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# Economic commentaries

## Asset prices, investment, credit and financial vulnerability

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## **Asset prices, investment, credit and financial vulnerability**

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*Previous analyses indicate that macroeconomic gap indicators for house prices, equity prices, investment and credit are useful in predicting periods of financial instability in Norway. The indicators show, with few exceptions, a common pattern with widening gaps from one to six years ahead of the periods and a subsequent decline. Owing to statistical revisions, the investment gap and the credit gap have been changed somewhat back to the 1940s, but the conclusions remain unchanged. The critical value of the credit gap has been reduced, however.*

*The house price gap, investment gap and credit gap were higher than their critical values in 2007 and are now falling even though the credit gap was higher than its critical value again in 2009. A fall in the indicators shows, in isolation, that financial imbalances are diminishing. At the same time, historical experiences show that the financial system is particularly vulnerable during periods of adjustment.*

### **Introduction**

Studies of banking crises often reveal relationships between asset prices and credit on the one hand and financial stress on the other. Such studies, however, provide few quantified indicators that central banks and the authorities can use in assessing the financial situation. Riiser (2005) and Riiser (2008) find that gap indicators of house prices, equity prices, investment and credit are useful in predicting financial instability in Norway back to 1819.

International studies indicate that the equity gap and the credit gap may be reliable indicators for predicting banking crises (see Borio and Lowe (2002). Gerdesmeier, Reimers and Roffia (2009) study periods of booms and busts in asset prices. Sharp changes in asset prices can cause financial instability and lead to an economic downturn. The authors find that credit, changes in long-term interest rates and the investment-to-GDP ratio, combined with either house prices or equity prices, are the best indicators to

forecast asset price busts up to eight quarters ahead. The findings in these articles are thus consistent with the conclusions in Riiser's analyses.

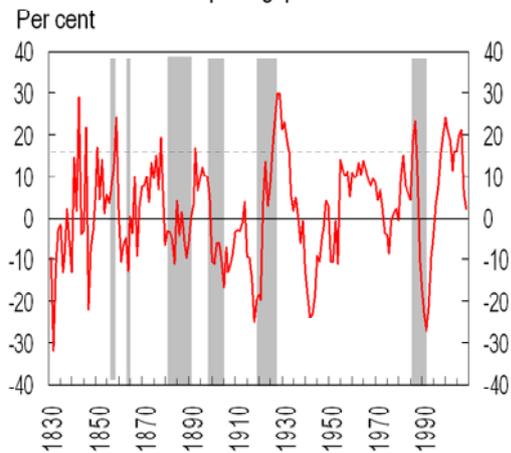
### **Revised gap indicators up to 2009**

This article presents revised figures for gap indicators for Norway. The annual gaps in real house prices, real equity prices and investment as a percentage of GDP and credit as a percentage of GDP are calculated using updated figures from Historical Monetary Statistics in Norges Bank and the national accounts. Trend values are calculated using a Hodrick-Prescott filter (HP filter) and a recursive method.<sup>1</sup> The gaps are measured as percentage deviation from trend, with the exception of the credit gap, which is measured as the difference in percentage points from trend.

The gap indicators are calculated up to and including 2009. As a result of the revision of national account figures back to 1940, the investment gap and the credit gap have been updated. The path of the indicators is nevertheless broadly unchanged so that the

conclusions from previous analyses still apply. The critical value of the credit gap is lower, however.

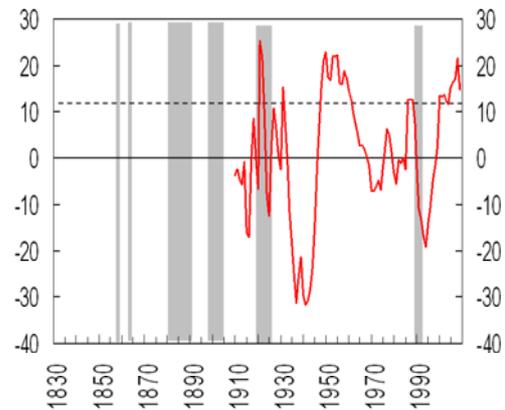
**Chart 1** Real house price gap<sup>1)</sup>. 1831-2009.



<sup>1)</sup>Percentage deviation from trend for house price index deflated by consumer price index. The broken line indicates the critical value.

Sources: Statistics Norway and Norges Bank

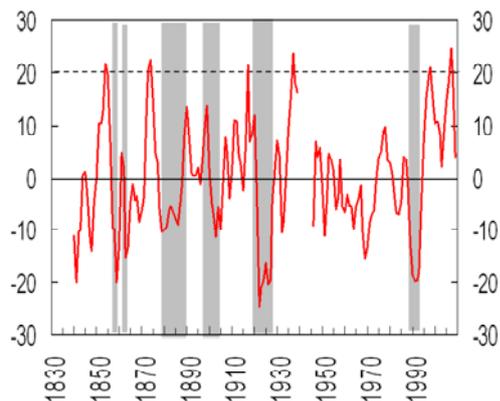
**Chart 3** Credit gap<sup>1)</sup>. 1910-2009. Percentage points



<sup>1)</sup>Deviation from trend for total credit to municipalities, non-financial enterprises and households measured as a percentage of GDP. From 1995, total credit to mainland Norway as a percentage of mainland GDP (market value). GDP data for 1940-1945 are not available. The broken line indicates the critical value.

