example, Bonaccorsi di Patti and Kashyap (2014).

[144] See, for example, Chiaramonte et al. (2015) and Köhler (2012).

Mean of Return on assets + Mean of Capital to assets ratioStandard deviation of Return on assets

REL dimension n°2 - **Stability of funding**

HQLA to total assets

Rationale: This ratio is an indicator for an institution's ability to liquidate assets without having to engage in distressed selling of assets. In particular when funding resources are become scarcer, e.g. in an acute crisis situation, a large stock of HQLA, which can either be pledged as collateral to obtain additional funding or sold at reasonable prices, should facilitate the orderly management of leverage.[145]

Measure: The *mean* over time of this ratio is used.

(ASF/total assets

Rationale: This ratio indicates the fraction of assets that is funded with stable sources of funding. These funding sources may prove more reliable in crisis situations which facilitate the orderly management of leverage. Hence, the higher this ratio, the lower the risk of unintended corrective measure, including distressed selling of assets.[146]

Measure: The *mean* over time of this ratio is used.

Deposit-to-assets ratio

Rationale: The deposit-to-assets ratio is a measure widely used to assess bank funding stability. This is because customer deposits are generally considered a relatively stable funding source which typically does not entail asset encumbrance and therefore is not directly linked to the change of market values of assets. Hence, where an institution has a high deposit-to-assets ratio, resilience can be considered to be increased and corrective measures, including distressed selling of assets, can be considered less likely.[147]

Measure: The *mean* of this ratio over time is used.

REL dimension n°3 - **Stability of business activity**

Annual growth rate of loans

Rationale: Assessing the volatility of the annual growth rate of loans may indicate whether lending activity is developing in a consistent and gradual manner and under a sustainable business plan. In contrast, volatile growth rates may be indicative of instability, in particular when combined with high leverage.[148]

Measure: The *standard deviation* of the annual growth rate of loans.

Annual growth rate of total assets

Rationale: Similar considerations as for the growth rates of loans apply. However, this measure applies to the full balance sheet.[149]

Measure: The *standard deviation* of the annual growth rate of total assets.

[145] See, for example, Dietrich et al. (2014); Kandrac (2012) and Angora and Roulet (2011).

[146] See, for example, Dietrich et al. (2014); Kandrac (2012 and Altunbas et al. (2011).

[147] See, for example, Köhler (2015); Beltratti and Stulz (2012) and Altunbas et al. (2011).

[148] See, for example, Köhler (2012); Altunbas et al. (2011) and Foos et al. (2009).

[149] See, for example, Damar et al. (2010).

REL dimension n°4 – **Concentration**
Primary class of assets to total assets Rationale: Institutions with high concentrations in a single class of assets (or business line) are expected to benefit less from the risk-mitigating effects of diversification.[150] A high degree of concentration may also make an institution more vulnerable to risks of so called 'tail events' which are not always captured fully by risk-based requirements and are therefore one of the reasons for introducing a LR as a supplementary measure. Measure: The primary (main) class of assets over time measured as the *mean* of the share of this asset class in total assets.
Primary source of income to total income Rationale: Similar considerations as for the primary assets class indicator apply. However, this indicator is derived from the income statement (rather than the balance sheet).[151] Measure: The primary (main) source of income over time measured as the *mean* of the share of this income source in total income.

[150] See, for example, Böve et al. (2010).

[151] See, for example, Köhler (2015), Mergaerts and Vander Vennet (2015) and Busch and Kick (2009).

Annex II – Risk indicators median values for business models

Business model		*Dimension 1* Level and stability of profitability			*Dimension 2* Stability of funding			*Dimension 3* Stability of business activity		*Dimension 4* Concentration	
		ROA (Sharpe ratio)	Peak loss	Z-score	HQLA to assets (mean)	ASF to assets (mean)	Deposits to assets (mean)	Growth rate of loans (sdt dev)	Growth rate of assets (sdt dev)	Primary class of assets (mean)	Primary source of income (mean)
Cross-border universal banks	Median of this business model	0.8	0.4%	12.0	10.6%	57.2%	39.2%	0.11%	0.11%	57.2%	61.1%
	Median of all other institutions	1.3	0.0%	21.0	8.4%	71.6%	57.0%	0.08%	0.07%	62.8%	68.6%
Local universal banks	Median of this business model	1.2	0.0%	16.0	9.5%	67.4%	54.2%	0.11%	0.10%	64.6%	63.4%
	Median of all other institutions	1.3	0.0%	21.1	9.1%	70.9%	48.9%	0.07%	0.07%	61.5%	68.6%
Automotive, consumer credit banks	Median of this business model	2.0	0.1%	24.2	2.2%	63.0%	29.1%	0.08%	0.10%	83.2%	71.4%
	Median of all other institutions	1.3	0.0%	19.7	9.3%	70.0%	51.9%	0.08%	0.08%	61.5%	67.3%
Building societies	Median of this business model	1.1	0.2%	18.4	8.1%	85.6%	70.3%	0.07%	0.09%	67.9%	86.6%
	Median of all other institutions	1.3	0.0%	19.8	9.2%	69.0%	51.3%	0.08%	0.08%	61.5%	67.0%
Locally active savings and loan associations, cooperative banks	Median of this business model	1.8	0.0%	35.3	8.4%	80.2%	71.5%	0.04%	0.03%	61.5%	71.9%
	Median of all other institutions	1.1	0.1%	17.1	9.5%	65.2%	43.8%	0.10%	0.10%	62.7%	65.3%
Private banks	Median of this business model	1.6	0.0%	16.7	16.2%	66.9%	45.7%	0.22%	0.15%	49.0%	82.8%
	Median of all other institutions	1.3	0.0%	19.8	9.1%	70.0%	51.8%	0.08%	0.08%	62.1%	67.2%
Custody banks	Median of this business model	0.7	0.2%	10.9	14.5%	25.9%	5.4%	0.95%	0.20%	72.4%	76.4%
	Median of all other institutions	1.3	0.0%	19.8	9.1%	70.2%	51.8%	0.08%	0.08%	62.0%	67.2%
Merchant banks	Median of this business model	1.1	0.1%	26.0	7.0%	41.4%	22.0%	0.18%	0.14%	67.8%	66.5%
	Median of all other institutions	1.3	0.0%	19.5	9.2%	70.0%	51.9%	0.08%	0.08%	62.0%	67.3%
Leasing and factoring banks	Median of this business model	1.3	0.0%	17.9	3.6%	61.8%	5.9%	0.11%	0.00%	92.3%	50.8%
	Median of all other institutions	1.3	0.0%	19.7	9.2%	70.0%	51.9%	0.08%	0.08%	61.5%	67.3%
Public development banks	Median of this business model	1.1	0.0%	24.7	10.9%	75.1%	6.6%	0.07%	0.08%	63.5%	87.3%
	Median of all other institutions	1.3	0.0%	19.7	9.1%	69.5%	53.7%	0.08%	0.08%	61.8%	67.3%
Mortgage banks including passthrough financing mortgage banks	Median of this business model	1.0	0.0%	43.0	2.4%	73.6%	21.3%	0.05%	0.06%	84.5%	93.8%
	Median of all other institutions	1.3	0.0%	19.0	9.3%	69.1%	51.9%	0.08%	0.08%	61.5%	67.2%
Other specialised banks	Median of this business model	0.8	0.1%	21.3	9.8%	57.7%	26.2%	0.08%	0.12%	49.1%	72.1%
	Median of all other institutions	1.3	0.0%	19.5	9.1%	70.8%	53.5%	0.08%	0.07%	62.5%	67.3%

Source: EBA QIS (June 2015)

Annex III – ESRB preliminary investigation into the potential impact of a leverage ratio requirement on market liquidity[152]

Contents:

[152] Paper drafted jointly by an Analysis Group comprised of both leverage ratio and market liquidity experts: Karen Braun-Munzinger (Bank of England), Tomasz Gromek (ESRB Secretariat), Philipp Grüber (ECB DG/MF), Otso Manninen (Bank of Finland, ESRB Expert Group on Market Liquidity), Barbara Meller (ECB DG/MF, ESRB Expert Group on Market Liquidity), Katie Rismanchi (ESRB Secretariat), Alberto Maria Sorrentino (Bank of Italy), Eero Tolo (Bank of Finland, ESRB Expert Group on Market Liquidity), Katarina Wagman (Sveriges Riksbank). With significant contributions from Michael Grill (ECB DG/MF), Jonathan Smith (ECB DG/MF) and Marian-Alexandru Zechiu (ESRB Secretariat).

