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Leverage Ratio

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Introduction

A limited leverage ratio is often explained as a transparent and simple capital requirement as opposed to capital requirements based on complex and advanced models of risk-adjusted assets. However, international uniform regulatory standards addressing high leverage in banks is disproportionate when it comes to banks operating in specific jurisdictions or with specialized business models.

Basel II introduced the Internal Rating Based (IRB) Approach to capital, partly with the objective of creating incentives for banks to better understand the risks they face. The consequence was increased complexity, as risks in reality differ from institution to institution and from jurisdiction to jurisdiction. Capital requirements for banks using internal models are based on the observed development of relevant data in the markets where the banks operate. Structural differences between different markets are thereby taken into account, including differences in legal frameworks such as creditor rights, foreclosure procedures, social support etc. These differences matter greatly, but they are difficult to quantify by other methods than looking at the actual history of PDs and LGDs.

Lately, the costs and benefits of the increased complexity have been queried, not least because of differences in risk weights across institutions. Those in favour of a regulatory minimum requirement for banks' leverage ratio often argue that excessive leverage was one of the most important drivers of the financial crisis and that the risk-adjustment failed to adequately measure the true riskiness of bank portfolios. The arguments are to some extent based on empirical evidence on banks operating on an international level and/or reflect deficient lending policies like disproportionate single name concentration risk, equity-free public sector lending, real estate finance with poor collateral quality or off-balance sheet lending.

It is important to note that these dysfunctional developments were not the result of deficient internal risk models but of the ignorance of well ascertainable risks which have not been assessed. Hence, the introduction of a simple back-stop leverage ratio would represent a reversal of meanwhile well established supervisory practices back to a crude and non-risk-sensitive approach, widely neutralising all recent labour- and cost-intensive efforts of credit institutions to improve and further fine-tune their risk management tools.

Furthermore, the critiques of internal models of risk-adjusted assets don't take into account the legal differences across jurisdictions as well as specialized business models. Studies based on specific national empirical evidence show that measures of capitalization – whether calculated as a simple leverage ratio or of risk-adjusted assets – might even not be the best indicator of the banks defaulting in the last crisis (see appendix).

Ideally, leverage ratio as a regulatory tool should only be a soft indicator among other indicators of a bank's ability to absorb losses – or if implemented as a hard rule with differentiated levels depending on other relevant indicators reflecting the overall risk profiles of the institution.

Proposed proportionality principles

As currently designed, a uniform leverage ratio reflects a balance-sheet risk profile of credit institutions characterised by exposures across all types of banking activities. Such "one-size ratio" is inappropriate for credit institutions who are not engaged in such broad variety of business lines, i.e. don't take risks across all types of banking activities because of their legal structure, their affiliation to an institutional protection scheme or



their specialised business model. Thus a uniform leverage ratio distorts level playing field across credit institutions.

For example, a uniform leverage ratio will prevent an appropriate remuneration of specialised mortgage lenders' equity, keeping in mind that a 3% leverage ratio translates into a risk weight close of 37.5% without a perspective to cross-subsidise the intrinsic low risk profile and related low margins of mortgage loans through other businesses.

Therefore, a more flexible and proportionate approach is required, targeting a limited leverage ratio whose calculation relies on a broad set of risk indicators – particular attention should be paid to business models which are considered to entail low risk, such as mortgage lending or specialised lending with governments etc. These indicators – or proportionality principles – will then help regulators carefully determine an appropriate limit of an institution's leverage ratio reflecting the overall resilience of the institution's business models operating in a specific jurisdiction.

Proportionality principles on leverage ratio could be based on the following indicators (non-exhaustive and noncumulative):

- Lending structure
 - Specialized low risk lending rooted in specific legislation or driven by group structure
 - Documented low loss rates in the respective business segments
 - Curtailing of liquidity and interest rate risks through matched/congruent funding
 - Affiliation to an institutional protection scheme
 - Current balance sheet growth or growth in off balance activities
 - Level and concentration of exposures
 - Large exposures
 - Regional diversification of the credit portfolio
 - Debtor rights and liabilities
 - Exclusion of non-recourse residential mortgage lending
- Funding structure
 - Funding through secured instruments, i.e. covered bonds
 - Cover asset eligibility requirements enshrined in national covered bond legislations act as a "risk filter" for issuers' balance sheets, thus efficiently reducing the risk stemming from the respective business segment
 - The risk mitigation effect of cover eligibility requirements is processed through
 - conservative valuation of real estate collateral
 - compliance with loan-to-value ratios
 - monitoring of real estate markets and revaluation of collateral if required
 - Asset-liability management, e.g. pass through business models

It should be left to national supervisors to assess these indicators in their jurisdictions and/or geographical areas proportionate with an appropriate level of leverage of the specific banks under their supervision.



