DET SYSTEMISKE RISIKORÅD

19 December 2014

Monitoring of systemic risks

Financial crises affect the overall economy and welfare. The most recent financial crisis was the crisis that developed into a systemic crisis in the autumn of 2008. Within a short period of time, large parts of the global financial system collapsed, and together with the ensuing uncertainty the crisis resulted in a considerable loss of welfare. Economic activity in major countries such as the USA, the euro area and the UK declined for four to five consecutive quarters, beginning in the autumn of 2008. In addition, considerable overall uncertainty meant that consumer spending came to a halt, resulting in a significant increase in the rate of unemployment. At the same time, share and house prices dropped, and the wealth of households was eroded.[1] In Denmark, the economic downturn in 2007-09 was the most severe since World War II.[2] Real GDP fell by more than 5 per cent between 2008 and 2009, and has still not returned to its pre-crisis level.

The costs to the economy of systemic financial crises are far-reaching. A financial crisis is deemed to be systemic when, as a consequence, part of or the entire financial system fails and the real economic developments come under pressure. The economic costs associated with systemic financial crises are significant because, among other things, cyclical downturns in the wake of financial crises are more severe and more prolonged than cyclical downturns not related to financial crises.[3] This financial crisis was particularly severe due to its global extent, but it was not a one-off event. Systemic financial crises must be expected to occur on a regular basis in the future as well.

In the years following the recent financial crisis, work has been done internationally and in Denmark to mitigate crises and improve the skills in identifying early signs of future financial crises. In Europe, the European Systemic Risk Board, ESRB, was established in 2010. In the following years, macroprudential authorities have been formed in a number of countries, tasked to, among other things, identify and counter risks that may lead to systemic financial crises. The aim is to be able to better identify early signs of a financial crisis and to be in a position to introduce initiatives designed to reduce the economic costs resulting from financial crises. Overall, this is referred to as macroprudential policy. So far, experience with macroprudential policy is limited in Denmark and internationally, and the policy area is still at an early stage of development.[4]

In Denmark, the Systemic Risk Council (the Council) is the macroprudential authority. The Council is responsible for monitoring and identifying systemic risks in Denmark and for proposing initiatives aimed at mitigating future

1 For a description of developments leading up to and during the financial crisis, see the report The financial crisis in Denmark – causes, consequences and lessons (link).

2 Cf. Abildgren et al. (2011), Real economic consequences of financial crises, Danmarks Nationalbank, Monetary Review, 3rd Quarter.

3 See for instance IMF (2009), From recession to recovery: how soon and how strong, IMF, World Economic Outlook, April, Reinhart and Rogoff (2009), The aftermath of financial crisis, American Economic Review: Papers & Proceedings, vol. 99 (2), 466-472 and Abildgren el al. (2011), see footnote 2.

4 This applies, inter alia, to the understanding of the complex economic and financial relationships resulting in systemic crises. Against this background, it is to be expected that the monitoring of systemic risks will be developed and targeted over time. Viewed in the context of the knowledge of monetary policy and its consequences that we have today, some compare the understanding of macroprudential policy with the level of understanding of monetary policy in the 1940s. cf. Haldane (2013), Macroprudential Policies – When and how to use them, paper from the conference 'Rethinking Macro Policy II: First Steps and Early Lessons', IMF, April 2013, and Aikman, Haldane and Nelson (2014), Curbing the Credit Cycle, The Economic Journal (online early view).

financial crises. Monitoring of systemic risks is a key aspect of the work performed by the Council. This note offers insight into the monitoring conducted by the Council.

1. Monitoring of systemic risks in practice

Systemic risks build up during the years leading up to a financial crisis. They are the result of complex interactions between the financial system and the real economy. The years leading up to the recent financial crisis were characterised by a strong sense of optimism and risk-taking among certain lenders and borrowers, i.e. households and firms. There was significant lending growth and lending conditions were eased in many banks. At the same time, developments in deposits did not follow lending, and several banks chose increasingly to finance their activities in the financial markets. Concurrently, the banks' capital buffers were eroded and their resilience to negative shocks was reduced. Households indebted themselves in the expectation that the good times of rising property prices, low unemployment and financial stability would continue. That led to a considerable increase in Danish households' indebtedness during the 2000s. Prices on houses and commercial property soared and price bubbles were created in both the housing and commercial property markets. Lending to, e.g. the commercial property industry, were subsequently the cause of a significant need for banking sector impairment.

1.1. The building blocks of monitoring

Identifying systemic risks is complex. Future crises will probably be different from past crises, but no doubt certain characteristics will be the same, such as unsustainably strong credit growth. It is important that the monitoring of systemic risks covers a broad area and offers an open mind to potential risks. As the Systemic Risk Council is tasked to warn about future financial crises, the Council focuses on the period during which the systemic risks build up. In terms of the recent financial crisis, this was primarily the 2000s.

The Systemic Council monitors the build-up of systemic risks from different angles in six monitoring blocks. Within each block, it is assessed whether underlying forces may be contributing to systemic risks building up. It may be a question of excessive willingness to take on risk or overly optimistic expectations about future developments. The blocks are defined as objectives:

1. Mitigate and prevent excessive credit growth and leverage
2. Mitigate and prevent excessive maturity mismatch and market illiquidity
3. Limit direct exposure concentrations
4. Limit systemic risks related to indirect exposure concentrations (interconnectedness)
5. Limit systemic risks connected with systemically important financial institutions and reduce misaligned incentives
6. Strengthen the resilience of the financial structures

The blocks may be seen as intermediate objectives to the overall objective of macroprudential policy which is to contribute to a stable and secure financial system to the benefit of economic growth and welfare.[5]

Box 1 describes the relationship between concepts such as a systemic financial crisis, financial cycles and systemic risks. They form an integral part of the Council's mindset in terms of systemic risk monitoring.

[5] According to the European Systemic Risk Board, ESRB, the overall objective of macroprudential policy is to "contribute to the safeguard of the stability 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."