1. Introduction

The leverage ratio is an important part of the post-crisis regulatory framework. It was initially proposed by the Basel Committee on Banking Supervision (BCBS) in December 2009 and is expected to be introduced as a Pillar 1 standard by 1 January 2018.[153] The ESRB considers the leverage ratio to be a potentially useful instrument as part of the overall regulatory toolkit. In its Recommendation on intermediate objectives and instruments of macroprudential policy,[154] the ESRB identified the prevention of excessive credit growth and leverage as one of the intermediate objectives towards the ultimate objective of macroprudential policy and noted that a macroprudential leverage ratio instrument could contribute to addressing this.[155] In 2015, the ESRB published an addendum chapter to its 2014 Handbook on Operationalising Macroprudential Policy in the Banking Sector which extended the analysis to discuss the potential use of the leverage ratio as a macroprudential instrument.[156] The chapter discussed the intended benefits of introducing a leverage ratio requirement alongside risk-weighted capital requirements, such as the simple and direct nature of the leverage ratio to guard against the build-up of excessive leverage, an underlying cause of the global financial crisis (BCBS).[157] It also recognised certain potential unintended consequences of introducing the leverage ratio, including the possible incentive for banks to replace safer exposures with more risky ones in order to maintain their profit margins or to reduce balance sheet-intensive activities if they are not sufficiently profitable.

The most recent discussions on the introduction of a leverage ratio have focused on the topic of market liquidity: some industry participants and other observers are investigating whether financial markets have become less liquid or more prone to episodes of severe illiquidity. Some point to post-crisis regulatory reform as having affected the supply of liquidity and intermediation services by broker-dealers in a significant way. The leverage ratio, which has been introduced in some key jurisdictions[158] and is expected to be introduced more widely from 2018, has come under particular criticism for constraining broker dealers' balance sheets particularly with respect to low margin business such as Securities Financing Transactions (SFTs).

[153] BCBS (2009), Strengthening the resilience of the banking sector," Consultative document, Basel Committee on Banking Supervision, December: http://www.bis.org/publ/bcbs164.pdf.

[154] Recommendation ESRB/2013/1 issued on 4 April 2013, http://www.esrb.europa.eu/pub/pdf/recommendations/2013/ESRB_2013_1.en.pdf.

[155] The ultimate objective of macroprudential policy is specified in Recommendation ESRB/2013/1 as 'to contribute to the safeguard of the financial system as a whole, including by strengthening the resilience of the financial system and decreasing the build-up of systemic risks, thereby ensuring a sustainable contribution of the financial sector to economic growth.'

[156] Chapter available here: http://www.esrb.europa.eu/pub/pdf/other/150625_esrb_handbook_addendum.en.pdf?505d0ec919dc8e05fb98bbd40e2e286c.

[157] BCBS (2014), *Basel III leverage ratio framework and disclosure requirements*, January: http://www.bis.org/publ/bcbs270.pdf.

[158] A Basel III-style leverage ratio has been introduced into the domestic legislation in the United States, Switzerland and the United Kingdom as a current or future requirement.

The ESRB has publically stated that it considers the state of market liquidity to be relevant from a systemic risk perspective and has been investigating the topic since 2015. In the context of the international efforts to develop a harmonised leverage ratio requirement, to which the EBA is contributing with its forthcoming report, the ESRB considers it very important to investigate the concerns that the leverage ratio could reduce liquidity in some financial markets.

Building on the expertise and available data of the ESRB Market Liquidity Expert Group, a team of leverage ratio experts (nominated by the Instruments Working Group), members of the ESRB Expert Group on Market Liquidity and the ESRB Secretariat have prepared some preliminary further analysis – beyond what has already been done for the ESRB Handbook chapter – to investigate the potential beneficial and negative effects of the leverage ratio requirement on market liquidity. This paper summarises the findings to date. An important source of data for this analysis has been an ESRB data collection in 2015. The data collection exercise covered both quantitative and qualitative data from a number of bank market makers in the EU. The quantitative data collected includes market makers' held for trading inventories, average trade size and volume of market making activity. The qualitative survey requested information on a range of topics including the effects of regulatory change and recent market disruptions. The banks covered by the qualitative survey trade a substantial share of bonds in major fixed-income markets: aggregating banks' own estimated market shares gives a total market share of the respondents that ranges from 64% in high-yield corporate bond markets to 85% in covered bond markets. Therefore, the survey can be viewed as being representative for market makers in Europe.

It is important to keep in mind that the analysis in this note is necessarily limited at this time for three key reasons. First, several factors may have been influencing the state of market liquidity in recent years. These include a range of regulations and non-regulatory factors. It is therefore difficult to empirically attribute certain developments to an individual factor, such as the leverage ratio. Second, the scope for empirical investigation is limited because at this time the leverage ratio is not yet a capital requirement for the majority of EU banks. It is true that the global banking system has been anticipating a leverage ratio requirement for some time but most EU banks are currently only subject to a leverage ratio disclosure requirement.[159] Further, market liquidity in the EU will also be influenced by the activities of dealers from non-EU jurisdictions, which are not in scope of this analysis. Third, there is no agreed theoretical framework that includes market liquidity, market making and regulation in order to model the impact of introducing a leverage ratio requirement. For these reasons, the focus of this work has been to (1) set out the conceptual channels by which regulation, in particular the leverage ratio, may affect banks and thereby their role in facilitating liquid markets, and (2) to investigate whether there is any empirical evidence of an impact due to the *anticipation* of a leverage ratio requirement.

[159] Capital Requirements Regulation Article 451.

Although preliminary, we hope that these findings will be useful to inform the EBA and the EU Commission when they consider the costs and benefits of introducing a leverage ratio requirement in the EU.

The rest of this paper is structured as follows: in Section 2, there is a conceptual discussion of how the leverage ratio could change banks' incentives and ability to facilitate liquid markets; then there is a short reminder of the range of other regulations that have been influencing banks since the global financial crisis, and a summary of banks' own views on the most important regulatory factors affecting them (Section 3); in Section 4, some empirical methods are used to explore the relationship between the leverage ratio, inventories and repo assets; Section 5 concludes.