Proportionality applied on specific business models

As an example of a business model that will be hit by a disproportionate approach to leverage ratio is the European mortgage credit industry and public sector lenders as this would not take into account the low-risk and high volume business model. As such, it is likely to encourage a shift towards riskier and more expensive mortgage lending as well as to jeopardise the existence of some long-standing business models without any obvious benefits in terms of stability or resilience.

A significant amount of the European mortgage and public sector lending is funded by secured instruments, primarily covered bonds with an indirect or direct preferential claim to the underlying assets – typically supported by a strong legal framework. Investors in those instruments are professional and clearly informed of the underlying risk – including the leverage ratio of this risk. Any disproportionate approach to leverage ratio may negatively affect the markets for covered bonds.

To conclude on the mortgage credit industry and proportionality principles, different indicators of risk resilience in specific mortgage lending models may be the mitigating explanation of a higher leverage business model. The diversity of the European banking landscape and business models requires a range of appropriately diversified leverage ratios where a band from 1% to 3% shall be envisaged and the applicable ratio be defined on the basis of the listed indicators.

* * *



Appendix

Increased capital requirements: Risk-weighted assets or simple leverage measure?¹

Most people – including the financial sector – probably share the view that the regulation of the financial sector was inadequate before the financial crisis. Regulatory tightening in the form of higher capital and liquidity requirements is thus a natural consequence of the hard-earned lessons of the crisis. However, the challenge lies in balancing the trade-off between financial stability on the one hand and costs in the form of the risk of a more expensive and less efficient financial sector on the other hand.

In addition to the tougher requirements for bank capital in the numerator of the capital ratios, some argue that the denominator should be revised. Especially banks' access to apply internal models in calculating the so-called risk-weighted assets, which are used in the denominator, is a frequent point of criticism. At international level, the Bank of England with Andrew Haldane at the forefront has headed this debate. The basic view is that the calculations behind the risk-weighted assets are too complex, which is why a simple measure of banks' leverage (leverage ratio) would make the job of regulators and supervisors easier and would better enable investors to make informed decisions (see Haldane, 2012). Moreover, in an empirical analysis the Bank of England has found evidence that the leverage ratio measured in 2007 at the onset of the financial crisis was a better default predictor than a measure based on risk-weighted assets.

By contrast, the Basel Committee finds that regulation and supervision of a sector as complex as the financial sector necessarily requires a complex set of instruments (see Byres, 2012). It is also argued that a simple leverage measure as opposed to a risk-weighted measure, other things being equal, creates incentives for banks to take on higher risks as they will try to maximise the return they can achieve on the capital employed. So far, the international debate has resulted in a compromise between the two views with the recent adoption of the CRR and CRD IV, according to which European financial institutions must have a minimum leverage ratio of 3 percent, whereas the actual capital requirements are still based on risk-weighted assets.