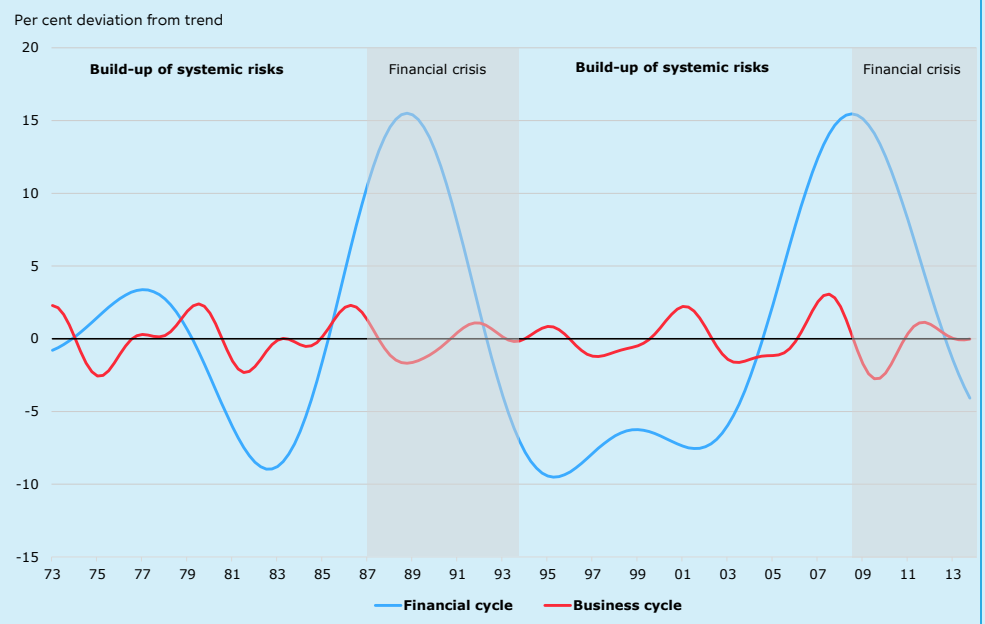
Systemic financial crises, financial cycles and systemic risks — Box 1

A *systemic financial crisis* is characterised by having such magnitude that the entire or significant parts of the financial system collapse and real economic developments come under pressure. The recent financial crisis was a systemic financial crisis. Prior to that, Denmark had experienced systemic financial crises in 1987-93 and from 1920 until the early 1930s, when the international financial system at the end of the period was characterised by considerable instability.[1), 2)] When the Systemic Risk Council refers to a financial crisis or a systemic crisis, it means a systemic financial crisis.

In the literature on financial crises the term *financial cycle* is often used. In order to understand the course of developments leading up to and during the 2008 financial crisis, one must look beyond the traditional business cycles according to Bank for International Settlements, BIS.[3)] BIS describes financial cycles as the self-reinforcing interactions between the perception of value and risk, risk appetite and financial conditions in general. During the expansionary stage of a financial cycle systemic risks are being build up. When the financial cycle turns – often followed by a systemic financial crisis – the self-reinforcing interactions move in the opposite direction and aggravate the downturn. It will typically be in the expansionary part of the financial cycle that initiatives are introduced to limit and not least dampen the associated costs.

According to Drehman et al. (2012)[4)] financial cycles deviate from business cycles in two ways: 1) Fluctuations are greater in financial cycles (amplitude), and 2) the duration of financial cycles is longer. The duration of a financial cycle is found to be twice as long as that of a traditional business cycle, which is normally up to 8 years. Chart A uses Danish data to illustrate the difference between financial and business cycles.

Stylised illustration of financial and business cycles using Danish data — Chart A



Note: The financial cycle is illustrated on the basis of series for credit to households and firms, credit-to-GDP ratio and house prices and is measured as deviation from a trend. The trend and the cyclical component of the series are calculated using a band pass filter, cf. Drehman et al. (2012), Characterising the financial cycle: don't lose sight of the medium term!, BIS working paper, No. 380.

Source: Statistics Denmark, Danmarks Nationalbank and own calculations.

Systemic risks

Systemic risks designate the vulnerabilities or imbalances in the financial system that contribute to increasing the risk of a systemic financial crisis occurring. For a risk to be described as systemic, part of or the entire system is expected to be impacted if the risk materialises. Hence, in a systemic context, focus is on the behaviour of the financial sector overall and its interaction with the real economy. Individual credit institutions do not play a prominent role, unless they are categorised as systemically important financial institutions

1 Cf. Detken et al. (2014), Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options, Occasional paper no 5, European Systemic Risk Board and Abildgren et al. (2011), Real economic consequences of financial crises, Danmarks Nationalbank, Monetary Review, 3rd Quarter.

2 There was also a bank crisis in Denmark in 1984-85, the so called Kronebank Crisis, where Denmark's seventh largest bank, Kronebanken, experienced difficulties.

3) Cf. BIS Annual Report 2014, IV Debt and the financial cycle: domestic and global.

4) Cf. Drehman et al. (2012), Characterising the financial cycle: don't lose sight of the medium term!, BIS working

paper, No. 380 as well as Borio (2012), The financial cycle and macroeconomics - what have we learnt?, BIS working paper, No. 390 and Claessens, Kose og Terrones (2011), Financial cycles: What?, How? When?, IMF Working Paper, No. 76.

Below follows a description, for each of the six blocks, of the Council's understanding of the mechanisms resulting in the build-up of systemic risks as well as the areas considered by the Council.

1.2. Block 1: Mitigate and prevent excessive credit growth and leverage

Credit institution lending activity is of significant importance to the real economy and traditionally fluctuates in keeping with economic trends. At times, however, lending may increase too much, which may result in the build-up of imbalances, e.g. in property prices.

Mechanisms related to the build-up of systemic risks

In an economic upswing, the future is often viewed with increased optimism. If this optimism turns into widespread overoptimism (risk illusion) and/or willingness to assume higher risks arises, this may lead to the build-up of systemic risks through the behaviour of borrowers and financial agents.[6] As far as credit institutions are concerned, this may among other things result in a considerable increase in lending and in easing of credit standards beyond what is warranted by the underlying economic development. If competition for customers is fierce, it may increase the likelihood of a situation of excessive willingness to take risk throughout the sector. This may be the case if credit institutions, for reasons of competition and possible pressure from shareholders, feel inclined to take a more risk oriented approach to follow other credit institutions. As for households and firms, it may cause them to incur debt disproportionate to the value of assets and income. Combined this contribute to reinforce the aggregate credit growth. Prior significant credit growth and relaxed credit conditions increase the risk of a sudden contraction of credit (credit crunch) when the tide turns. One reason for this is that the credit risk incurred by the credit institutions simultaneously increases disproportionally.

Furthermore, risk illusion and excessive willingness to take on risk among credit institutions may result in a considerable increase in exposures compared to the institutions' equity capital, i.e. their leverage becomes very high. The consequence of high leverage is that a modest percentage loss on exposures, such as loans to households and firms, leads to a considerable reduction in equity capital and an equivalent increase in the need to react, for instance by cutting back on lending activities as a means of adjusting balance sheets.