2. Conceptual discussion – *how to assess the impact of a leverage ratio requirement on the role of banks in facilitating liquid markets?*

The leverage ratio was proposed in 2009 by the Basel Committee on Banking Supervision (BCBS) against the backdrop of concern over excessive leverage in the lead up to the Great Financial Crisis and previous financial crises. The leverage ratio is complementary to risk-weighted capital requirements and is intended to constrain the creation of excessive leverage in the banking system. It seeks to be risk insensitive, including both on- and off-balance sheet banking activities. On-balance sheet items are generally measured at their notional accounting value. There is a specific treatment for Securities Financing Transactions (SFTs), derivatives and off-balance sheet exposures. For example, in the case of SFTs some limited netting of cash is permitted in specific circumstances such as when the counterparty and settlement dates are aligned. In the case of derivatives, which are associated with very high (and sometimes changeable) notional values, an approach was developed to capture the replacement cost and potential future exposure. [160] But for the broad majority of a bank's activities, any exposure, irrespective of risk profile or credit mitigation, is in scope and attracts a leverage exposure and capital charge.

At the currently envisaged BCBS calibration of a 3% minimum leverage ratio, the majority of large internationally active banks in scope of the BCBS rules – which are likely to include the most significant market making banks - would not currently fail to meet the leverage ratio. This is shown in Table 1, taken from the March 2015 BCBS Monitoring Report, which shows that only 6.6% of banks in the international sample would fail to meet a 3% leverage ratio if they are compliant with their Tier 1 risk-weighted requirements.[161] In other words, even if an exposure would *nominally* attract a leverage ratio charge, the absolute amount of capital the bank has to hold in the risk-weighted framework would exceed the implied leverage ratio capital charge at the level of the aggregate balance sheet. But those firms who currently fail to meet a 3% leverage ratio, meaning that they would be bound by it, may choose to reprice or withdraw certain activities – further discussed below. Even those firms who are not bound by the leverage ratio at the portfolio level may choose to manage some portfolios at business line levels or use this as a rationale for adjusting their pricing.

[160] The current BCBS definition of the leverage exposure measure is described here: http://www.bis.org/publ/bcbs270.pdf. The BCBS is currently consulting on certain revisions to this definition.

[161] http://www.bis.org/bcbs/publ/d312.pdf.

Table 1:

Share of banks meeting the Basel III leverage ratio before and after capital raising to meet the risk-based target Tier 1 ratio

Full sample of banks, in per cent — Table 3

		Target Tier 1 ratio binding (<8.5% + GSIB surcharge)?			Total after capital raising to meet **target** Tier 1 ratio
		Yes	No	Total	
Leverage ratio binding (<3%)?	Yes	2.4	5.7	8.1	6.6
	No	6.6	85.3	91.9	93.4
	Total	9.0	91.0	100.0	100.0

Source: Basel Committee on Banking Supervision.

As noted in Dudley (2016),[162] two types of such activities that could be in scope may be particularly relevant to market liquidity. First, dealers may become less willing to hold inventory in markets where the on-balance sheet assets attract low risk weights. This is an example of so-called 'risk shifting', whereby banks may choose to change the composition of their balance sheet towards higher risk and higher return activities because they have to hold a minimum amount of regulatory capital in any case. This effect was explored in, for example, Grill et al (2015),[163] who find overall that a leverage ratio requirement can incentivise greater risk taking, but that this effect is outweighed by the marginal benefits from greater bank resilience.

The second relevant activity that may be affected is the willingness of banks to finance leveraged intermediaries who take positions in markets, so-called funding liquidity. Such securities financing transactions, particularly where against high quality collateral, typically attract low risk weights, but are captured in the leverage ratio. Moreover, intermediating securities financing transactions has never been a particularly profitable activity for banks – instead it tends to be a relationship business – and the additional capital costs may make it unaffordable or unattractive for banks to provide widely.

All things being equal, in normal market conditions the leverage ratio may thus make some market liquidity- related activities less attractive for a part of the banking sector and result in increased capital costs for firms with low average risk weights. This might particularly affect holding inventory in markets where the expected returns are relatively low such as sovereign bonds and high quality corporate bonds, and intermediating securities financing transactions.

The importance of such effects for market liquidity will depend on a number of factors, outlined here:

[162] Dudley, W.C. (2016), 'Market and Funding Liquidity: an Overview', https://www.newyorkfed.org/newsevents/speeches/2016/dud160501.

[163] https://www.eba.europa.eu/documents/10180/1018121/Grill,%20Lang,%20Smith+-+The+Leverage+Ratio,%20Risk-Taking+and+Bank+Stability+-+Paper.pdf.

- **the proportion of incumbents affected by a leverage ratio constraint.** If intermediation in a given market was currently provided by relatively more constrained firms, then market liquidity may be more affected and for longer while these banks adjust to the new regulation and until less constrained banks also adapt. Activities and markets that are characterised by a high degree of bank concentration may be affected to a greater extent;
- **the ability of less constrained banks to expand their market share.** The easier it is for this to occur then the impact on market liquidity should be lower as the less constrained banks can take over activities performed by constrained incumbents. However, there are some fixed costs with particular activities which may act as barriers to entry. For example, costs associated with access to CCPs and arising from more limited netting opportunities for banks operating with fewer counterparts or smaller balance sheets;
- **to the extent that the leverage ratio does increase the effective capital requirements for incumbent or new providers, how those costs are absorbed.** For example, whether they are passed on through increased liquidity premia, greater fees to clients, or reduced returns to shareholders.

Importantly, aside from any costs due to these potential adjustment actions, the leverage ratio can be expected to also support market liquidity, particularly during periods of stress. First, it makes firms better able to absorb shocks. The leverage ratio's function of ensuring that firms' capital does not fall below a certain fraction of their total exposures (given by the calibration of the requirement) is important to guard against model risk and measurement errors in the risk-weighted framework. This is particularly important for low-probability, high-impact events such as a sovereign default, for example. It ensures that firms are better able to cope with stresses they were *not* expecting, and should put them in a better position to continue to support markets even in periods of heightened uncertainty. *In extremis*, if banks are less likely to fail then they will not rapidly withdraw services that support market liquidity.

Second, there may also be an impact through banks' own funding costs. While the Modigliani/Miller (MM) theorem may hold over the cycle, better capitalised banks may be better able to absorb short term stresses and maintain financial services as their debt funding costs are likely lower in times of market wide stress.[164] This matters particularly in situations when equity is only available at very high cost just when market liquidity-related activities are likely most needed.

As suggested in the ESRB Handbook Chapter on Macroprudential Leverage Ratios,[165] the design (as well as the calibration) of a leverage ratio framework is likely to be important in terms of its impact. Namely, the proportion of the leverage ratio requirement that is a minimum requirement and the proportion that is a buffer. While the leverage ratio in itself

[164] The Modigliani Miller theorem shows that the volatility of returns on equity fall and the safety of debt investments rise as the amount of equity capital held rises. In consequence, under the specific assumptions of the theorem, the weighted average cost of finance to the institution stays the same even when the composition of its liabilities change. See Modigliani, F.; Miller, M. (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review* 48 (3): 261–297.

[165] Addendum chapter to the ESRB Handbook on Operationalising Macroprudential Policy in the Banking Sector. Available here: https://www.esrb.europa.eu/pub/pdf/other/150625_esrb_handbook_addendum.en.pdf.

is naturally countercyclical[166], a countercyclical buffer element of the requirement could further strengthen this. For example, it would allow a bank to reduce capital in a stressed period, without risk of attracting a stigma. This may lower the risk that market makers reduce their intermediation in core markets due to perceived leverage constraints, while also limiting the build-up of unsustainable exposures in an upswing. More generally, if there is a buffer element to the leverage ratio framework, consideration should be given to its design features (e.g. if there are automatic or more discretionary consequences of a buffer breach). This may influence how banks respond when their leverage ratio falls.

