Appendix for
Norges Bank Paper no. 4 | 2019:
«A framework for advice on the
countercyclical capital buffer»
Indicators for assessing financial imbalances and access to credit

Assessment of financial imbalances

Norges Bank’s assessments of financial imbalances can be divided into three main elements: (a) pricing of risk and lending conditions; (b) real estate market vulnerabilities; and (c) vulnerabilities in the household and corporate sectors. Norges Bank uses different indicators to assess these three elements. Indicators that will be used regularly are described below.

Pricing of risk and lending conditions. Persistently low bond market risk premiums may be a sign that financial market participants underestimate risks (Chart 1.1). Equity market developments (for example indicators of overvaluation and low volatility) may also be useful.

Low lending margins may reflect strong competition between banks for borrowers and lenient lending conditions. Other indicators for lending conditions, such as credit standards measured in Norges Bank’s lending survey, debt-to-income (DTI) and loan-to-value (LTV) ratios for new loans, for example from Finanstilsynet’s residential mortgage lending survey, will also be used.
Real estate market vulnerabilities. Residential and commercial property prices have risen substantially ahead of periods of financial instability in Norway (Charts 1.3, 1.4, 1.5 and 1.6). Other indicators may also be used for assessing vulnerabilities in the real estate market. Data for housing starts and completions, population growth and housing market activity can provide information on further developments in house prices. In the same manner, required rates of return, vacancy rates and office rents may be used for assessing vulnerabilities in commercial real estate.
Chart 1.3 Ratio of house prices to disposable income\(^1\).
Index. 1998 Q4 = 100. 1983 Q1 – 2019 Q2

1) Disposable income per capita (aged 15-74). Disposable income is adjusted for estimated reinvested dividend income for 2000 Q1-2005 Q4 and reduction of equity capital for 2006 Q1 – 2012 Q3. From 2015Q1, growth in disposable income excluding dividend income is used. Forecast for disposable income for 2019 Q2. 2) Based on data from 1978 Q4 onwards.
Sources: Eiendomsvirdi, Finn.no, Norwegian Association of Real Estate Agents (NEF), Real Estate Norway, Statistics Norway and Norges Bank.

Chart 1.4 House price gap. Ratio of house prices to disposable income\(^1\).
Deviation from estimated trends. Percent. 1983 Q1 – 2019 Q2

1) Disposable income per capita (aged 15-74). Disposable income is adjusted for estimated reinvested dividend income for 2000 Q1 - 2005 Q4 and reduction of equity capital for 2006 Q1 – 2012 Q3. From 2015 Q1, growth in disposable income excluding dividend income is used. The trends are estimated based on data from 1978 Q4 onwards. Forecast for disposable income for 2019 Q2. 2) One-sided Hodrick-Prescott filter estimated on data augmented with a simple projection. Lambda = 100 0000. 3) One-sided Hodrick-Prescott filter. Lambda = 400 0000.
Sources: Eiendomsvirdi, Finn.no, Norwegian Association of Real Estate Agents (NEF), Real Estate Norway, Statistics Norway and Norges Bank.
Chart 1.5 Real commercial real estate prices.

1) Index. 1998 = 100. 1983 Q1 – 2019 Q2

1) Estimated real selling prices per square metre for prime office space in Oslo. Deflated by the GDP deflator for mainland Norway. Average selling prices for the past four quarters. 2) Based on data from 1981 Q3 onwards.

Sources: CBRE, Dagens Næringsliv, OPAK, Statistics Norway and Norges Bank

Chart 1.6 Commercial property price gap. Real commercial property prices as deviation from estimated trends.

1) Percent. 1983 Q1 – 2019 Q2

1) Estimated real selling prices per square metre for prime office space in Oslo. Deflated by the GDP deflator for mainland Norway. The trends are estimated based on data from 1981 Q3 onwards. 2) One-sided Hodrick-Prescott filter estimated on data augmented with a simple projection. Lambda = 400 000. 3) One-sided Hodrick-Prescott filter. Lambda = 400 000.