Overall, systemic risks are built up because the resilience of both credit institutions and borrowers to unexpected, negative events is reduced. Thus, there is an increased risk of a systemic financial crisis.

Monitoring focus and indicators

In its surveillance the Council focuses on whether banking sector lending activities and credit conditions show signs of unsustainable development. Furthermore, the Council assesses whether developments in the market for owner-occupied housing are deemed sustainable. The housing market plays a crucial role, as real property is used as collateral for the majority of loans to households. If prices soar, a considerable price correction is most likely to take place at some point, thus significantly deteriorating banking sector credit quality. Chart 1 shows three of the indicators applied by the Council when monitoring housing market developments.[7]

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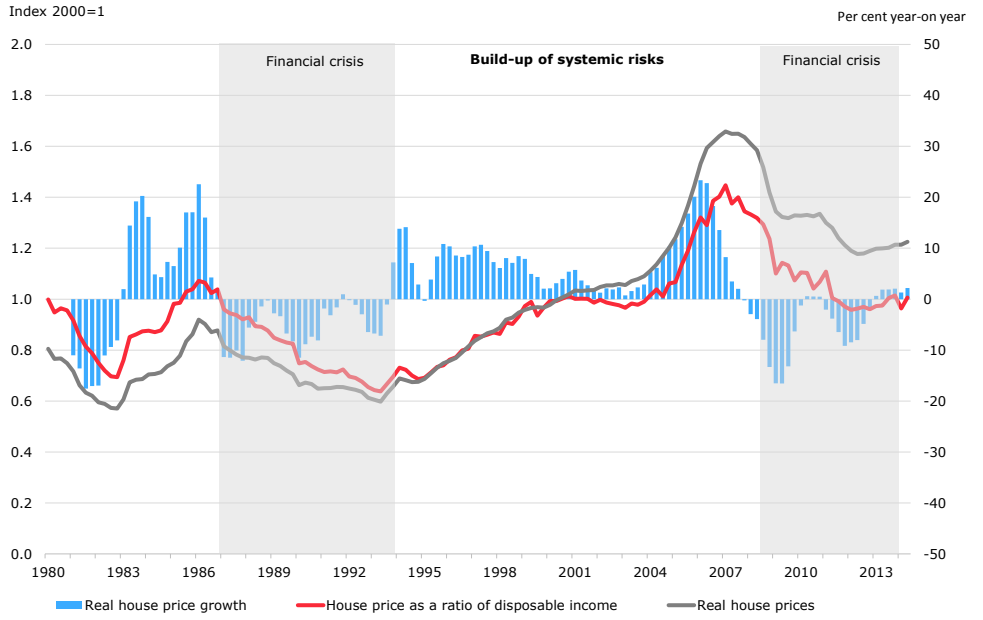
6 Build-up of systemic risks may be caused by both rational and irrational behaviour by borrowers and financial agents.

7 Other examples of indicators under monitoring block 1 are listed in Appendix 1.

In addition, the Council examines whether credit institutions in general tend to reduce their capital resilience, cf. Chart 2, and excess capital adequacy under the regulatory capital requirements. Danmarks Nationalbank's semi-annual stress test of large and medium-sized Danish banks is included in the assessment of the robustness of the entire sector.

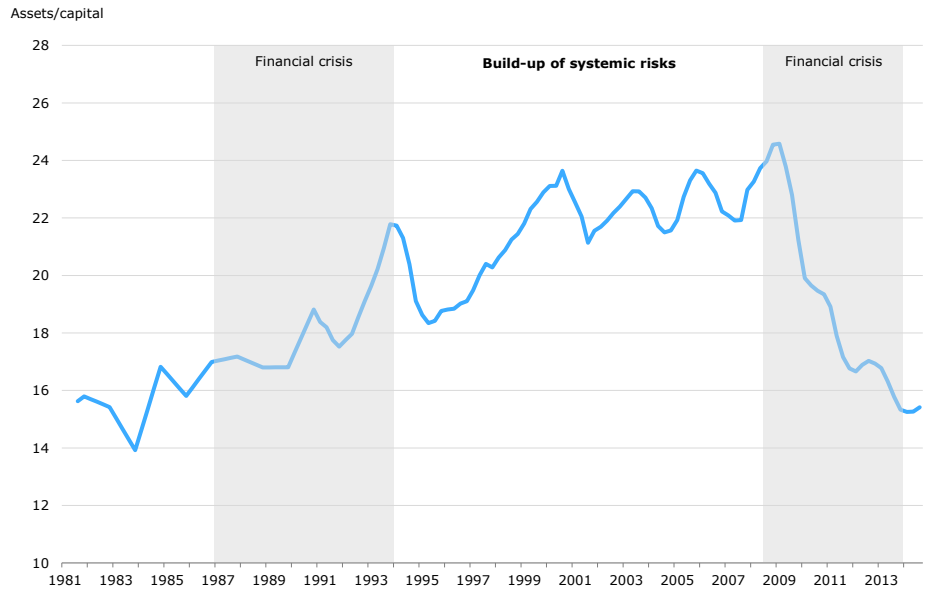
Selected indicators of housing-market developments — Chart 1



Note: Real house prices as applied in Danmarks Nationalbank's MONA data bank. House prices are as the average price of a single-family home according to Statistics Denmark, and income equals household disposable income from the MONA data bank.

Source: Statistics Denmark, the MONA data bank and SKAT.

Leverage of banks — Chart 2



Note: Banking sector leverage measured as the total value of assets, guarantees and commitments divided by the value of Tier 1 capital (incl. additional Tier 1 capital). 4-quarter moving averages.

Source: Danish Financial Supervisory Authority.

As of 2015, part of the monitoring included in block 1 will be published on a regular basis. This step is taken because the requirements for applying the countercyclical capital buffer (a macroprudential instrument) come into effect on 1 January 2015. Details of the Council's role and basis for decision-making with regard to this initiative are described in the note "The countercyclical capital buffer", which is available on the Systemic Risk Council's website. [8]

1.3 Block 2: Mitigate and prevent excessive maturity mismatch and market illiquidity

The financial sector relies on financing in order to grant loans. Financing is in part provided by the capital markets. If access to these markets becomes difficult, the institutions will be under pressure to reduce their balance sheets. This may be done by for instance reducing or terminating loans to households and firms, which may potentially have an adverse effect on the real economy in the form of e.g. a decline in consumer spending and investments.

