STAFF MEMO

Norwegian banks' adjustment to higher capital requirements

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AUTHORS:

HANNA WINJE AND
LARS-TORE TURTVEIT

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Norwegian banks' adjustment to higher capital requirements[1]

Banks have increased their capital ratios in recent years to meet stricter regulatory requirements. This paper examines how the largest Norwegian banks have adjusted to higher capital requirements over the past five years. We find that this adjustment has mainly taken place through an increase in equity in the form of retained earnings. At the same time, banks' risk-weighted assets have decreased, even though their total assets have grown. This also contributes to pushing up capital ratios.

In part 1 and 2 we provide a brief overview of the capital requirements facing banks and their options for adjusting to them. In part 3 and 4 the increase in banks' capital ratios is decomposed to show the contributions from different adjustment methods. We also look more closely at the various contributions. Some closing remarks are given in part 5.

1. Banks are facing more stringent capital requirements

The banking crisis in the Nordic countries in the late 1980s and early 1990s, and the global financial crisis in 2007–2009, demonstrated clearly how problems in the banking sector can affect the real economy. This has led to stricter regulation of banks. Capital requirements have increased to improve banks' loss-absorbing capacity. At the same time, the rules have become more risk-sensitive with the Basel II framework, but also more complex.

The Norwegian rules lay down requirements for various measures of capital adequacy. The most widely discussed is the common equity tier 1 ratio:

$$Common\ equity\ tier\ 1\ ratio\ = \frac{Common\ equity\ tier\ 1\ capital}{Risk-weighted\ assets}$$

Common equity tier 1 (CET1) capital consists of equity capital less regulatory deductions.[2] This is divided by the bank's total risk-weighted assets. The higher the risk of loss, the higher an asset's risk weight. The higher the risk weight, the more capital the bank must hold against the asset.

The implementation of the Basel II rules in Norway in 2007 allowed the largest Norwegian banks to use internal ratings-based (IRB) models to calculate risk weights for loans to households and firms. IRB models can result in a lower risk weight than the models used previously. This pushes up a bank's capital ratio and thereby helps release capital. To limit this effect, the Basel II framework included a transitional rule preventing banks' risk-weighted assets from falling below a set percentage of what

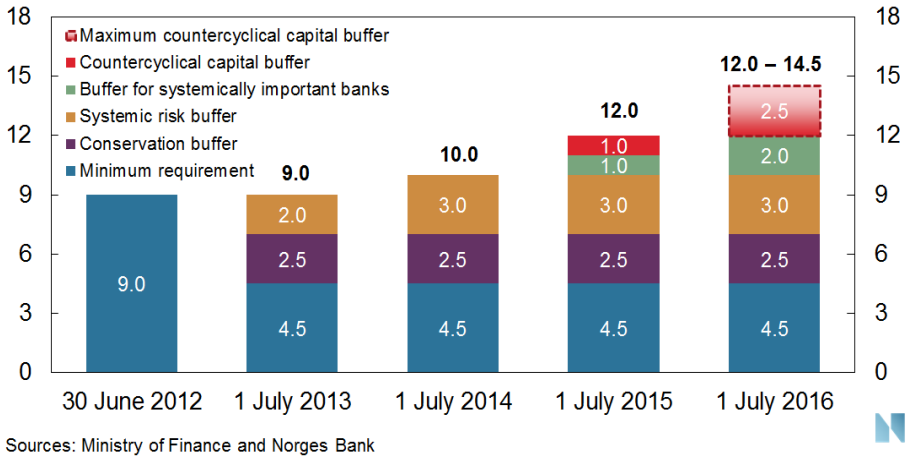
[1] We are grateful to Bjørne Syversten, Sindre Weme, Katrine Boye and Frank Hansen for useful input and comments.
[2] Deductions of less loss-absorbing items such as goodwill and other intangibles.

they would have been under Basel I.[3] Initially this floor was to be phased out by 2010, but it has been retained through to 2017.

From 30 June 2012, Finanstilsynet (Financial Supervisory Authority of Norway) required all Norwegian banks to hold CET1 capital equivalent to 9 percent of risk-weighted assets. This was a significant increase from the previous implicit minimum of 5.1 percent.[4] From 1 July 2013, the capital and buffer requirements of the EU capital framework (CRR/CRD IV) were implemented for Norwegian banks. Chart 1 shows the gradual phasing-in of the CET1 requirements through to 1 July 2016.[5] How high the CET1 ratio must be depends on whether a bank is designated as systemically important and on the size of the countercyclical capital buffer. The largest banks have communicated targets of around 13–15 percent CET1 capital in 2016.