In summary, to assess the aggregate impact of the leverage ratio on market liquidity, it is necessary to compare any costs that may result from imposing a leverage ratio requirement due to potentially rising liquidity premia and/or quantity restrictions[167] to the benefits. The benefits relate to (i) curbing excessive market liquidity in times of exuberance, which may sow the seeds for market fragility in future, and (ii) greater resilience of dealer banks, which improves their ability to provide market and funding liquidity, including in stressed periods. There is limited historical experience on which to assess how the financial system is likely to adapt and innovate in response to such regulatory change, also taking account of the concurrent regulatory changes presented in Box 1. In order to quantitatively assess the costs and benefits, it would be useful to develop a partial equilibrium model adapted to the current characteristics of the EU banking sector.

Recent policy papers have discussed the costs and benefits outlined above. For example, Dudley (2015)[168] argues that the hypothesis of diminished market making is not supported by the available evidence. First, he argues that the evidence to date that market liquidity has diminished markedly is, at best, mixed. Second, it is not clear whether regulation is the primary driver, as other factors have also played an important role, technological change for example. Moreover, even if a connection could be made to regulatory causes, the costs of any reduction in liquidity might be low relative to the benefits of the regulations. Recent regulatory changes have made major financial institutions less prone to failure, as shown by the sharp fall in credit default swap spreads for major dealers in recent years. In a more recent speech (Dudley, 2016), he underlines the importance of both funding and market liquidity, arguing that “the changes in the regulatory regime are likely important, but that we need to do considerably more work before we reach a conclusion on their relative contribution”. In particular, he reiterates, even if a decline in market liquidity was found to have occurred, it might not be persistent as innovation takes place.

[166] There is evidence that the Basel III leverage ratio is significantly more countercyclical than the risk-weighted regulatory capital ratio: it is a tighter constraint for banks in booms and a looser constraint in recessions (Brei, M. and Gambacorta, L. (2014), “The leverage ratio over the cycle”, *BIS Working Papers*, No 471, November).

[167] The costs may differ in the transition and the steady-state when banks have adapted to all forthcoming regulations and structural changes.

[168] Dudley, W.C. (2015), ‘Regulation and Liquidity Provision‘, https://www.newyorkfed.org/newsevents/speeches/2015/dud150930.html.

The Committee on the Global Financial System (CGFS) recently carried out a study into the related subject of fixed income market liquidity.[169] They found that "more stringent regulatory requirements to contain systemic risks in the financial system, in turn, have – by design – curbed dealers' risk-taking capacity. As a result, many dealers reportedly provide liquidity only when they can easily match client orders, but step back from quoting during more volatile market conditions, particularly in the absence of formal market-making arrangements." However, they note that benchmarking costs arising from such curbs on dealer capacity against the cost of liquidity before the crisis is misleading, as this does not reflect market changes since that time, nor greater resilience of banks to stress. In a recent speech, Shin has argued that encouraging banks to maintain broad foundations for their intermediation activity through adequate capital may help to secure robust, reliable market liquidity.[170]

The EU Commission recently closed a Call for Evidence in order to gather information on the interactions and cumulative impact of the EU regulatory framework for financial services. Some of the responses made reference to the impact of EU regulation on market liquidity.[171] Between 7-8% of the responses referred to market liquidity, making it the sixth most referenced topic out of a total of fifteen that were covered in the responses.[172] Feedback on the market impacts of different rules was largely qualitative or based on external studies. The Commission comments that this may reflect the difficulty of assessing the impact of rules that are very recent (or not yet implemented or adopted) and also the difficulties inherent in isolating the impact of EU rules from other factors (e.g. monetary policy, national policy changes, macroeconomic developments) that may also play a significant role.[173] The Commission summarises that:

> 'A number of market participants argued that specific pieces of legislation and the cumulative impact of certain EU rules have had a detrimental impact on market liquidity, particularly in corporate bond markets. Other respondents questioned whether regulation was responsible for the decline in market liquidity, arguing that other factors play a greater role, and that the evidence of an adverse impact of regulation is unclear. Some public sector respondents cautioned that part of the impact of regulation was intended and reminded of the risks of excessive liquidity before the financial crisis.' *(Page 9, Summary of contributions to the 'Call for Evidence', EU Commission, 2016.)*

[169] CGFS: Fixed income market liquidity - https://www.bis.org/publ/cgfs55.pdf.

[170] Shin, H.S. (2016), 'Market liquidity and bank capital', *Bank for International Settlements*. http://www.bis.org/speeches/sp160506.pdf.

[171] European Commission's Summary of contributions to the 'Call for Evidence: EU regulatory framework for financial services – understanding the interactions and cumulative impact of regulation', published 17 May 2016, http://ec.europa.eu/finance/consultations/2015/financial-regulatory-framework-review/docs/summary-of-responses_en.pdf.

[172] Chart 3 in 'Summary of contributions to the 'Call for Evidence' (EU Commission, 2016).

[173] Page 7 of 'Summary of contributions to the 'Call for Evidence' (EU Commission, 2016).

It is also significant that a number of non-banks (infrastructure providers, custodians, fund managers, other financial actors) responded that regulatory change affecting them could have a possible bearing on market liquidity.

Box 1: Summary of post-crisis regulatory changes affecting banks

A wide range of regulatory changes that affect banks have been announced and introduced following the financial crisis. The combined impact on banks of adjusting to the new regulatory landscape, including the Basel III leverage ratio, may influence their role in supporting liquid markets. Table 2 summarises a number of key reforms.

Table 2: Overview of key banking regulatory changes and their potential impact on banks as market makers

Regulations	*Summary impact on banks*
Reforms to capital requirements ▪ The standardised approach to credit risk and role of internal ratings-based models ▪ The fundamental review of the trading book ▪ The leverage ratio	These change the relative cost of activities – broadly, risk-weighted capital change seek to ensure appropriate capital holdings for known risks, so where risk was underestimated in the past, it will now be more costly. And the leverage ratio, which is not risk sensitive, will constrain a bank's ability to take on excessive leverage and guard against model risk and measurement errors in the future. The leverage ratio is likely to particularly affect firms with predominantly low risk-weighted activities.
Reforms to funding and liquidity requirements ▪ Liquidity coverage ratio (LCR) ▪ Net stable funding ratio (NSFR)	These reforms will require some banks to change their funding activities and asset structure. For example, the LCR may incentivise firms to reduce the maturity mismatch over one month of their book, shortening wholesale lending and seeking out longer term funding. It also influences their demand for liquid assets. The NSFR restricts the use of short-term wholesale funding to fund longer-term activities above one year.
Structural reforms ▪ Ring-fencing within EU banking groups ▪ Volcker rule for US banks ▪ Other structural requirements such as requirements for intermediate holding companies	These reforms affect both the activities that banks can carry out and the level of risk-sharing permitted across banking groups. These may interact with other regulatory requirements – for example, a liquidity requirement may have a different impact if applied to a banking group than to a deposit-taking subsidiary.

In terms of capital regulations, the interaction between risk-weighted capital requirements and the leverage ratio is particularly important. However, the other areas of regulation will require balance sheet and structural change by several banks in the EU. And banks may

take longer to reach their optimal new equilibrium structure if they have to understand and adapt to several regulations at once.