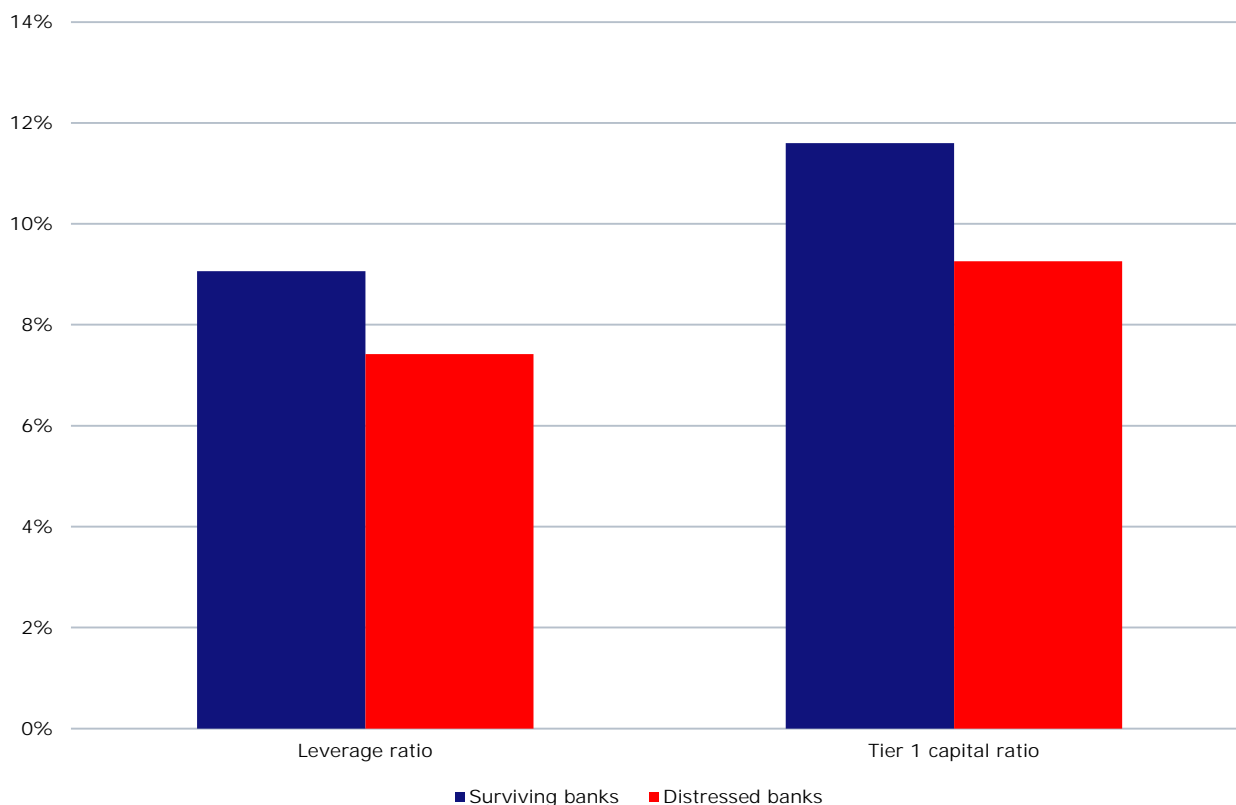
In this appendix the debate is narrowed to a Danish context. Hence, we have applied the same empirical analysis as Andrew Haldane (2012) to Danish banks and supplemented the analysis with various other financial ratios.

Figure 1 shows the average leverage ratio and Tier 1 capital ratio in 2007 of a sample of the 58 largest Danish banks. Generally, both financial ratios tend to be lower for banks that became distressed during the financial crisis. The leverage ratio of the surviving banks is 22 higher on average than that of the banks that failed. Measured by the Tier 1 capital ratio, which is based on risk-weighted assets in the denominator, the percentage is 25.

¹ This appendix draws heavily on the paper "Higher Capital Requirements Imply Higher Earning Requirements in the Financial Sector" by Christian Sinding Bentzen, Jesper Berg and Niels Storm Stenbæk, forthcoming in the Danish Journal Finans/Invest.



Figure 1 – Average leverage ratio and Tier 1 percent 2007



Note: Leverage ratio approximated as booked equity in percent of total assets plus off-balance sheet items.
 Sources: Danish FSA, Nykredit.

To achieve a more detailed picture, Figures 2 and 3 present a graphical overview of the distribution of the capital ratios. In the figures, the banks with the best ratios have been sorted left to right for each capital ratio. The immediate impression is that the Tier 1 capital ratio is better than the leverage ratio at ranking the banks that later became distressed. Looking at the five lowest values separately, the leverage ratio does not predict a single default, whereas the Tier 1 capital ratio correctly gets three out of five banks. However, the leverage ratio has a decent hit rate subsequently. Without naming the banks concerned, it is probably no surprise that the five most leveraged banks in 2007 – and thereby those with the lowest leverage ratios – are also the five largest Danish banks, which all apply internal models in calculating risk-weighted assets, and which all have highly diversified loan portfolios and lower-than-average risk weights. This seems to be a strong indication that risk-weighted assets provide a more accurate picture of the risk of Danish banks than the simple leverage measure.

Putting the debate further into perspective, Figures 7 and 8 show the distribution of the financial ratios "Sum of large exposures" and "Property exposure" in 2007. These two financial ratios seem to be even better at ranking the banks that later became distressed than the capital ratios. Looking at the distribution of the banks' property exposures in 2007 separately, this financial ratio gets the first seven right – and even on the basis of a smaller sample, where the missing observations are mainly from failed banks, which are presumed to have had large property exposures.