1) Phasing-in of CET1 requirements

Percent. 30 June 2012 – 1 July 2016



Sources: Ministry of Finance and Norges Bank

2. Banks' adjustment options

Banks can increase their CET1 ratio in different ways. They can choose to increase their CET1 capital (the ratio's numerator) and/or reduce their risk-weighted assets (the ratio's denominator).

CET1 capital can be increased by retained earnings. Boosting profits, for example through higher lending spreads, will contribute to more rapid growth in equity. This will also be the case if banks choose to retain more of their profit rather than paying dividends to shareholders. In addition, banks can raise new equity in the market by issuing shares or equity certificates.

Risk-weighted assets can be reduced through a decrease in total assets or a decrease in the average risk weight.[6] A reduction in lending will bring down total assets. The average risk weight will come down if the risk weight for an exposure decreases, for example through the approval of new IRB models, or if the proportion of assets with lower risk weights increases.

[3] The floor was 95 percent when introduced in 2007. It was then lowered to 90 percent in 2008 and to the current level of 80 percent in 2009.
[4] Circular 14/2001 from Kredittilsynet (now Finanstilsynet) required a Tier 1 capital ratio of at least 6 percent in order to issue time-limited subordinated loan capital. From 2002, hybrid capital such as preferred capital securities could constitute up to 15 percent of Tier 1 capital. This implied a minimum CET1 ratio of 0.85 * 6.0 = 5.1 percent. For a long time, however, this ratio was calculated using higher risk weights than used today.
[5] See, for example, Section 2 of *Monetary Policy Report* 2/13 for a more detailed description of the phase-in.
[6] Average risk weight = Risk-weighted assets / Total assets.

The sale of assets can affect both the numerator and the denominator of the CET1 ratio. An asset sold for more than its book value will boost profits. This can increase CET1 capital. If the proceeds are used to repay debt or invested in assets with lower risk weights, risk-weighted assets will be reduced as well.

How banks choose to adjust to stricter capital requirements will depend on the macroeconomic environment, competition in the banking sector and regulatory conditions. Their chosen methods of adjustment will in turn impact the real economy. A reduction in bank lending could slow credit growth, as could higher lending rates. In a country experiencing strong growth in debt and house prices, these may be desirable effects. In an economic downturn, however, these effects on credit growth may be unwelcome.

3. Decomposition of CET1 ratios

Cohen and Scatigna (2014) look at how a global set of 94 banks adjusted to tighter capital requirements over a period of three years. They decompose the change in CET1 ratios from end-2009 to end-2012, thereby shedding light on the contributions from different adjustment methods.

Table 1 – Banking groups' market shares[1)] Percent. As at 31 Dec. 2013 (31 Dec. 2008)	**Retail market**	**Corporate market**
DNB Bank	31.2 (31.3)	30.7 (30.2)
Nordea Bank Norge	10.6 (10.8)	15.0 (17.8)
SpareBank 1 SR-Bank	5.1 (4.4)	4.7 (3.9)
Sparebanken Vest	4.1 (3.9)	2.3 (1.9)
SpareBank 1 SMN	3.3 (2.5)	3.6 (2.3)
SpareBank 1 Nord-Norge	2.7 (2.2)	2.0 (1.5)
All	56.9 (55.0)	58.3 (57.4)

1) A bank's gross lending in each market as a percentage of total gross lending in that market by all banks and mortgage companies in Norway. For the SpareBank 1 banks, this includes lending by the mortgage companies SpareBank 1 Boligkreditt and SpareBank 1 Næringskreditt.
Source: Norges Bank

Based on Cohen and Scatigna's method,[7] we have conducted this decomposition exercise for the six largest Norwegian banking groups in the period from end-2008 to end-2013. Table 1 shows the market shares of the groups included in the analysis. DNB and Nordea Bank Norge have been designated as systemically important financial institutions by the Ministry of Finance. The other four are large regional savings banks. Three of these are members of the SpareBank 1 Alliance and have stakes in the jointly-owned mortgage companies SpareBank 1 Boligkreditt and SpareBank 1 Næringskreditt. DNB Bank, Nordea Bank Norge and Sparebanken Vest are not members of alliances and have wholly-owned mortgage companies.

[7] See the appendix for a more detailed presentation of the methodology.