Sources: Statistics Norway and Norges Bank

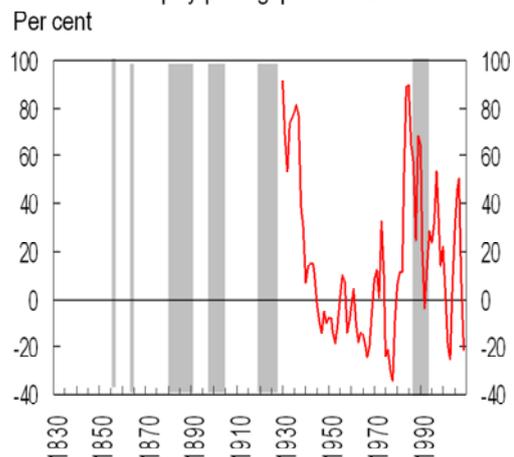
**Chart 2** Investment gap for investment excl. changes in inventories and statistical deviations<sup>1)</sup>. 1840-2009. Per cent



<sup>1)</sup>Percentage deviation from trend for total gross fixed capital formation excl. changes in inventories/statistical deviations measured as a percentage of GDP. From 1970, mainland gross fixed capital formation as a percentage of mainland GDP (market value). No data available for 1940-1945. The broken line indicates the critical value.

Sources: Statistics Norway and Norges Bank

**Chart 4** Real equity price gap<sup>1)</sup>. 1930-2009.



<sup>1)</sup>Percentage deviation from trend for equity price index deflated by consumer price index. Break in 2001 in connection with change from OSEAX (all-share index) to OSEBX (benchmark index)

Sources: Statistics Norway and Norges Bank

Riiser (2005) finds that all the gap indicators are useful in predicting previous episodes of financial instability in Norway. The indicators show, with few exceptions, a common pattern with widening gaps from one to six years ahead of the periods of financial instability and a subsequent fall. As a rule, at least two of the gap indicators have high values prior to banking crises (see Table 1). This indicates that combinations of indicators may increase the strength of the analysis.

Charts 1-4 show developments in gap indicators for Norway. In the charts, the banking crises in 1857, 1864, 1880-1890, 1899-1905, 1920-1928 and 1988-1993 are marked in grey.

Historical data indicate certain threshold value for gap indicators that may be associated with financial vulnerability, so-called critical values. Based on the peak values for the gap indicators ahead of the banking crises, it may seem as though a house price gap that approaches 17 per cent, an investment gap of over 20 per cent and a credit gap of 13 percentage points are signs of increased financial vulnerability.

Compared with the analysis in Riiser (2008), the critical value for the credit gap is reduced from 14-15 to 13 percentage points as a result of a lower credit gap ahead of the crisis in 1988-1993 in the updated calculations.

The conclusions must be interpreted with caution, particularly since there is uncertainty as to the quality of the data for the earliest period.

In 2007, the housing price gap, the investment gap and the credit gap were higher than their critical values. In 2009, all the gaps had diminished even though the credit gap was still higher than its critical value again last year. A correction in financial imbalances can take a long time. The historical analysis indicates that financial stress has often arisen from one to six years after the indicators have reached their critical values. This suggests that the financial system in Norway may still encounter challenging periods in the coming years.

**Table 1. Banking crises in Norway**

Crisis	Observed gap	Maximum value (peak) of gap in period before banking crisis	Peak year	Number of years before banking crisis***	Missing data
1857	House price gap Investment gap	17 22	1851 1854	6 3	Credit gap Equity price gap
(1859)*	House price gap Investment gap**	24 (22)	1859 (1854)	0 (5)	Credit gap Equity price gap
1864	House price gap Investment gap	No peak 5	1861	3	Credit gap Equity price gap
1880-1890	House price gap Investment gap	19 23	1878 1874	2 6	Credit gap Equity price gap
1899-1905	House price gap Investment gap	17 14	1893 1899	6 0	Credit gap Equity price gap
1920-1928	House price gap Investment gap Credit gap	4 21 25	1914 1917 1921	6 3 One year after the crisis erupted	Equity price gap
1988-1993	House price gap Investment gap Credit gap Equity price gap	23 4 13 90	1987 1986 1986-1988 1985	1 2 2-0 3	

\* It seems as though the house price gap captures the banking crisis in Bergen in 1859.

\*\* Same peak as prior to the banking crisis in 1857

\*\*\* A more relevant measure is probably the number of years prior to the peak of the banking crisis. For the crisis in 1988-1993, the peak is reached in 1991-1992 (see Vale (2004)). Information is not available as to when the peaks of the other crises are reached. For the period 1880-1890, the peak is probably reached during the crisis in Arendal in 1886.

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<sup>1</sup> For a description of the Hodrick-Prescott filter, see Bjørnland, Brubakk and Jore (2004). We use the same method as in Borio and Lowe (2002), for example  $\lambda$  equal 1600 for annual data.