Mechanism related to the build-up of systemic risks

Banking sector vulnerability in terms of market financing depends on the level of continuous need for market financing as well as the quality of its liquidity buffer. Liquidity buffers comprise the liquid assets that a bank is obliged to hold in order to be able to sell and realise without any significant loss of value if its source of market financing dries out (market illiquidity). Rising continuous financing requirements and limited liquid buffers do not have a negative impact on the economy during the period leading up to a financial crisis. They do, however, pose systemic risks as they may contribute to intensifying a financial crisis once the financial cycle turns. Therefore, systemic liquidity risks build up over a prolonged period of time leading up to a financial crisis, whereas the negative impact following in the wake of market illiquidity and a possible fire sale of liquid asset will manifest itself during the crisis.

During the expansionary stage of a financial cycle, credit volumes tend to rise dramatically. Typically, bank deposits will not increase fast enough to cover the increase in lending, and banks will choose to increase their level of market financing.[9] If asset maturities are much longer than the maturities of the liabilities, i.e. maturity transformation is performed, the banks' business model becomes even more dependent on access to market financing. If the behaviour is widespread, the credit institutions overall are more vulnerable to illiquidity in the financial markets.

At the same time, banks' liquidity buffers may deteriorate if increased willingness to take risk means that the safety margin to regulatory requirements is squeezed. The outcome may be that liquidity reserves are no longer sufficient to withstand a situation in which financing is not available in the capital markets. This will cause a decline in overall resilience in times of market illiquidity, because banks do not have enough liquid assets to sell in that situation. At the same time, a concentration of liquid assets may fuel market unrest. This happens because the banks' need to sell liquid assets increases if prices fall when supply of a particular asset is high. Banks, therefore, experience an increased need to sell assets, which puts additional pressure on the sector. This

8 http://www.risikoraad.dk.

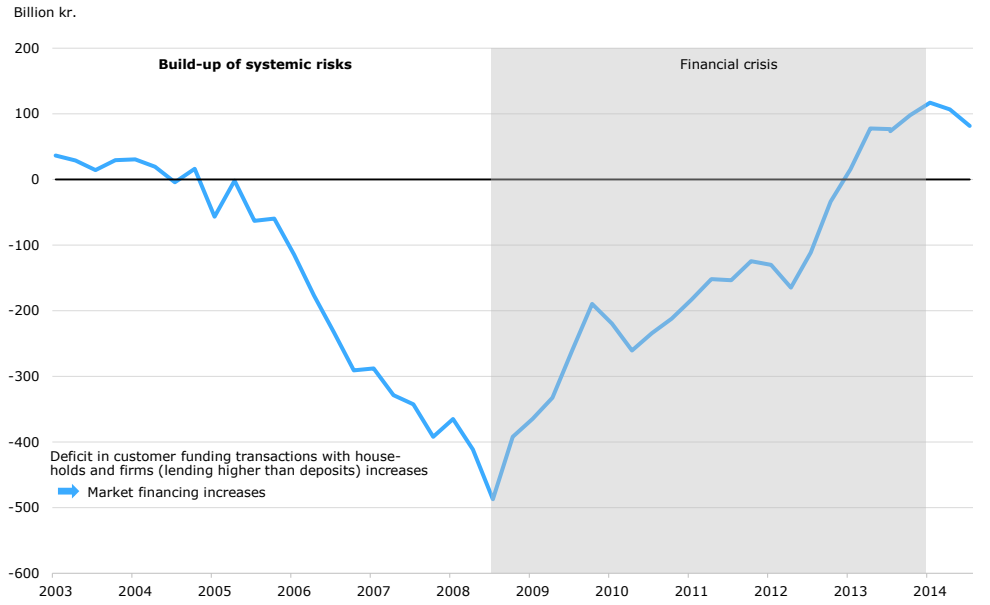
9 See for instance Shin (2013), Procyclicality and the search for early warning indicators, IMF Working Papers, No. 258, and Hahn, Shin and Shin (2013), Non-core bank liabilities and financial vulnerability, Journal of money, credit and banking, 45 (p. 1).

mechanism is known as a negative fire sales spiral and characterises the market panic that may follow in a financial crisis.[10]

Monitoring focus and indicators

The Council monitors the continuous financing requirement of the sector and its composition. That includes among other things funding obtained from capital markets, in particular developments in the use of short-term market financing. One indicator of the need for market financing is the banking sector's customer funding surplus vis-à-vis households and firms, cf. Chart 3.

Banks' customer funding surplus vis-à-vis households and firms — Chart 3



Note: The customer funding surplus is the difference between banking sector deposits and loans vis-à-vis counterparties that are not monetary financial institutions. The customer funding surplus is calculated exclusive of repo transactions.

Source: Danmarks Nationalbank.

In addition, the Council monitors overall banking sector liquidity buffers to assess to what extent banks will be able to obtain liquidity by selling liquid assets if financing is unobtainable elsewhere. In Denmark, the volume of liquid funds held by each bank is subject to minimum requirements. Furthermore, the Danish Financial Supervisory Authority's Supervisory Diamond defines a benchmark for excess liquidity coverage of more than 50 per cent. The Council focuses on whether movements are noted in the safety margin to the regulatory requirements. In addition, the Council assesses whether certain factors exist, such as portfolio concentrations that may impact asset values in a time of crisis.

As from October 2015, Danish credit institutions will most likely be subject to a new European liquidity requirement known as Liquidity Coverage Ratio, LCR. Once the requirement enters into force, LCR compliance will be a part of the monitoring by the Council.

1.4. Block 3: Limit direct exposure concentrations

If banking sector exposure is very homogeneous, credit institutions will be vulnerable to the same negative events. This increases the likelihood of a single negative shock triggering a financial crisis. This is because the overall effect of

[10] Cf. Brunnermeier and Pedersen (2009), Market Liquidity and Funding Liquidity, The Review of Financial Studies, Vol. 22, No. 6, pp. 2201-2238, and Brunnermeier (2009), Deciphering the liquidity and credit crunch 2007-08, Journal of Economic Perspectives, Vol. 23, No. 1.

the reaction is intensified when multiple credit institutions suffer a simultaneous blow and may have to reduce lending to households and firms.