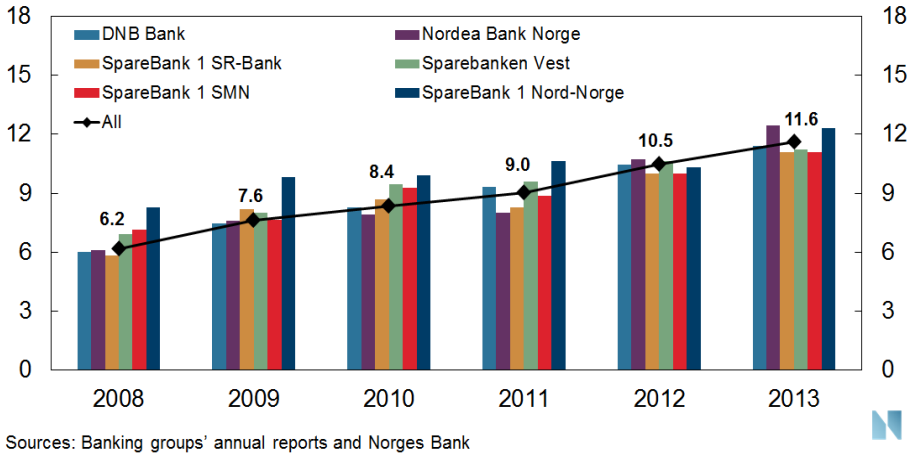
Differences between the rules for capital adequacy and financial reporting mean that risk-weighted assets and total assets will not be comparable for banks with stakes in jointly-owned mortgage companies.[8] This presents challenges when decomposing the denominator of the capital ratio. We do not, therefore, show the decomposition of the risk-weighted assets for the six largest banks as a whole.

4. Norwegian banks' adjustment

Over the past five years, the six largest Norwegian banks taken together have almost doubled their CET1 ratio (see Chart 2). The increase from end-2008 to end-2013 was 5.4 percentage points. This is due primarily to a significant increase in CET1 capital, but a reduction in risk-weighted assets has also played a role (see Chart 3).

2) CET1 ratio

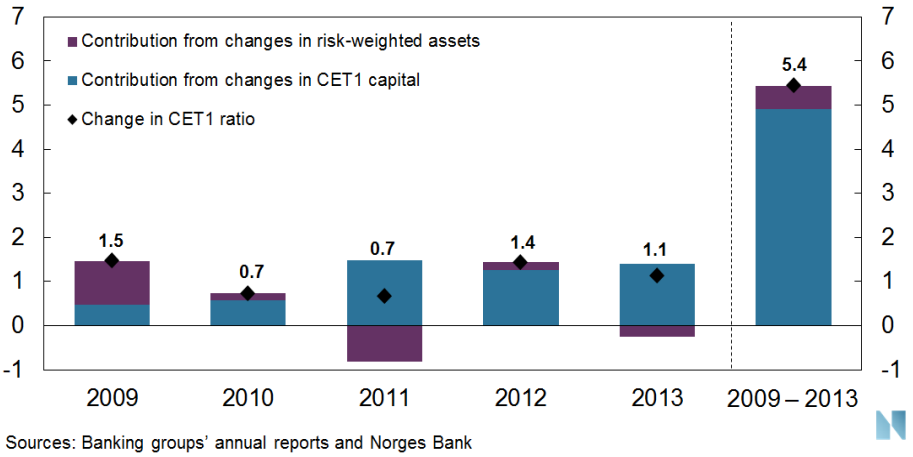
Six largest Norwegian banking groups. Percent. 2008 – 2013



Sources: Banking groups' annual reports and Norges Bank

3) Decomposed change in CET1 ratio

Six largest Norwegian banking groups. Percentage points. 2009 – 2013



Sources: Banking groups' annual reports and Norges Bank

[8] Financial reporting rules normally require at least 50 percent ownership of a company for it to be consolidated as a subsidiary. As a result, only a marginal part of the value of loans sold by the SpareBank 1 banks to their jointly-owned mortgage companies is included in their balance sheets. When it comes to capital adequacy reporting, jointly-owned mortgage companies are generally consolidated proportionally, even where ownership is below 50 percent. Total assets will therefore be lower, but the ratio of risk-weighted assets to total assets higher, than would be the case with wholly-owned mortgage companies.