Table 1 shows a number of statistical representations of the data. The left hand side variable is an indicator variable taking the value of 1 if the banks became distressed during the financial crisis, and the value 0 if the bank has survived so far. The right hand



side includes the financial ratios for 2007 discussed above. The point estimates of the logistic regressions can be translated into a conditional probability that the average bank should become distressed. The performance of the different statistical models may thus serve to determine which financial ratios would have served as the best early warning indicators in 2007.

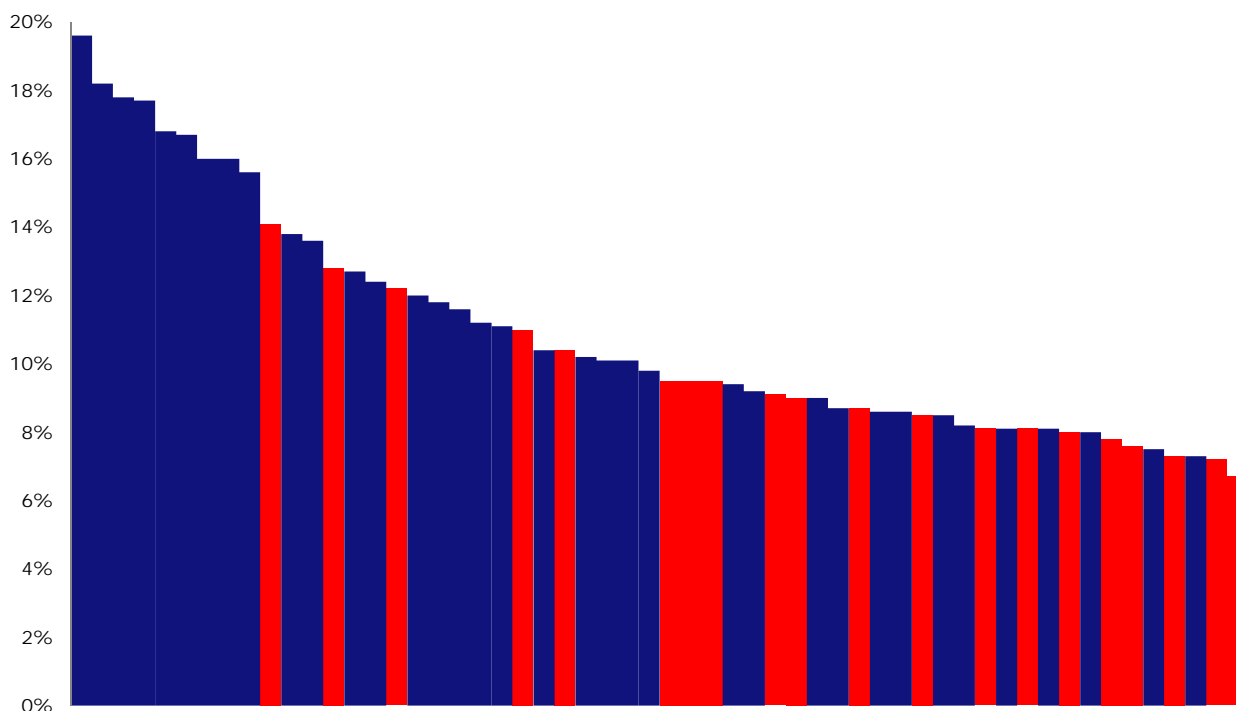
The solo regressions in columns (1) to (4) show that all the financial ratios may each contribute significantly to explaining which banks became distressed during the financial crisis. However, for the leverage ratio only at a significance level of 10 percent, whereas the Tier 1 capital ratio is significant at 5 percent, and the remaining two financial ratios at 1 percent. Looking at the explanatory power of the models expressed by pseudo R-squared, the property exposure in 2007 appears to do better than the sum of large exposures – however, this is subject to some reservations as the two samples are not identical, as mentioned above. In column (5), all the first three financial ratios are included; the leverage ratio turns out insignificant, the Tier 1 ratio significant at 10 percent while the sum of large exposures is significant at 1 percent. Applying the full model to the reduced data set, the sum of large exposures becomes insignificant, which is attributable to a high correlation with property exposure. The leverage ratio and the Tier 1 capital ratio maintain their significance levels of the solo regressions.