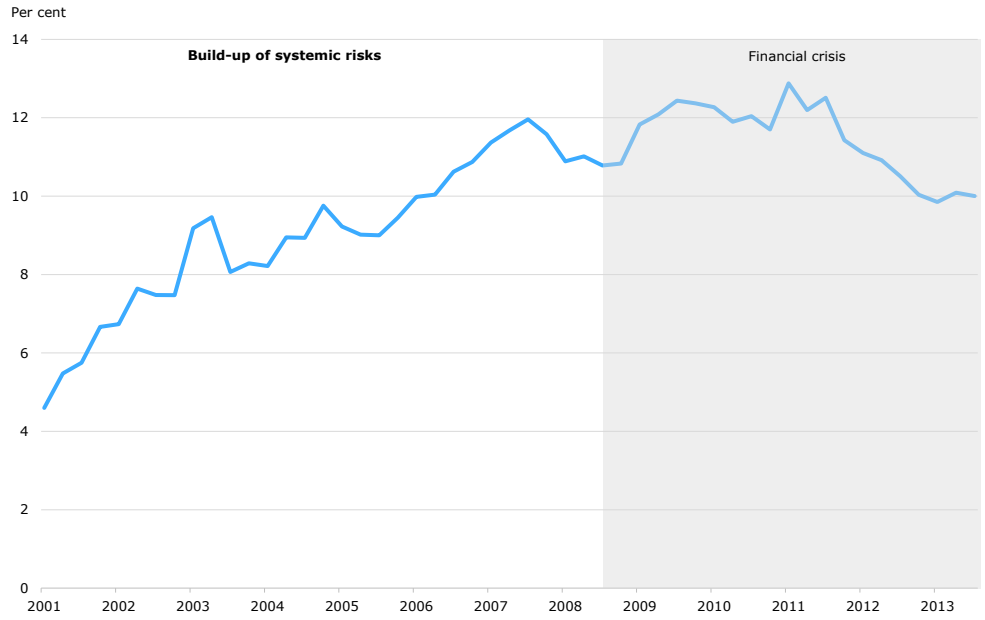
Mechanism related to the build-up of systemic risks

In the expansionary part of a financial cycle, the risks assumed by credit institutions may become increasingly concentrated, e.g. vis-à-vis a specific industry or in the form of large exposures, i.e. several big loans to a few borrowers. In a situation of high concentration, credit institutions become increasingly vulnerable to specific adverse events experienced by these borrowers. If this behaviour becomes a general trend in the sector, systemic risks build up.

Monitoring focus and indicators

The Council examines whether there is a general tendency towards concentration in banking sector loans to individual borrowers, known as large exposures. Furthermore, developments in credit institutions' diversity of lending activities are monitored. If the trend is towards reduced diversity, this is related to increased systemic risks. It is particularly relevant to monitor the commercial property market, as this market, internationally as well as in Denmark, has played a prominent role in past financial crises, cf. Chart 4.

Banks' lending to the commercial property industry — Chart 4



Note: Lending to the industry is stated as a ratio of banking sector lending to industries exclusive of employees, pensioners, etc. as well as insurance, banking and finance activities. The term 'commercial property industry' comprises agents engaged in the purchase and sale of real property, leasing of real property and other property related activities such as property appraisal. Adjustments have been made for data breaks in 2009 due to new industry codes.

Source: Danmarks Nationalbank.

1.5. Block 4: Limit systemic risks related to indirect exposure concentrations (interconnectedness)

Whether or not a negative shock will trigger a financial crisis depends, among other things, on how easily the repercussions spread from one institution to another and whether it gains momentum. If, for instance, close ties exist between credit institutions (a high degree of interconnectedness), the potential channels for contagion of instability between credit institutions are wider. Thus, the effects of unexpected shocks may be broad based and swift.

Mechanism related to the build-up of systemic risks
In the expansionary part of a financial cycle, increased willingness to take risk and financial innovation often cause credit institutions' inter-sector activities to rise. This may be reflected in money market lending activities, i.e. with another financial entity, or holdings of debt and capital issues from other financial entities. When, for instance, one credit institution holds a bond issued by another credit institution, it is exposed to the issuing institution through the value of the bond. If the issuing institution becomes distressed, the value of the bond may drop. Hence, the credit institution is exposed to the institution that issued the bond. This is called indirect exposure as opposed to direct lending exposure as monitored in block 3.

Credit institutions may be interconnected with financial entities in Denmark and abroad. A high degree of international interconnectedness increases the risk of an international shock being transmitted to the Danish financial system. Domestic interconnectedness determines the possible degree of contagion in the Danish system. Overall, a high degree of interconnectedness in the financial sector is associated with increased systemic risks. The type of interconnectedness, however, is of relevance to the degree of systemic risks.

Monitoring focus and indicators
The Council monitors interconnectedness between credit institutions and other financial entities within the system. Monitoring is based on indicators of inter-institutional lending activity, including the volume of repo transactions, as well as the financial entities' holdings of each other's debt and capital issues. The indicators are supplemented with more advanced tools allowing the Council detailed insight into how the institutions are connected. One example of such a tool is network analyses that provide insight into which credit institutions play a central role in a market, e.g. the money market.[11] They provide valuable information for the assessment of systemic risks, as the central players may potentially be the cause of systemic effects.

1.6. Block 5: Limit systemic risks connected with systemically important financial institutions and reduce misaligned incentives

Some credit institutions are so large and complex that it may have systemic consequences should they experience problems. This happened during the financial crisis when the collapse of the investment bank Lehman Brothers caused extensive instability throughout the international financial system.

Mechanism related to the build-up of systemic risks
Large and complex financial institutions play a central role in the financial system and vis-à-vis economic agents. In the money market, they may be providing financing to other financial institutions or they may be responsible for a substantial part of total loans to regular borrowers. If such institutions experience difficulties, the consequences will affect the economy as a whole. This type of institution is known as a systemically important financial institution, SIFI.[12]

Furthermore, the incentives of SIFIs are influenced by the fact that they are large and complex. They may assume higher risks if management and the capital markets believe that the authorities are willing to bear part of a possible loss to avoid SIFIs getting into difficulties. It is said that these institutions enjoy an implicit government guarantee. The preconception that the authorities will step in and help may therefore adversely affect the incentive structures in large credit institutions. This is because a SIFI is more inclined to assume risk when a

[11] For an example of a network analysis of Danish credit institutions, see Danmarks Nationalbank, Financial stability, 1 Half 2014, page 36.