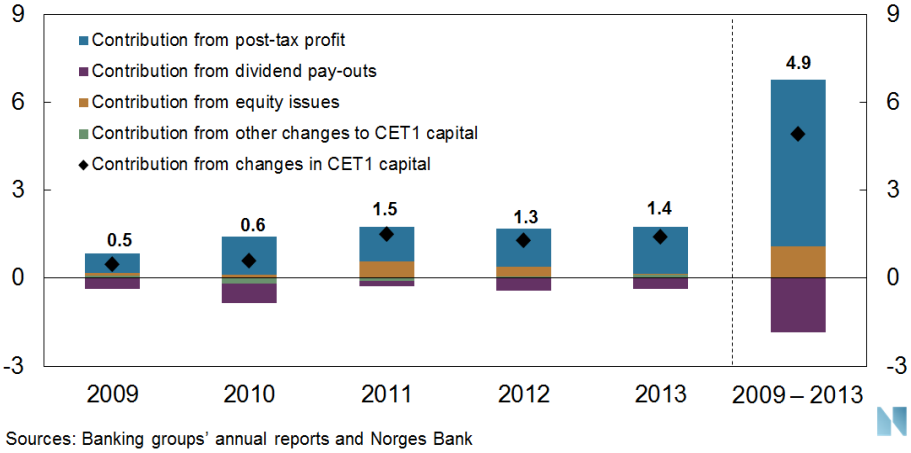
Strong growth in CET1 capital

In the period examined, the six banks increased their CET1 capital by 77 percent. In isolation, this has produced a rise in the CET1 ratio of 4.9 percentage points. The decomposition of this contribution is presented in Chart 4.

The contribution from retained earnings corresponds to the contribution from earnings less the contribution from dividends shown in the chart. This makes up 3.8 percentage points and is the largest contributor to the increase in CET1 capital. Banks' earnings have been solid, and dividend pay-outs have been moderate. On average, the largest banks retained 66 percent of their post-tax profit during the period.[9] The large regional savings banks retained slightly more than the systemically important banks.

4) Decomposed contribution from CET1 capital

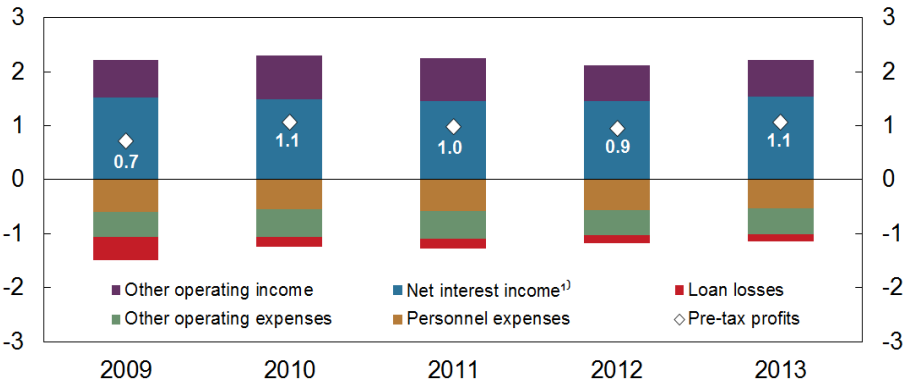
Six largest Norwegian banking groups. Percentage points. 2009 – 2013



Sources: Banking groups' annual reports and Norges Bank

5) Pre-tax profits

Six largest Norwegian banking groups. Percent of average total assets. 2009 – 2013



1) Commission fees from jointly-owned mortgage companies to owner banks are reclassified to net interest income
Sources: Banking groups' annual reports and Norges Bank

Banks' earnings have through the five-year period been around 1 percent of average total assets (see Chart 5). A number of factors have contributed to this. Solid growth in the Norwegian economy has led to very low loan losses in recent years. A focus on cost-cutting has seen a drop in total operating expenses relative to average total assets, especially over the past couple of years. This is due largely to a decrease in personnel

[9] DNB Bank does not pay dividends but makes group contributions to DNB, which then pays dividends to its shareholders. Somewhat similarly, Nordea Bank Norge pays dividends to Nordea AB, its sole shareholder. The regional savings banks pay dividends to the holders of shares and equity certificates and also to savings bank foundations. All of these transfers are treated as dividends in the decomposition.

expenses relative to average total assets of 9.4 percent during the period. Several banks have a stated strategy of reducing staff numbers as part of their adjustment to higher capital requirements.

Other things being equal, a higher equity ratio will result in higher net interest income, both in absolute terms and relative to average total assets. This is because banks will pay interest on a smaller part of their overall funding. Net interest income relative to average total assets has nevertheless been relatively stable for the six largest banks. There was a slight increase in 2013, as a result of lending spreads growing during the year. The degree to which banks can boost earnings through wider spreads will depend on competition in the banking sector. Higher lending rates can also be a means of reducing lending growth.

Chart 4 shows that equity issues made the second-greatest contribution to growth in CET1 capital. Issuing new equity produces an immediate increase in capital, but several factors cause this not to be banks' preferred adjustment method.[10] For the six largest Norwegian banks as a whole, equity issues increased the CET1 ratio by 1.1 percentage points during the period.[11] The two systemically important banks pulled down this figure. The contribution from equity issues is 2.5 percentage points for the four large regional savings banks combined.