Sources: CBRE, Dagens Næringsliv, OPAK, Statistics Norway and Norges Bank
**Vulnerabilities in corporate and household sectors.** Total credit-to-GDP ratio (and measured against alternative trend estimates) is a key indicator (Charts 1.7 and 1.8) set out in the Regulation on the Countercyclical Capital Buffer. It is, however, also important to look at the breakdown of credit by borrower groups (different groups of households and enterprises) and source (banks, bond market, foreign) (Chart 1.9). Households’ and enterprises’ savings and net lending may also shed light on whether credit developments are sustainable (Charts 1.10 and 1.11). The wholesale funding ratio can also be used to assess credit developments. In periods where banks’ lending growth exceeds deposit growth, banks must raise a larger share of their funding directly in financial markets.

The ESRB also recommends using indicators for external imbalances. Norway has a large current account surplus owing to oil and gas exports and the fiscal rule for petroleum revenue spending. Other measures of external imbalances may therefore be more useful, such as the private sector’s net lending and banks’ funding from abroad (Chart 1.12).
Chart 1.8 Credit gap. Credit mainland Norway as a share of mainland GDP.
Deviation from estimated trends.1) Percentage points. 1983 Q1 – 2019 Q2

1) The sum of C2 households and C3 non-financial enterprises for mainland Norway (all non-financial enterprises pre-1995). C3 non-financial enterprises comprises C2 non-financial enterprises and foreign debt for mainland Norway. The trends are estimated based on data from 1975 Q4 onwards. 2) One-sided Hodrick-Prescott filter estimated on data augmented with a simple projection. Lambda = 400 000. 3) One-sided Hodrick-Prescott filter. Lambda = 400 000.
Sources: IMF, Statistics Norway and Norges Bank

Chart 1.9 Decomposed credit gap. Credit as a share of GDP. Mainland Norway.
Gap calculated as deviation from trend.1) Percentage points. 1983 Q1 – 2019 Q2

1) One-sided Hodrick-Prescott filter estimated on data augmented with a simple projection.
Sources: IMF, Statistics Norway and Norges Bank
Chart 1.10 Households’ saving and net lending.\(^1\) \(^2\) Share of disposable income. Four-quarter moving average. Percent. 1980 Q1 – 2019 Q1

1) Saving and net lending of households and non-profit institutions serving households. Saving and net lending is adjusted by excluding dividend income received. Disposable income is adjusted by excluding dividend income received and adding savings in pension funds. 2) Annual data before 2002.
Sources: Statistics Norway and Norges Bank

Chart 1.11 Non-financial enterprises’ saving and net lending.\(^1\) \(^2\)
Share of GDP. Four-quarter moving average. Percent. 1980 Q1 – 2019 Q1

1) Saving and net lending of non-financial enterprises. Saving and net lending is adjusted by adding dividends paid. 2) Annual data before 2002.
Sources: Statistics Norway and Norges Bank
Debt-servicing capacity can be assessed using both an aggregate estimate of debt servicing costs (comparison of the current level with historical developments) (Chart 1.13 and 1.14), and measures of debt at risk based on studies of individual household and enterprise data (see for example Solheim and Vatne (2013)). Studies at the household level will capture vulnerabilities that may be related to skewed distribution of debt burdens even when debt at the macro level does not appear particularly high. Studies show that debt servicing burdens have peaked close to crises, and the associated risks are reflected in losses by financial institutions.¹

¹ See Drehmann, Juselius and Korinek (2017).
Norges Bank also uses model-based and composite indicators to assess financial imbalances. Norges Bank has developed an early warning model for financial crises based on a large number of combinations of explanatory variables and trend estimation models.
Norges Bank has also developed a ribbon heatmap as a tool for assessing systemic risk in the financial system in Norway (Chart 1.16). The heatmap tracks developments in a broad range of indicators in three main areas: risk appetite and asset valuations, non-financial private sector vulnerabilities (household and corporate) and financial sector vulnerabilities. Developments in each individual indicator are mapped into a common colour coding scheme, where green (red) reflects low (high) levels of vulnerability. The heatmap thus provides a visual summary of current vulnerabilities in the Norwegian financial system compared with historical episodes.