[12] 'SIFI' is an abbreviation of Systemically Important Financial Institution. There are a total of six Danish SIFIs: Danske Bank, Nykredit Realkredit, Nordea Bank Danmark, Jyske Bank, Sydbank and DLR Kredit.

gain accrues to the credit institution itself, whereas a loss will be shared with the tax payers. This may be reflected in more risky lending activities, higher capital leverage and a more risky funding structure. The result of this misaligned incentive structure is that the system – the large institutions in particular – become more vulnerable to negative shocks.

In these years, SIFIs in Denmark and abroad are subjected to stricter requirements. The authorities are tasked to plan and prepare the resolution of a distressed SIFI so that the central functions performed by the SIFI may be continued without the need for public funds. If it proves impossible to draft such a plan, the authorities must demand e.g. that the SIFI be reorganised or that its capital be increased to allow for such reorganisation. The purpose is to allow for the winding up of the SIFI without insurmountable consequences for economy as a whole. This should limit the impact on the financial sector and the real economy of a distressed SIFI. It is desirable, however, to avoid a situation where a SIFI has to be resolved. Therefore, SIFIs are required to meet specific capital requirements to strengthen their resilience. The aim is to reduce the risk that a SIFI will experience difficulties. A positive side effect of the new requirements is that incentive problems in SIFIs are solved once it becomes evident the SIFI is required to cover all losses on its own.

Monitoring focus and indicators

The Council monitors developments in all major Danish financial institutions. Focus is on whether their business models develop in an increasingly risky direction, e.g. by becoming more dependent on regular access to the capital markets or by reducing their capital and liquidity resilience to negative shocks.

1.7. Block 6: Strengthen the resilience of the financial structures

The final monitoring block is broader than the rest and includes assessment of risks associated with financial structures, i.e. structures in the financial sector, but also in the real economy to the extent that they imply or may contribute to intensifying systemic risks in the financial system. In this case, the Council seeks to assess if specific Danish structures contain systemic risks. That may be areas where Danish structures differ from foreign structures. It may be in relation to the pension and life insurance sector, which is quite substantial in Denmark, the special Danish mortgage credit system or the, in international comparison, very high level of Danish household debt. One example of the work performed by the Council under block 6 is the discussion of risks related to the high level of household debt in December 2013.[13] An analysis conducted by the Council indicated that Danish households with a high loan-to-value ratio prior to the recent crisis demonstrated a greater propensity to reduce consumption during the ensuing crisis. Thus, the high level of debt is likely to have contributed to weaker growth in private consumption. This means that the level of debt may have contributed to intensifying fluctuations in economic activity following the financial crisis with an ensuing spill-over effect into the financial sector.

Internationally, financial entities outside the traditional regulated system contributed to intensifying the recent financial crisis.[14] These financial entities are not subject to traditional banking regulation and supervision and may behave in a more risky manner. Overall, they are referred to as the shadow banking system.[15] The Systemic Risk Council will look into the extent of these entities in Denmark and into whether possible shadow banks pose a risk to the

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13 Press release following the Systemic Risk Council's meeting is available on the Council's website. http://www.risikoraad.dk.

14 Cf. The financial crisis in Denmark – causes, consequences and lessons, Ministry of Business and Growth Denmark, and IMF (2014), Global Financial Stability Report, October, Chapter 3, The International Monetary Fund.

15 Internationally, private equity and hedge funds, among others, are considered shadow banks. International analyses show that the shadow banking system grew considerably during the years leading up to the financial crisis in 2008, cf. among others IMF (2014), Global Financial Stability Report, October, Chapter 3, The International Monetary Fund.

traditional regulated system. In a systemic context it is important to assess whether risks in fact no longer impact credit institution balance sheets, and whether shadow banks are capable of withstanding negative shocks without these shocks being transmitted to the traditional regulated system.

In terms of the broader focus of this block, the Council assesses and discusses relevant issues as required.

1.8. An overall assessment of the systemic risks

Based on the assessment of systemic risks in the monitoring blocks, the Council form an overall assessment of current systemic risks. Cyclical, systemic risks weigh heavily in the overall assessment. However, possible structural risks may impact the overall assessment as well. The degree of systemic risk depends on the extent to which indicators in a given block point towards the build-up of systemic risks and the degree to which deviations have spilled over into other monitoring blocks. Moderate signals of the build-up of systemic risks in several monitoring blocks may thus be just as serious as a clear signal of the build-up of systemic risks in a single block.

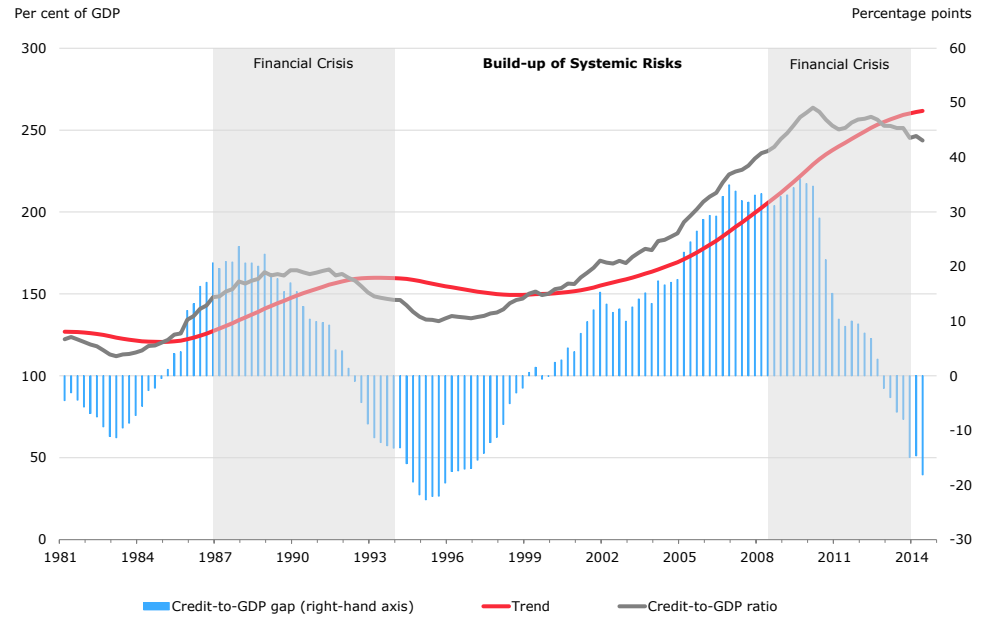
The Systemic Risk Council applies a large number of indicators when monitoring different angles of systemic risks (the monitoring blocks). The appendix to this note shows a number of other indicators considered by the Council. The indicators are indicative, however, as it is important not to adopt a mechanical approach when assessing systemic risks. This is because the financial system develops over time and no fixed set of indicators will be able to identify all types of systemic risks. At the same time, risks must be weighed against already implemented measures such as fiscal policy measures or changes in the supervisory practices of the Danish Financial Supervisory Authority, which may dampen the build-up of systemic risks. Hence, expert judgement is important when the Council forms its overall assessment of the current systemic risks.