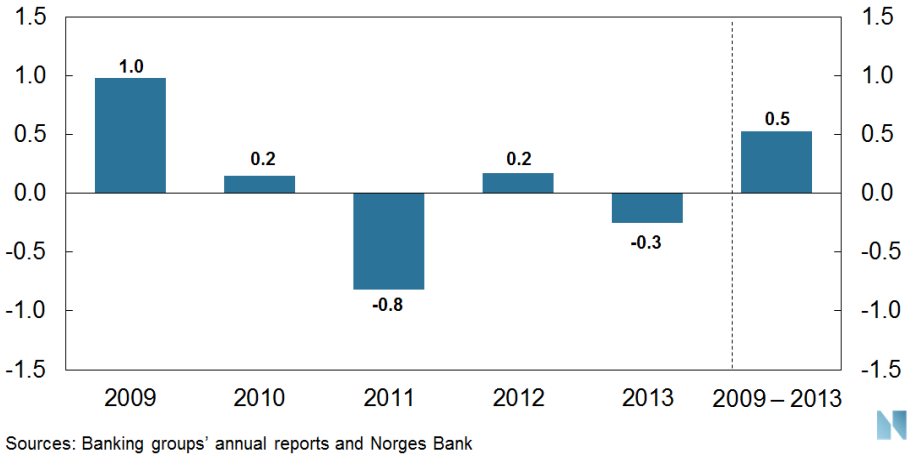
The component "other changes in CET1 capital" consists of regulatory deductions from equity and changes in equity other than retained earnings and equity issues. This component had very little influence on banks' CET1 ratios during the period.

Decrease in risk-weighted assets

Growth in total assets and reduction in the average risk weight have opposing effects, and therefore leads to a much smaller contribution from risk-weighted assets than from CET1 capital. A decrease in risk-weighted assets of 6 percent has, in isolation, increased the CET1 ratio by 0.5 percentage point in the period examined (see Chart 6). Due to variations from year to year, however, this contribution is rather sensitive to the choice of period.

6) Contribution from changes in risk-weighted assets

Six largest Norwegian banking groups. Percentage points. 2009 – 2013



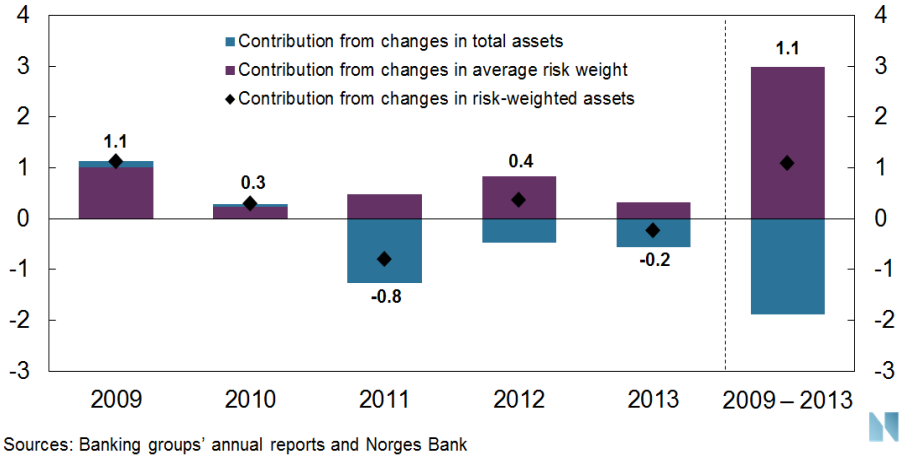
Sources: Banking groups' annual reports and Norges Bank

[10] See the box on equity issuance on page 37 of *Financial Stability Report* 2014.
[11] DNB Bank and Nordea Bank Norge do not issue equity in the market but to their parent companies DNB and Nordea AB.

Because the banks' total assets grew by 26 percent during the period, the fall in risk-weighted assets indicates a substantial decrease in the banks' average risk weight. Chart 7 shows the decomposed contribution from risk-weighted assets for the two systemically important banks. The average risk weight has fallen by no less than 29 percent at these two banks over the past five years, from 69 to 49 percent, significantly increasing their CET1 ratio. A fall in the average risk weight may be due to a change in banks' asset mix and/or a change in their assets' risk weights.