Furthermore, other regulatory changes which do not apply directly or exclusively to banks are relevant to understanding market liquidity. For example, the Markets in Financial Instruments Directive II and Regulation (MiFID II and MiFIR) and the European Market Infrastructure Regulation (EMIR). As discussed in Section 3, banks report that all of these regulations are affecting them. For this reason, it is important to take account of broader regulatory changes when analysing the potential impact of the leverage ratio.

3. Market makers' feedback on factors affecting their market making capacity and market liquidity – *how does regulation fit in?*

The ESRB's qualitative survey of bank market makers in the EU (described in Section 1) provides some information on the effects of regulation in general and the leverage ratio in particular on market liquidity. According to most respondents, perceived lower market liquidity has its origin in a reduction in the number of market participants (investors in general and market makers in particular), as well as capital and balance sheet constraints, potentially as a result of regulation. Other cited determinants of perceived market illiquidity relate mostly to changes in the market structure. In this paper, we will focus on the reduction in market makers' activities in the context of changing regulatory requirements and as one potential source of lower market liquidity.

Respondents reported that regulatory initiatives would alter the revenue-cost basis underlying their market making activities. The participating banks identify market regulation on the one hand and the regulation of market participants on the other hand as the main causes of reduced market making. Besides other effects, the latter may increase traders' balance sheet (and in particular capital) constraints and thus limit market makers' ability and willingness to trade or enter new positions. In particular, they mention the Markets in Financial Instruments Directive II and Regulation (MiFID II and MiFIR), the European Market Infrastructure Regulation (EMIR), the Central Securities Depositories regulation, Securities Financing Transaction Regulation and the regulation on short selling as well as Basel III capital and liquidity requirements. The main arguments made by the market makers were that:

i) additional capital requirements increase capital charges and therefore the costs of providing liquidity; and that analogously
ii) the new liquidity framework further increases the funding needs related to market making. At the same time, these costs are not balanced by additional revenues and therefore disincentivise market making.
iii) Additional transparency requirements under the MiFID II/ MiFIR/ EMIR framework reduce the scope to make gains as other market participants are better informed about the risk positions held by market makers.

It is important to note that some of the respondents' answers were imprecise and it is not always possible to distinguish their feelings about specific regulations from their

responses. In particular, references to “capital requirements” may relate to the leverage ratio and/or changes to risk-weighted capital requirements, for example owing to the Fundamental Review of the Trading Book. Similarly, some banks refer to the CRD IV/CRR framework in general while others distinguish different measures specified therein. Another factor which might have been influencing the respondents and has not been controlled in analysing their responses is respondents’ own position with respect to the requirements, e.g. the size of their capital or leverage ratios or Net Stable Funding Ratio.

Only a few respondents explicitly mention a negative effect due to the leverage ratio. If mentioned, respondents criticised that the leverage ratio may eliminate the risk-sensitivity of capital requirements. Thereby, the leverage ratio could incentivise market makers to increasingly refrain from supporting liquidity provision in low-risk markets. In particular, respondents warn that repo markets may be disproportionately affected.

However, when asked about which markets would primarily be affected by a reduction or withdrawal in the provision of liquidity, respondents indicate that periods of distress would reduce their risk appetite and their ability to exit positions in general and across all asset classes. Further, less liquid (i.e. high yield) bond markets and generally more risky markets are among the markets where respondents would reduce their liquidity provision first. Those responses could indicate that expected reduction in market making in times of stress is not driven by regulation but by risk aversion and other bank internal considerations. Or the responses could indicate that, at least in times of stress, the incentive effects from risk-based capital requirements outweigh the effects of risk-insensitive requirements such as the Leverage Ratio.

Overall, the key messages from market makers were that a range of regulations impact their activities. Market makers expect capital and liquidity regulations, including but not exclusively the proposed leverage ratio requirement, and market regulation, in particular transparency requirements, to negatively impact their profit and incentive structure such that it would lead to a reduction or withdrawal of market making services in the future. But market makers also pointed out that other factors besides regulation and their own market making activities have an impact on market liquidity. In interpreting the results of the qualitative questionnaire, it is important to keep in mind that these are the views of the market makers in the sample and that there are some limitations when interpreting the survey results due to the fact that responses were provided in open text format and are therefore not always precise and easily comparable.

4. Empirical investigation

Some of the channels described in the conceptual analysis above and the survey evidence from market makers suggest that banks which are targeting higher leverage ratios may hold smaller trading inventories or provide less secured financing than if they had not been trying to boost their leverage ratios. This may amount to reducing inventories or repo activity from previous levels, or not increasing them as much as they would otherwise have done, thereby potentially putting pressure market liquidity. **The following two boxes empirically explore the relationship between the leverage ratio on the one hand and trading, repo activity and inventories on the other hand.**

While it is difficult to investigate empirical evidence for EU banks at this time as there is not yet a harmonised leverage ratio solvency requirement, banks have reported that they are already adapting to an anticipated future leverage ratio requirement and the existing disclosure requirement.[174] This is confirmed by the analysis on the impact of the leverage ratio on risk-taking and bank stability shown in Grill, Lang and Smith (2015).[175] It is also likely that some banks have had a market incentive to improve their leverage ratios since the 2008 financial crisis when some investors had more confidence in leverage ratios than risk-weighted capital requirements. [176] For these reasons, a relationship may be observable in recent data. **Nevertheless, going forward the data availability will improve and future analysis could expand on the current work.**

Box 2: Trading and repo activities – is there a causal link with expected leverage ratio requirements?

Borrowing from the methodology of Grill, Lang and Smith (2015), an attempt is made to consider the impact on trading assets and repo activity of imposing a leverage ratio requirement. In particular, a difference-in-difference type analysis is performed, whereby banks are separated into those that already meet the anticipated requirement and those that would need to adjust their balance sheets in order to meet it. The activities of these two groups of banks can be compared and, if enough other factors are controlled for, any differences may be attributed to their leverage ratio positions.

More specifically:

- institutions whose leverage ratio is below the target make up the so-called ‘ treatment group’, while
- institutions whose leverage ratio is above the target make up the ‘control group’.

The initial announcement of the BCBS leverage ratio was made in December 2009. At that time, the BCBS made the decision to start testing a minimum Tier 1 leverage ratio of 3% until January

[174] EU credit institutions have been required to disclose their leverage ratios in a uniform way since 1 January 2015 (CRR Article 451).

[175] Grill, Michael, Jan Hannes Lang and Jonathan Smith (2015): The impact of the Basel III leverage ratio on risk-taking and bank stability, *ECB Financial Stability Review*, November, pp. 120-132.

[176] Cunliffe (2014), ‘The role of the leverage ratio and the need to monitor risks outside the regulated banking sector’, http://www.bankofengland.co.uk/publications/Documents/speeches/2014/speech746.pdf.

2017.[177] Given that an annual dataset is used, 2010 is used as the start date of the 'treatment' i.e. when the sample of banks is split into two groups. And 3% is taken to be the target leverage ratio at that time - i.e. banks whose Tier 1 leverage ratios were lower than 3% would have had to adjust their balance sheets to comply with the anticipated requirement.

Using annual data on around 500 banks from 27 EU countries over 2005-2014,[178] two groups of regressions are run using the above technique to assess whether there are any significant changes in **(A) trading assets** and **(B) repo activity** of banks bound by the leverage ratio requirement relative to those that were not bound over the same period. The specific data series chosen for these variables was influenced by data availability (time series data for a large sample of banks is required); they should be reasonable proxy variables of the market liquidity-related activities of interest.