2. Appendix: Selected indicators in monitoring blocks 1-4

Below is a selection of the indicators applied by the Council.

Block 1: Mitigate and prevent excessive credit growth and leverage

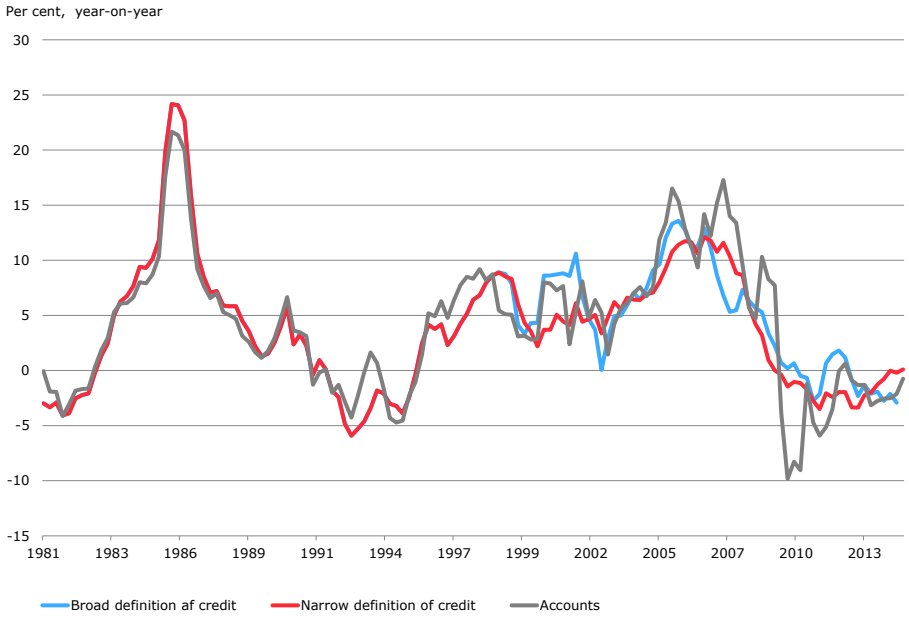
Credit-to-GDP ratio, trend and credit-to-GDP gap — Chart B.1



Note: The credit-to-GDP gap is defined as deviations of the ratio of credit to GDP from its long-term trend. Credit is from the quarterly financial accounts statistics and comprises loans to domestic households and non-financial corporations in both Denmark and abroad as well as securities issued (excluding equities). The trend applied to calculate the credit-to-GDP gap is estimated using a recursive HP filter. This is in keeping with international guidelines, cf. ESRB (2014) and BCBS (2010).

Source: Abildgren (2007), Abildgren (2010), Statistics Denmark, the MONA data bank, Danmarks Nationalbank and own calculations.

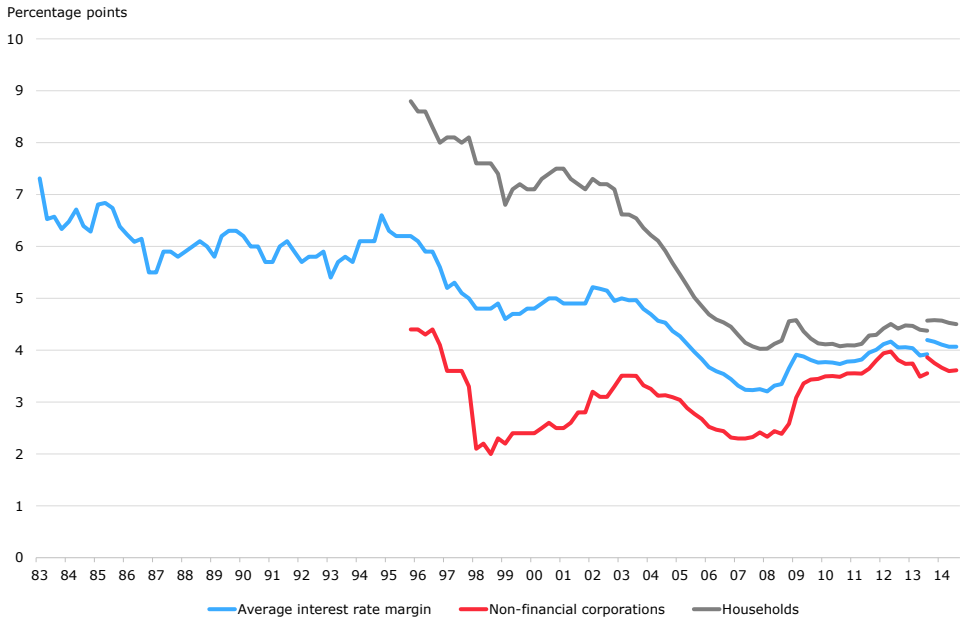
Annual real credit growth — Chart B.2



Note: Different measures of credit growth. Real growth is calculated based of the private consumption deflator. Growth in terms of both the broad and narrow definitions of credit was identical in 1999, because data related to the broad definition was linked to data related to the narrow definition during this period. Accounting data has been reported to the Danish Financial Supervisory Authority.

Source: Danmarks Nationalbank, Statistics Denmark and the Danish Financial Supervisory Authority.