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2 See Norges Bank (2014) and Anundsen et al. (2016).
3 See Arbatli and Johansen (2017).
Assessment of access to credit

Norges Bank examines indicators in three different areas to establish an overall assessment of access to credit: (a) stress in financial markets; (b) developments in credit and credit practices; and (c) banks' profitability.

Financial market stress. Indicators of financial market stress (for example, risk premiums) provide information on the tightening of financial conditions. The CISS indicator, which is a composite stress indicator, can shed light on vulnerabilities related to correlation and close interlinkages between markets (Chart 1.17). Banking sector stress may be measured by a number of indicators, for example money market premiums (Chart 1.18), risk premiums on bonds issued by Norwegian and Nordic banks, equity price developments in the banking sector and CDS prices for Nordic banks (Chart 1.19). Since banks from other Nordic countries have significant market shares in Norway, these banks should also be included in the assessment.

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*See Hagen and Pettersen (2019).*
Chart 1.17 CISS indicator for Norway.¹) Week 38 2003 – week 36 2019

1) CISS, measured by the black line, is higher the more stress there is in the different market segments (the colored areas above zero increases) and the more correlation there is between segments (the grey area below zero decreases). CISS is described in Monetary Policy Report 1/19 and Hagen, M. and P. M. Pettersen (2019) "An improved composite indicator of systemic stress (CISS) for Norway." Staff Memo 3/19. Norges Bank.
Sources: Bloomberg, DNB Markets, Thomson Reuters Datastream and Norges Bank

Chart 1.18 Spread in Norwegian three-month money market rate.¹) Five-day moving average. Percentage points. 1 January 2007 – 13 September 2019

1) Norges Bank’s forecast of the difference between three-month money market rate and expected policy rate.
Sources: Thomson Reuters and Norges Bank
Developments in credit and credit practices. Higher lending margins may be an indicator of a tighter credit supply (Chart 1.2). Developments in credit (to different sectors and from different sources) may, combined with a measure of banks’ credit practices such as in Norges Bank’s lending survey, provide information about financing conditions faced by households and enterprises (Chart 1.20).
**Banks’ profitability.** If bank losses increase or are expected to increase, capital requirements can be a binding constraint for lending. In such situations banks will probably reduce their lending activity. Return on equity (Chart 1.21), share of non-performing loans (Chart 1.22), loan losses (Chart 1.23) and losses on securities along with developments in capital ratios (Chart 1.24) may be used to assess banks’ profitability.

**Chart 1.21 Return on equity for large Norwegian banks. Percent. 2008 Q2 – 2019 Q2**

Sources: Banks’ quarterly reports and Norges Bank

**Chart 1.22 Non-performing loans as a percentage of total loans.** All banks and mortgage companies in Norway. 1990 Q3 – 2019 Q1

1) Break in the definition of non-performing loans in Q4 2009 and Q1 2018. From 2018 onwards, only non-performing loans according to the 90-day definition are included.

Source: Norges Bank
Chart 1.23 Loan losses as a share of total loans. Annualised. All banks and mortgage companies in Norway. Percent. 1987 Q1 – 2019 Q2

1) Annual data up to and including 1991. Annual values are divided equally over the quarters. Source: Norges Bank

Chart 1.24 Norwegian banks’ Common Equity Tier 1 (CET1) capital ratios. Share of risk-weighted assets and total assets.¹) Percent. 1996 – 2018

1) Consolidated figures where applicable. Parent banks otherwise. Nordea has been removed from the historical series owing to its conversion to a branch in 2017. Source: Finanstilsynet (Financial Supervisory Authority of Norway)
References