Formally, the regressions run are of the form:

$$y_{i,j,t} = \alpha + \mu_i + \lambda_t + \upsilon_j \cdot \lambda_t + \beta T_{i,j,t} + \theta' X_{i,j,t-1} + \varepsilon_{i,j,t}$$

where μ_i, λ_t and υ_j are bank, time and country fixed-effects respectively, $\boldsymbol{T_{i,j,t}}$ **is the 'treatment indicator'**, and $X_{i,j,t-1}$ is a set of bank-specific control variables.[179] The treatment indictor is defined as zero for all banks before 2010: it is still zero after 2010 for all banks with leverage ratios above 3%; it is equal to one for all banks with leverage ratios below 3% after 2010.

(A) Trading assets

Two regressions were run: the first regression uses the value of trading assets[180] in billions of Euros as the dependent variable ($y_{i,j,t}$), and the second regression uses the proportion of trading assets to total assets as the dependent variable. Tables 4 and 5 display the results, where the treatment indicator is the main variable of interest.

Looking at Table 4, the first regression suggests that, over the whole time period 2005-2014, banks with leverage ratios lower than 3% held on average €27bn more trading assets than those banks with higher leverage ratios. However, they held on average €16bn fewer trading assets after the anticipation of the leverage ratio requirement. That is to say, banks reduced their trading assets compared to the amount they otherwise would have held if they had not been bound by the expected leverage ratio requirement. Moreover, the results reveal that overall banks with higher leverage ratios have lower holdings of trading assets: a 1p.p. increase

[177] BCBS, 'Strengthening the resilience of the banking sector', Consultative document, Basel Committee on Banking Supervision December 2009.

[178] The dataset has three main building blocks: (i) a large set of bank-specific variables based on publicly available financial statements from SNL Financial and Bloomberg; (ii) a unique collection of bank distress events that covers bankruptcies, defaults, liquidations, state aid cases and distressed mergers as in Betz et al. (2014) and; (iii) various country-level macro-financial variables from the ECB's Statistical Data Warehouse. The dataset builds upon and expands the dataset described in Betz, F., Oprica, S., Peltonen, T. and Sarlin, P. (2014), "Predicting distress in European banks", *Journal of Banking & Finance*, Vol. 45, pp. 225-241.

[179] In both regressions, control variables are lagged by one period. For indicator variables (which take the value 1 or 0), the control is based on the value of the variable in the previous period. The following firm specific variables are included in each regression: the change in balance sheet size (measured via the logarithm of total assets) since it is assumed that the size of the institution may impact its trading assets; profitability (measured via the pre-tax return on assets) since there may be a relationship between a firm's recent profitability and trading assets; the liquid asset ratio (liquid assets to liabilities) to capture any relationship between having a liquid balance sheet and trading assets; and the leverage ratio (measured as tier 1 capital to total assets) to control for the amount of leverage on a firm's balance sheet.

[180] An SNL Financial data series used: 'Total Assets Held for Trading'.

in a bank's leverage ratio is associated with around €1bn lower holdings of trading assets. This would suggest that the expected introduction of a leverage ratio requirement may have led to a decrease in some banks' trading assets between 2010 and 2014. Importantly however, this result should be seen in light of the broader deleveraging by banks since 2010, which is analysed in the second regression.

Table 5 suggests that there seems to have been no effect from the expected introduction of the leverage ratio requirement on the share of trading assets in banks' portfolios.[181] Therefore, taken in the context of the overall portfolio, the leverage ratio requirement does not appear to have had a negative impact on trading assets. In this sense, there is evidence that the anticipation of a regulatory requirement and possibly market pressure for banks to maintain a certain leverage ratio since 2010 have precipitated a certain degree of exposure reduction by banks (as well as capital raising and retention) in order to become less highly leveraged.

Table 4

Dependent variable: Trading assets	
Variable	**Coefficient**
Treatment indicator (LR≤3%, yr≥2010)	**-15.685** **(7.330)**
Tier 1 risk-weighted requirement threshold indicator	-0.583 (1.286)
Leverage Ratio	**-0.999**** **(0.463)**
Liquid assets to liabilities	-0.012 (0.010)
Δ Size (Δ log total assets)	3.525* (2.101)
Pre-tax ROA	0.971* (0.568)
Dummy (LR≤3%)	**26.774***** **(9.806)**
Observations	2567
Constant, Bank, Time, Country*Time fixed effects	Yes

Notes: All regressors are lagged by one period to take account of endogeneity concerns. Robust standard errors in brackets.

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 5

Dependent variable: Trading assets to total assets	
Variable	**Coefficient**
Treatment indicator (LR≤3%, yr≥2010)	**0.385** **(1.013)**
Tier 1 risk-weighted requirement threshold	0.023

[181] The coefficient on the treatment indicator variable is insignificant and so we cannot reject the null hypothesis that the leverage ratio had no effect on the share of trading assets to total assets.

indicator	(0.339)
Leverage Ratio	-0.0712
	(0.065)
Liquid assets to liabilities	0.046**
	(0.021)
Δ Size (Δ log total assets)	0.258
	(0.196)
Pre-tax ROA	0.077
	(0.092)
Dummy (LR≤3%)	0.023
	(0.339)
Observations	2541
Constant, Bank, Time, Country*Time fixed effects	Yes

Notes: All regressors are lagged by one period to take account of endogeneity concerns. Robust standard errors in brackets.
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

(B) Repo activity

In another regression, a similar analysis is run with repo assets[182] as a proportion of total assets as the dependent variable. This was used in order to investigate the impact on repo assets of being below a 3% leverage ratio from 2010. Table 6 displays the results. The coefficient on the treatment indicator is insignificant, suggesting that the leverage ratio requirement has not caused banks to reduce the amount of repos to total assets on their balance sheet between 2010 and 2014.

Table 6

Dependent variable: Repo to Total Assets	
Variable	**Coefficient**
Treatment indicator (LR≤3%, yr≥2010)	**0.364**
	(0.778)
Tier 1 risk-weighted requirement threshold	0.133
indicator	(0.434)
Leverage Ratio	0.468
	(0.166)
Liquid assets to liabilities	0.076***
	(0.016)
Δ Size (Δ log total assets)	0.857
	(0.798)
Pre-tax ROA	-0.228*
	(0.136)
Dummy (LR≤3%)	0.650

[182] A Bloomberg data series used: 'Securities sold with a repurchase agreement'. Note that this is used as a proxy for overall repo market activity and will capture banks' own repo funding as well as dealer banks' intermediation in repo markets in which they buy and sell securities with a repurchase agreement ('matched book activity').

	(0.778)
Observations	646
Constant, Bank, Country*Time and Time effects	Yes

Notes: All regressors are lagged by one period to take account of endogeneity. Robust standard errors in brackets.
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Summary of results

We have investigated the impact of the leverage ratio requirement on inventories, trading assets and repo activity from the date of the BCBS announcement in 2010 until end-2014. The findings suggest that banks that needed to improve their leverage ratios to meet a 3% requirement or market expectation have been doing so in part by reducing the size of their balance sheets. This has included reducing their trading assets relative to the amount they would have held if not bound by the leverage ratio; however neither trading assets nor repos have significantly fallen as a share of these banks' total assets since 2010. Arguably, a general deleveraging has been a desired effect of the leverage ratio for banking regulators, and it is positive for market liquidity considerations that trading and financing activities have not been reduced disproportionately as part of this process.