Based on the regressions, the conclusion is that financial ratios reflecting the sum of large exposures or property exposures have been much better at predicting which Danish banks would become distressed during the financial crisis than the capitalisation ratios. Of the two financial ratios for bank capitalisation, the Tier 1 ratio based on risk-weighted assets, appears to be more accurate than the simple leverage fraction, the leverage ratio. These conclusions are well in line with the underlying idea that can be inferred from CRR and CRD IV, which impose increased requirements on, for example, large exposures. It should be noted that the determination of capital is still based on risk-weighted assets, whereas the leverage ratio is introduced as a parallel measure and must constitute at least 3 percent. In a Danish context, the increased requirements for the sum of large exposures is currently of less importance in that the market has largely "solved" the problem on its own; the banks that had excessive (property) exposures in 2007 have thus to a large extent disappeared from the map.

The observation that simple financial ratios such as property exposure and the sum of large exposures were the best early warning indicators may also serve to throw the discussion of better capitalised SIFIs into relief. Indeed, Denmark probably held the world record for bank failures per capita during the financial crisis, but measured by total lending by distressed Danish banks, we are far from the top. The accumulated lending of the banks that failed represents only about 6 percent of total lending. The largest Danish banks have distinguished themselves in an international comparison by being among the best capitalised banks and being able to absorb their losses without becoming insolvent – in part because the sum of large exposures has not been significant in these banks. The desire to impose increased capital requirements beyond the general EU regulatory consensus on the sector in general, and on the major Danish financial institutions in particular, thus cannot be ascribed to any direct lesson from the Danish crisis, but rather to the fear of the potential adverse effects on the economy, if one of the major Danish financial institutions should fail. Since increased capital requirements for the financial sector come at a price – e.g. higher earnings requirements especially in the short term – this suggests that Danish policy makers should take pause to reconsider.