7) Decomposed contribution from risk-weighted assets

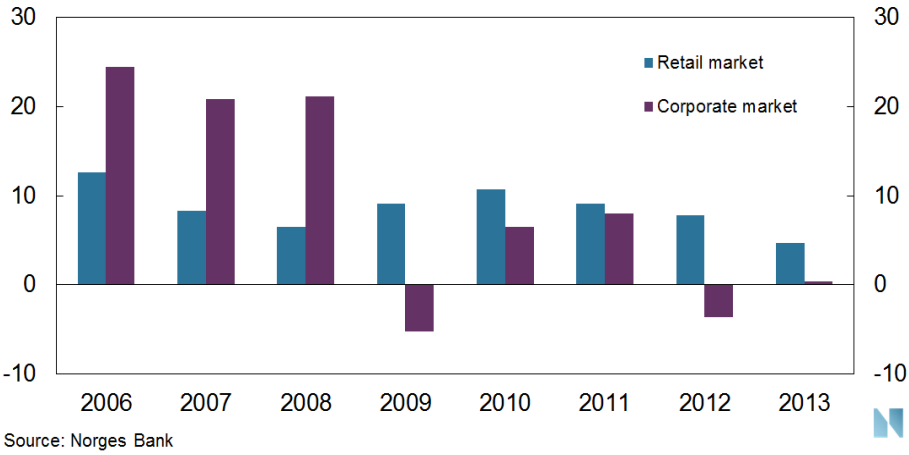
DNB Bank and Nordea Bank Norge. Consolidated level. Percentage points. 2009 – 2013



Sources: Banking groups' annual reports and Norges Bank

8) Twelve-month growth in lending

Six largest Norwegian banking groups. Percent. 2006 – 2013



Source: Norges Bank

More moderate lending growth helps slow growth in total assets and thereby risk-weighted assets. In addition, a shift in lending growth towards loans with lower risk weights will further slow growth in risk-weighted assets. In the years before the financial crisis, banks' lending growth was much higher in the corporate market than in the retail market. Since the crisis, lending growth has slowed, especially in the corporate market (see Chart 8). This shift in favour of the retail market, which features lower risk weights, has contributed to the rise in capital ratios. Banks have stated explicitly that this has been a conscious strategy in their adjustment in recent years. It may also have been motivated by lending in the retail market being considered as more profitable than lending in the corporate market.

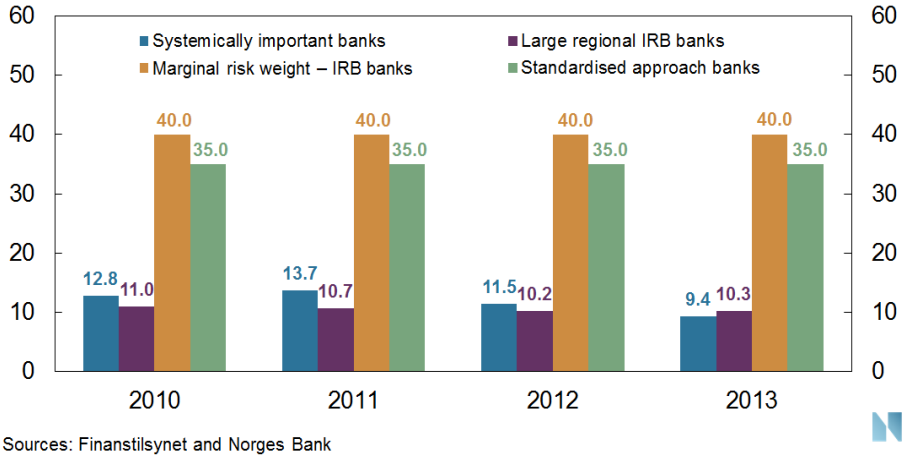
The switch to the Basel II rules brought a reduction in risk weights for mortgages both in banks using the standardised approach and in banks with approved IRB models. The risk weight for well-secured mortgages using the standardised approach fell from

50 percent to 35 percent, while the risk weight for corporate loans stayed at 100 percent. This made it more attractive to shift the emphasis of lending growth towards the retail market. The same was the case in the IRB banks, where the internal models led to larger decreases in risk weights for mortgages than for corporate loans. For the individual bank, a higher share of mortgages will bring a decrease in the average risk weight. However, greater credit growth in the household sector and greater exposure to the housing market could pose a risk to the banking sector at a systemic level and thereby implicitly for each individual bank. This type of systemic risk has not been captured by banks' risk weights.

The switch to internal models may result in a given asset being assigned a lower risk weight than before without there having been any change in the actual risk associated with the asset. In addition, banks' loan losses will affect the data series used to calculate the risk weights. Low loan losses in recent years have brought banks' risk weights down even further. Chart 9 shows that average risk weights for mortgages in IRB banks have been lower and falling during the period relative to banks using the standardised approach. The same applies to average risk weights for corporate loans. The transitional rule has, however, eliminated much of the direct effect of the switch to the IRB approach on banks' risk-weighted assets. This is because the transitional rule may cause a deviation between average and marginal risk weight for the IRB banks. Easing of the transitional rule will then lead to decreases in risk-weighted assets and higher CET1 ratios, as seen in 2009.