It is important to note that these results are based on activity until 2014 only. It is possible that an effect on trading and financing activities has started to crystallise more recently or that banks are yet to adjust their portfolios in response to the incentives created by the leverage ratio that were discussed in Section 2. It will therefore be important to monitor changes in these types of exposures in the coming years.

Box 3: Exploring the relationship between market makers' inventories and leverage ratios

Making use of the data that has been collected by the ESRB (described in Section 1), we analyse the recent relationship between market makers' inventories and their leverage ratios.

For a given level of capital, holding more inventories increases the leverage exposure measure and reduces the leverage ratio (the ratio of regulatory capital to leverage exposures). In anticipation of a regulatory minimum leverage ratio, banks may choose to reduce their inventories in order to boost their leverage ratio in response.[183] Given this, the following relationship might be expected in the data:

a. from a **time series perspective**, for the banks that have been targeting higher leverage ratios in recent years, we may expect to see their inventories falling, unless they sufficiently reduced other exposures or raised capital over the period. If they took other actions to increase their leverage ratio, any change in their inventories may be unrelated to their leverage ratio position and there may not be an apparent relationship between

[183] A similar effect could occur if banks perceive there to be a 'market' minimum leverage ratio requirement i.e. investors, counterparts and analysts expect them to exceed a certain leverage ratio in order to be considered healthy and viable in the market.

the two in the data;

b. from a **cross-sectional perspective**, those banks in the sample with higher inventories in general may have lower leverage ratios, unless these banks also are the best capitalised or have smaller holdings of other assets (e.g. in the banking book). If these banks are the best capitalised or have fewer non-trading assets, then there may be no apparent relationship between inventories and leverage ratios.

In order to better understand the relationship between market makers' inventories and leverage ratios, some simple statistical regressions were performed. We ran several different regressions with inventory as the dependent variable and leverage ratio as the independent variable.[184] Because leverage ratio reporting has only started in recent years, the dataset used in the statistical analysis is not large: it included seven banks over seven periods from 2014Q1.

Results:

To sum up the results, only three out of the total 24 regression analyses performed revealed a significant relationship between inventory holdings and the leverage ratio, of which one was negative and two were positive. The three significant relationships all came from using the more simple regression models; in the more sophisticated models which took account of time and bank fixed effects, no significant relationships were found. While the simpler models were investigated due to the small sample size, the omission of controls for unobserved time and bank specific fixed effects may bias the results and give a misleading picture of the relationship between the variables.

Due to this sparse evidence of a significant relationship and the contradicting signs, we conclude that it is difficult to confirm the hypothesis that, in this sample, banks that needed to improve their leverage ratio have been reducing their inventory holdings, or that banks with higher leverage ratios have had fewer inventories. It should be stressed that this analysis and the conclusions rely on a very small sample and cannot show whether or not there is a causal relationship (unlike the analytical method used in Box 2, which requires a longer time series and larger sample of banks). Similar analysis could be repeated at a future date for a larger sample of banks in order to benefit from increased sample size and to take account of future developments in banks' responses to the expected leverage ratio requirement.

[184] These covered three types of regressions: (1) pooled Ordinary Least Squares (OLS) using levels of leverage ratios and inventories; (2) pooled OLS using the quarterly change in these variables; and (3) a panel regression with bank fixed effects using levels of leverage ratios and inventories. Each type of regression was conducted with and without time fixed effects. Further, two definitions of the leverage ratio have been investigated - the EU definition using a transitional definition of Tier 1 capital, and the EU definition using a fully phased-in definition of Tier 1. As data on leverage is bounded by zero and as levels of inventory are very high, the regressions are repeated taking the logarithm of leverage and inventories. As a further robustness check, missing inventory data is also interpolated.

5. Conclusions

A mixture of conceptual and empirical, including qualitative and quantitative, analyses have been used to investigate the potential beneficial and negative effects of the leverage ratio requirement on market liquidity. It is important to keep in mind that the potential for analysing this topic is limited at this time for a few reasons: several factors may have been influencing the state of market liquidity in recent years and it is difficult to disentangle the effect of specific factors; the leverage ratio is still only an anticipated capital requirement for the majority of EU banks; and there is no agreed theoretical framework for market liquidity, market making and regulation in order to model the impact of introducing a leverage ratio requirement. However, it has been possible to establish some important considerations for when assessing the costs and benefits and to draw some tentative conclusions about the impact to date of banks already anticipating the leverage ratio requirement. The key messages are summarised below.

1. Market makers are currently subject to many factors, including much regulatory change, which may be changing their incentives to provide market making and financing services. Market makers self-report that several regulations are influencing them at present. These include reforms to capital, liquidity and funding requirements and structural reforms. Furthermore, there are a number of important changes to market regulation, for example additional transparency requirements.

2. Conceptually, there are channels by which the leverage ratio specifically could reduce incentives to act as a marker maker or provide market financing. We have identified two relevant activities that may be affected: (1) dealers providing inventory, particularly for low risk-weighted assets; and (2) the willingness of banks to finance leveraged intermediaries who take positions in markets, so-called funding liquidity. All things being equal, the leverage ratio may thus make some market liquidity-related activities less attractive for a part of the banking sector and result in increased capital costs for firms with low average risk weights. But the size of any resulting effect on market liquidity will depend on a number of factors, including: the proportion of incumbents affected by a leverage ratio constraint (in aggregate, not expected to be large based on recent BCBS QIS data); the ability of less-constrained firms to expand their market share; and, to the extent that the leverage ratio increases costs for some banks, how much these costs are absorbed.

3. Aside from any costs related to these potential adjustment actions, the leverage ratio can also be expected to support market liquidity, particularly during periods of stress. First, it ensures a minimum degree of resilience at all stages in the financial cycle and can ensure that banks are better able to absorb shocks. This should put banks in a better position to continue to support markets even in periods of heightened uncertainty. *In extremis*, if banks are less likely to fail then they will not rapidly withdraw services that support market liquidity. Second, there may also be

an impact through banks' own funding costs. Better capitalised banks may be better able to absorb short term stresses and maintain financial services as their debt funding costs are likely lower in times of market wide stress. This matters particularly in situations when equity is only available at very high cost just when market liquidity-related activities may be most needed.

4. In order to assess the aggregate impact of the leverage ratio on market liquidity, it is necessary to compare any costs that may result from imposing a leverage ratio requirement due to potentially rising liquidity premia and/or quantity restrictions to the benefits. The benefits relate to (i) curbing excessive market liquidity in times of exuberance, and (ii) greater resilience of dealer banks which improves their ability to provide market and funding liquidity, including in stressed periods. It is possible that the structure and design features of the leverage ratio requirement (e.g. minimum versus buffer) may influence how banks respond when their leverage ratio falls.

5. There is limited historical experience on which to assess how the financial system is likely to adapt and innovate in response to such regulatory change, also taking account of the other concurrent regulatory changes. In order to quantitatively assess the costs and benefits, it would be useful to develop a partial equilibrium model adapted to the current characteristics of the EU banking sector. Some recent policy papers have discussed the costs and benefits. Dudley (2015, 2016) and Shin (2016) have put weight on the benefits of recent regulatory change for delivering robust and reliable market liquidity via banks. The Committee on the Global Financial System found that more stringent regulatory requirements have curbed dealers' risk-taking capacity but noted that benchmarking costs arising from such curbs on dealer capacity against the cost of liquidity before the crisis is misleading, as this does not account for market changes since that time, nor greater resilience of banks to stress.