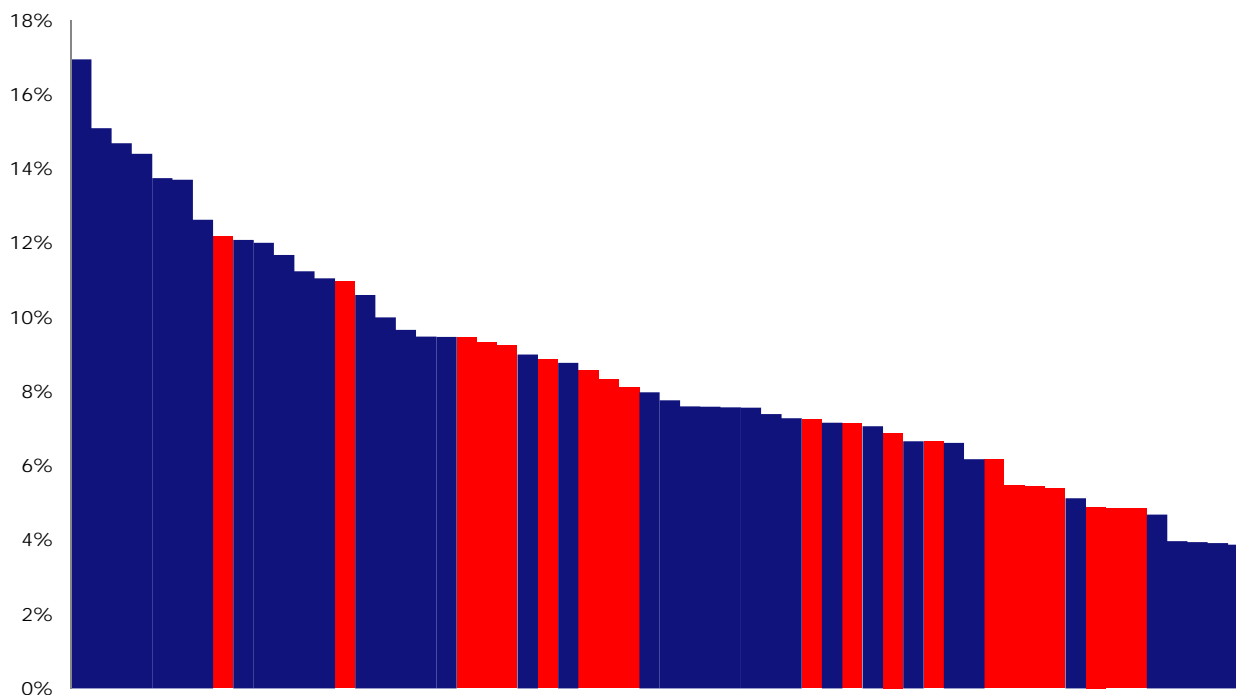


Figure 2 – Tier 1 capital ratio 2007



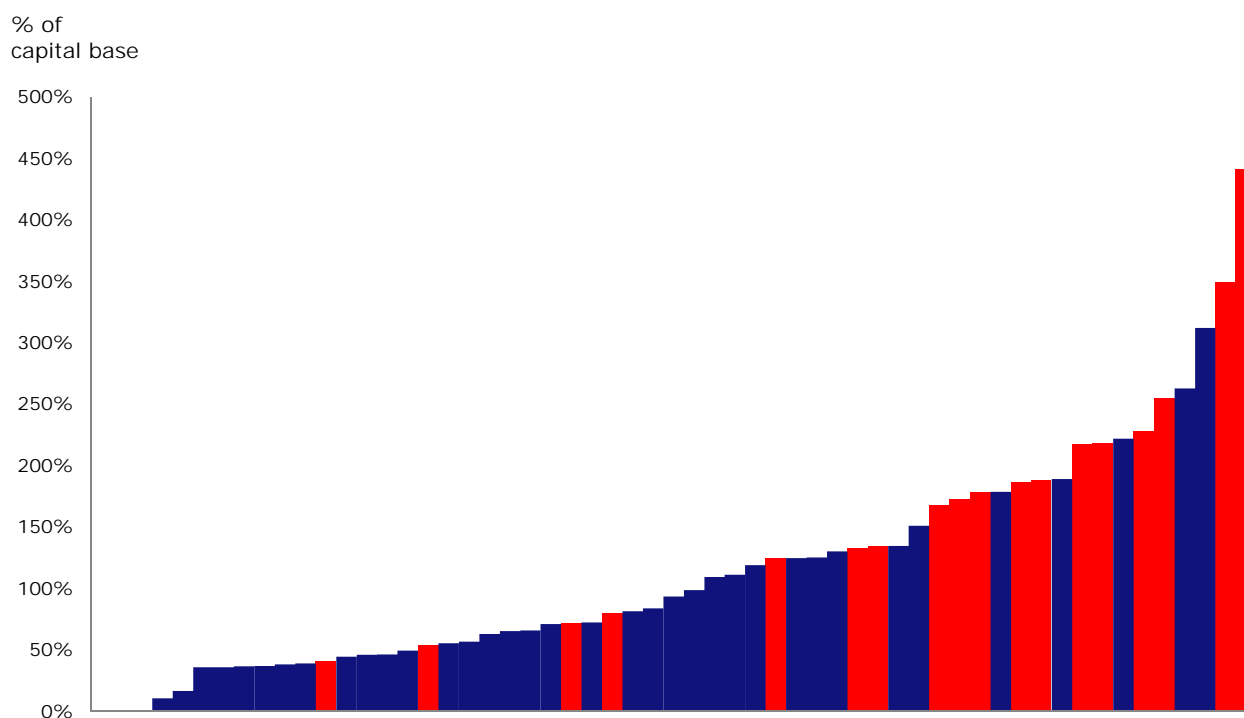
Note: Red marking denotes banks that became distressed during the financial crisis.
 Sources: Danish FSA, Nykredit.

Figure 3 – Leverage ratio 2007



Note: Red marking denotes banks that became distressed during the financial crisis. Leverage ratio approximated as booked equity in percent of total assets plus off-balance sheet items.
 Sources: Danish FSA, Nykredit.