9) Retail mortgage risk weights

Consolidated level. Percent. At year-end. 2010 – 2013



Sources: Finanstilsynet and Norges Bank

Chart 10 decomposes growth in CET1 ratios for the two systemically important banks, the large regional IRB banks and two large banks using the standardised approach: Sparebanken Møre and Sparebanken Sør.[12] The banks using the standardised approach have the highest CET1 ratios at both end-2008 and end-2013. Having been in a strong position in terms of capital requirements, they have not had the same need to bolster their capital ratios. The gap to the IRB banks has narrowed during the period.

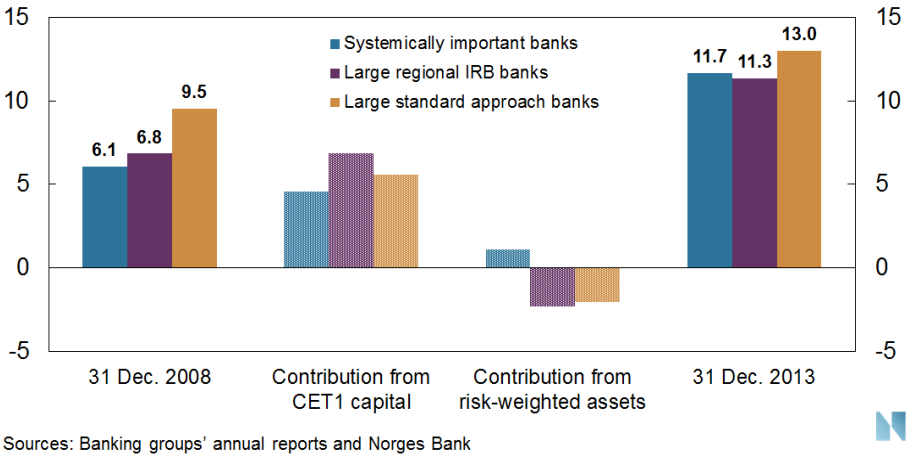
Growth in CET1 capital has been strongest in the large regional IRB banks and weakest in the systemically important banks. While the effect of the change in risk-weighted assets has been positive for the systemically important banks, it has been negative for the other two groups. The contribution from the change in risk-weighted assets has been more negative for the large regional IRB banks than for the large

[12] Sparebanken Sør merged with Sparebanken Pluss at the start of 2014 to form the new Sparebanken Sør. The analysis here is based on the old Sparebanken Sør.

banks using the standardised approach. This also weighs in favour of the transitional rule curbing the effect of IRB modelling on banks' reported CET1 ratios.

10) Decomposed change in CET1 ratio

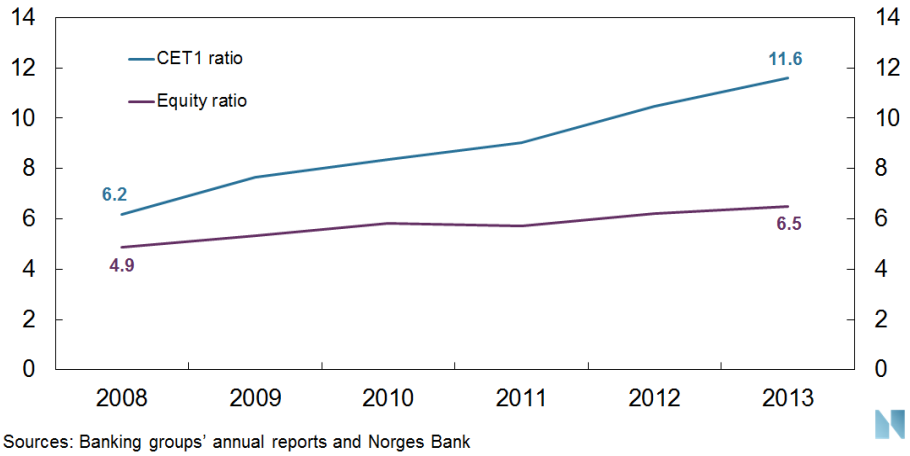
Consolidated level. Percent and percentage points. 2009 – 2013



Sources: Banking groups' annual reports and Norges Bank

11) CET1 ratio and equity ratio

Six largest Norwegian banking groups. Percent. 2009 – 2013



Sources: Banking groups' annual reports and Norges Bank

Different measures of solvency

The CET1 ratio is a risk-sensitive measure of banks' solvency. The equity ratio, on the other hand, looks at equity in relation to total assets without considering the risk associated with those assets. It is therefore a simpler measure of solvency. Different rates of growth in risk-weighted assets and total assets have led to a widening gap between the two measures of solvency. Since end-2008, the CET1 ratio has risen by 88 percent, and banks' reported equity ratio[13] by just 33 percent. The two measures therefore paint a very different picture of movements in banks' solvency (see Chart 11).