6. In addition to examining the conceptual channels by which the leverage ratio may have an impact on market liquidity, we have also drawn on information provided to the ESRB Expert Group on Market Liquidity via a qualitative survey of major European market making banks. Overall, the key messages from market makers were that a range of regulations impact their activities. They expect capital and liquidity regulations - including but not exclusively the proposed leverage ratio requirement - and market regulation such as transparency requirements, to negatively impact their profit and incentive structure such that it would lead to some reduction or withdrawal of market making services in the future. But market makers also pointed out that other factors besides regulation and their own market making activities have an impact on market liquidity. In interpreting the results of the qualitative questionnaire, it is important to keep in mind that these are the views of the market makers in the sample and that there are some limitations when interpreting the survey results since responses were provided in open text format and are therefore not always precise and easily comparable.

7. Some of the channels described in the conceptual analysis above and the survey evidence from market makers suggest that banks which are targeting higher leverage ratios may hold smaller trading inventories or provide less secured financing than if they had not been trying to boost their leverage ratios. This may amount to reducing inventories from previous levels or intermediating less secured funding, or not increasing them as much as they would otherwise have done, thereby potentially putting pressure on market liquidity. While it is difficult to investigate empirical evidence for EU banks at this time as there is not yet a harmonised leverage ratio solvency requirement, banks have reported that they are already adapting to an anticipated future leverage ratio requirement and the existing disclosure requirement. It is also likely that some banks have had a market incentive to improve their leverage ratios since the 2008 financial crisis when some investors had more confidence in leverage ratios than risk-weighted capital requirements. For these reasons, a relationship may be observable in recent data and efforts were made to perform an initial quantitative analysis.

8. An empirical method was used to investigate the evidence for a *causal* impact of the leverage ratio requirement on banks' market liquidity-related business after the date of the initial BCBS announcement in 2009. The findings suggest that banks which needed to improve their leverage ratios to meet a 3% requirement or market expectation have been doing so in part by reducing the size of their balance sheets. This has included reducing their trading assets relative to the amount they would have held if not bound by the leverage ratio; however neither trading assets nor repos have significantly fallen as a share of these banks' total assets since 2010. Arguably, a general deleveraging has been a desired effect of the leverage ratio for banking regulators, and it is positive for market liquidity considerations that trading and financing activities have not been reduced disproportionately as part of this process. It is important to note that these results are based on activity until 2014 only. It is possible that an effect on trading and financing activities has started to crystallise more recently or that banks are yet to adjust their portfolios in response to the incentives created by the leverage ratio. It will therefore be important to monitor changes in these types of exposures in the coming years.

9. Some preliminary statistical analysis was performed to investigate the relationship between dealers' inventories and their leverage ratio position for the seven Euro Area banks in the sample of the ESRB data collection. This showed very little evidence of a significant relationship between the two since the start of the data series in 2014. Thus we cannot conclude that, in this sample, banks that needed to improve their leverage ratio have been reducing their inventory holdings, or that banks with higher leverage ratios have had fewer inventories in this sample. It should be stressed that this analysis and the conclusions must rely on a very small sample and cannot be show whether or not there is a causal relationship.

10. It is difficult to comment at this time on whether the introduction of the leverage ratio, or a particular calibration of it, is likely to significantly affect the future state of market liquidity. This preliminary analysis suggests there may be some costs

associated with the leverage ratio for broker dealers, but that there are also expected to be benefits - the leverage ratio may help to ensure that banks can sustain the provision of services that are important to market liquidity, particularly taking account of stressed periods. The analysis presented in this paper should be the starting point for future, deeper theoretical and empirical investigation into this question.

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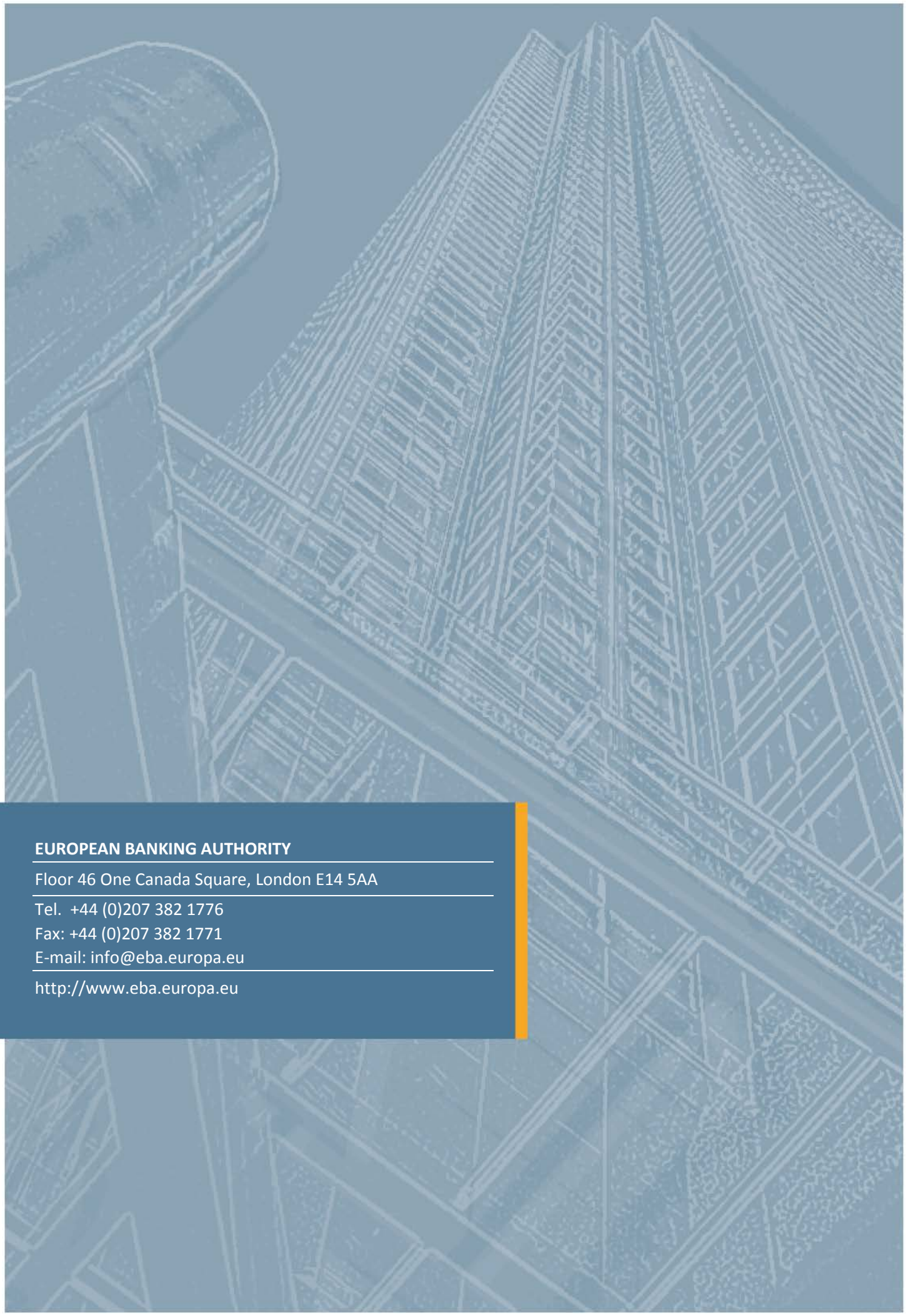

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