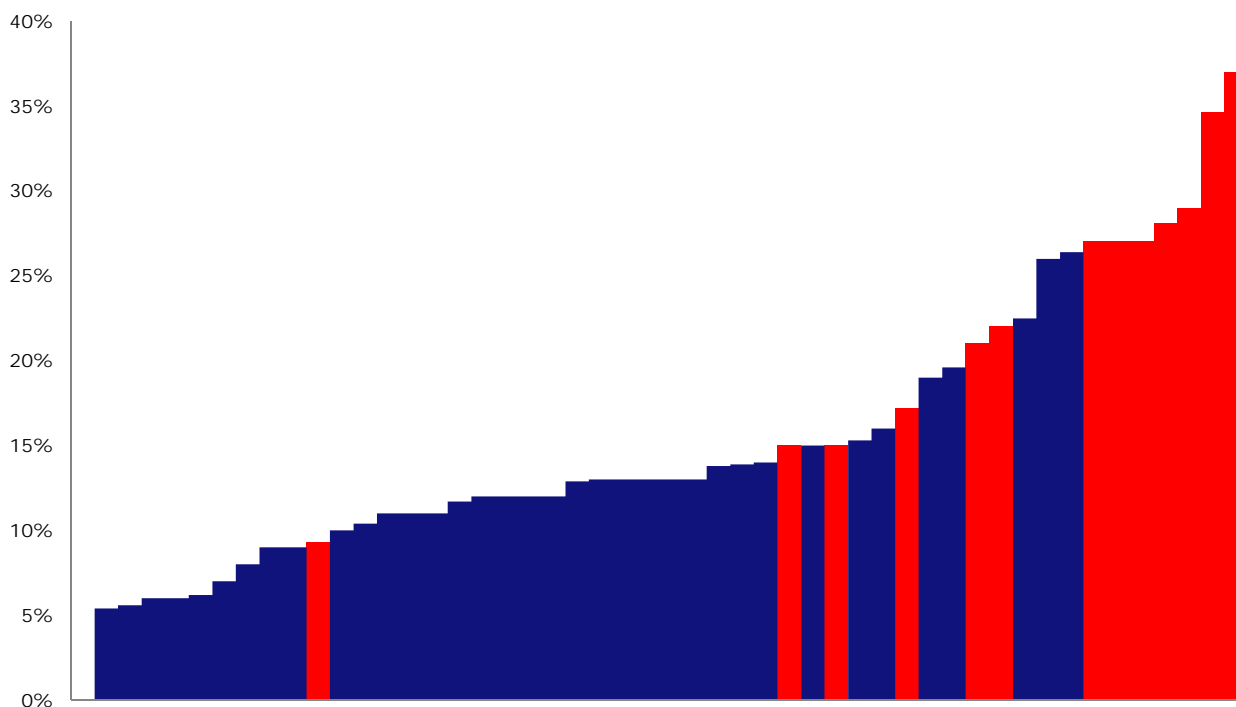
Figure 4 – Sum of large exposures 2007



Note: Red marking denotes banks that became distressed during the financial crisis.

Sources: Danish FSA, Nykredit.

Figure 5 – Property exposure 2007



Note: Red marking denotes banks that became distressed during the financial crisis. Note that the data sample is smaller than in the other calculations due to a lack of data.

Sources: Danish FSA, Nykredit.



Table 1: Logistic regression models

| | Model (1) | Model (2) | Model (3) | Model (4) | Model (5) | Model (6) |
|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Dependent variable | Indicator of bank distress | Indicator of bank distress | Indicator of bank distress | Indicator of bank distress | Indicator of bank distress | Indicator of bank distress |
| Leverage ratio 2007 | 0.20 (0.11)* | | | | 0.34 (0.27) | 0.99 (0.50)* |
| Tier 1 capital ratio 2007 | | -0.33 (0.15)** | | | -0.52 (0.29)* | -1.11 (0.53)** |
| Sum of large exposures 2007 | | | 0.015 (0.0047)*** | | 0.013 (0.0049)*** | 0.00068 (0.0068) |
| Property exposure 2007 | | | | 0.25 (0.07)*** | | 0.32 (0.11)*** |
| Observations | 58 | 58 | 58 | 50 | 58 | 50 |
| Pseudo R-squared | 0.09 | 0.18 | 0.33 | 0.55 | 0.41 | 0.67 |

Note: Logistic regressions on bank distress. Standard errors in parentheses. Constant contained in all specifications. *, **, *** denotes a significance level of 10%, 5%, and 1%, respectively

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Byres, Wayne (2012) Regulatory Reforms – Incentives Matter (Can We Make Bankers More Like Pilots?), Speech at the Bank of Portugal conference on Global Risk Management: Governance and Control Lisbon, 24 October 2012.

Haldane, Andrew (2012) The Dog and the Frisbee, Speech at the Federal Reserve Bank of Kansas City's 366th economic policy symposium, "The changing policy landscape", Jackson Hole, Wyoming, 31 August 2012.