[13] Since loans sold to jointly-owned mortgage companies in the SpareBank 1 Alliance are not fully consolidated in total assets, there is a discrepancy between the SpareBank 1 banks' reported equity ratios based on their balance sheets and their "true" equity ratios. Arbitrage activity has inflated DNB Bank's balance sheet in recent years. Adjusted for this activity, its equity ratio is somewhat higher.

5. Closing remarks

Cohen and Scatigna (2014) find in their global set of 94 banks that growth in capital has been the main driver behind growth in CET1 ratios. Based on the same method, we find that this also applies to the largest Norwegian banks. As with the global banks, the effect of increased total assets has been offset by the effect of a fall in the average risk weight. Both growth in total assets and the reduction in the average risk weight are, however, greater for the Norwegian banks than for the global set.

Norwegian banks are well-capitalised by international standards. A substantial build-up of CET1 capital in recent years has increased their solvency. Different rates of growth in total assets and risk-weighted assets at the largest banks have, however, led to a widening gap between the CET1 ratio and the equity ratio. Banks' solvency depends not only on the proportion of loss-absorbing capital, but also on the risk of loss. The risk associated with banks' assets is therefore key to an assessment of solvency. Risk is difficult to observe, however, and challenging to quantify. Which measure of solvency is given most emphasis will depend on confidence in assets' risk weights adequately capturing the actual risk associated with them.

The widening gap between the CET1 ratio and the equity ratio is not problematic if it reflects a corresponding decrease in the actual risk associated with banks' assets. If it instead reflects the failure of banks' models to capture risk adequately, there may be a question of whether banks' solvency has improved as much as the increase in the CET1 ratio would imply. Following a review of banks' internal risk models for mortgage weights in 2013, Finanstilsynet considered it necessary to tighten the modelling rules so that they better capture the risk associated with mortgages. Similar action has also been taken in other countries.

References

Cohen, B. and M. Scatigna (2014): "Banks and capital requirements: channels of adjustment", *BIS Working Papers*, No. 443.

Methodological appendix[14]

The relationship between the CET1 ratio at two points in time, $t = 1$ and $t - 1 = 0$, can be seen as a combination of the relationship between CET1 capital (C) at these two times and the relationship between risk-weighted assets (RWA) at these two times:

$$\frac{C_1/RWA_1}{C_0/RWA_0} = \frac{C_1/C_0}{RWA_1/RWA_0}$$

This expression can be transformed logarithmically to show changes in the various components as additive:

$$\frac{C_1}{RWA_1} - \frac{C_0}{RWA_0} = N \ln\left(\frac{C_1}{C_0}\right) - N \ln\left(\frac{RWA_1}{RWA_0}\right)$$

where N is a normalisation factor:

$$N = \left(\frac{C_1}{RWA_1} - \frac{C_0}{RWA_0}\right) \Big/ \left(\ln\frac{C_1}{RWA_1} - \ln\frac{C_0}{RWA_0}\right)$$

To obtain more information on how CET1 capital and risk-weighted assets have been adjusted, these terms can be decomposed further. We divide the change in CET1 capital into four components: earnings (E), dividends (D), equity issues (I) and other changes in equity (O):

$$\ln\left(\frac{C_1}{C_0}\right) = \ln\left(1 + \frac{E_1}{C_0} - \frac{D_1}{C_0} + \frac{I_1}{C_0} + \frac{O_1}{C_0}\right)$$

As in Cohen and Scatigna, risk-weighted assets are decomposed in two parts. The first part is risk-weighted assets relative to total assets (TA). This fraction corresponds to the bank's average risk weight. Multiplied by the change in the bank's total assets, this gives the change in risk-weighted assets:

$$\ln\left(\frac{RWA_1}{RWA_0}\right) = \ln\left(\frac{RWA_1/TA_1}{RWA_0/TA_0} * \frac{TA_1}{TA_0}\right) = \ln\frac{RWA_1/TA_1}{RWA_0/TA_0} + \ln\frac{TA_1}{TA_0}$$

The change in the CET1 ratio each year can be summed to obtain the total change. The contributions to the change in the ratio cannot, however, be summed in this way to obtain the total contribution in a particular period, because the normalisation factor will change. There will therefore be discrepancies in the charts between the sum of the contributions in individual years and the overall contribution for all of the years.

[14] Based on Cohen and Scatigna (2014).