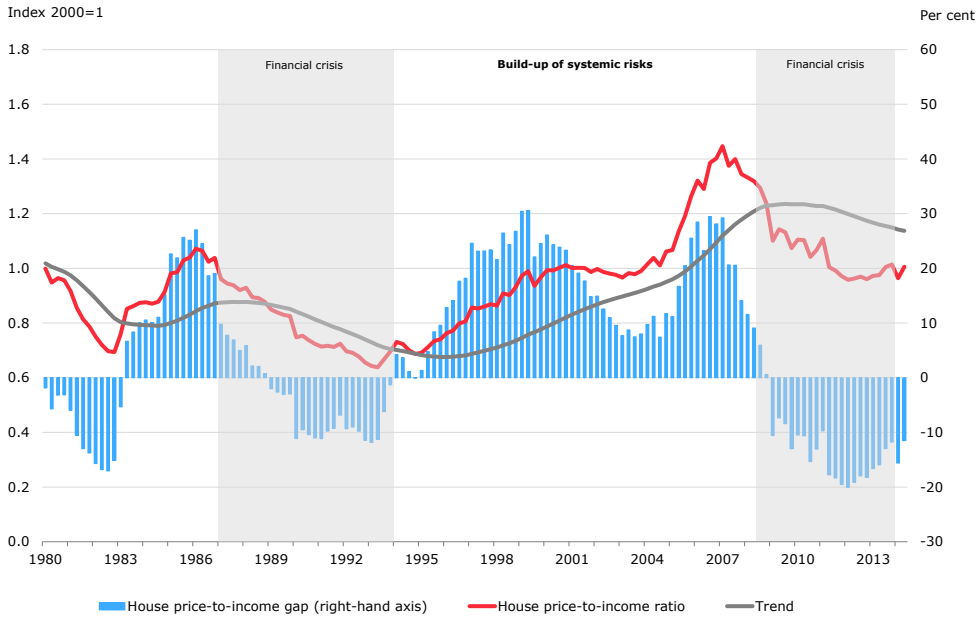
Banks' average interest rate margin — Chart B.3



Note: The interest-rate margin is the difference between banks' average lending and deposit rates on outstanding business. The overall average interest rate margin is based on outstanding business with households, non-financial corporations and general government. Data breaks from 4th quarter 2013 due to transition to new balance sheet and interest rate statistics for monetary financial institutions.

Source: Danmarks Nationalbank.

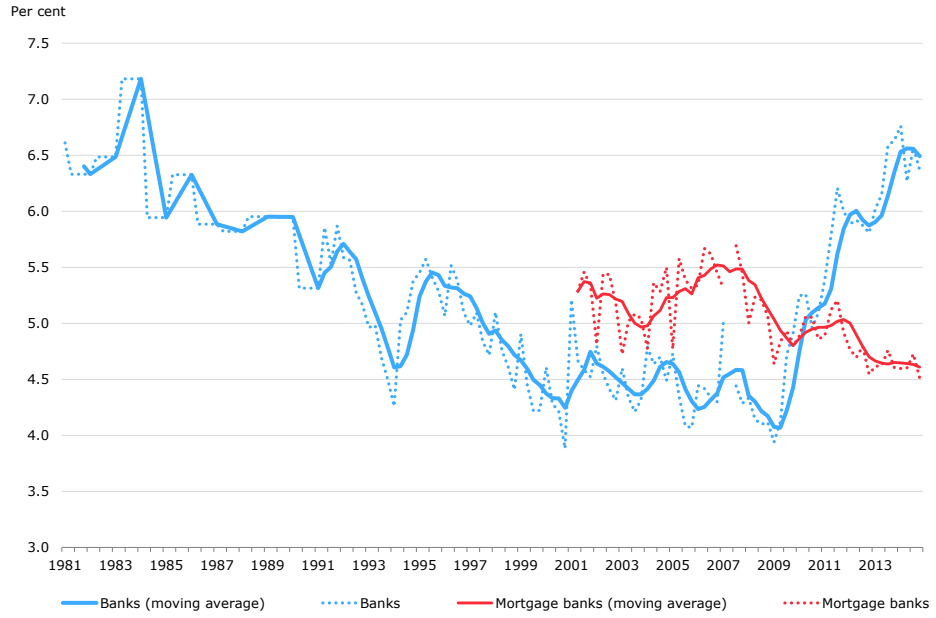
House price-to-income gap — Chart B.4



Note: The house price-to-income gap is defined as deviations of the ratio of house prices to income from its long-term trend. House prices are measured on the basis of the average price of a single-family home according to Statistics Denmark, and income equals household disposable income from Danmarks Nationalbank's MONA data bank. Disposable income has been adjusted for data breaks back in time. The trend is estimated using a recursive HP filter.

Source: Statistics Denmark, the MONA data bank and own calculations.

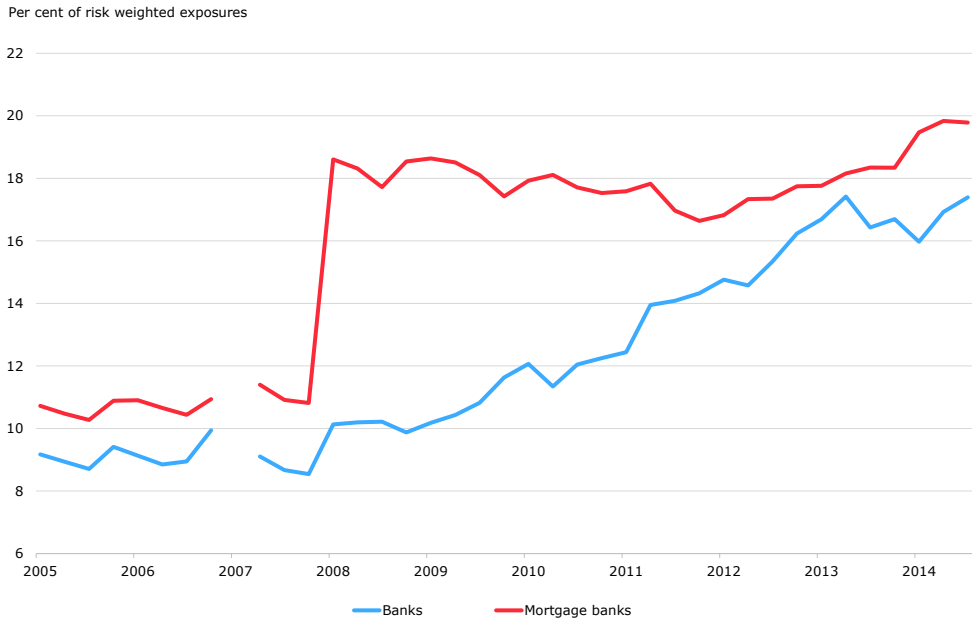
Leverage ratio of banks and mortgage banks — Chart B.5



Note: The leverage ratio is defined as Tier 1 capital (including additional Tier 1 capital) divided by the sum of assets, guarantees and credit commitments. The 1st quarter of 2007 does not include Tier 1 capital data due to the transition to Basel II. 4-quarter moving averages.

Source: Danish Financial Supervisory Authority and own calculations.

Common Equity Tier 1 capital ratio of banks and mortgage banks — Chart B.6

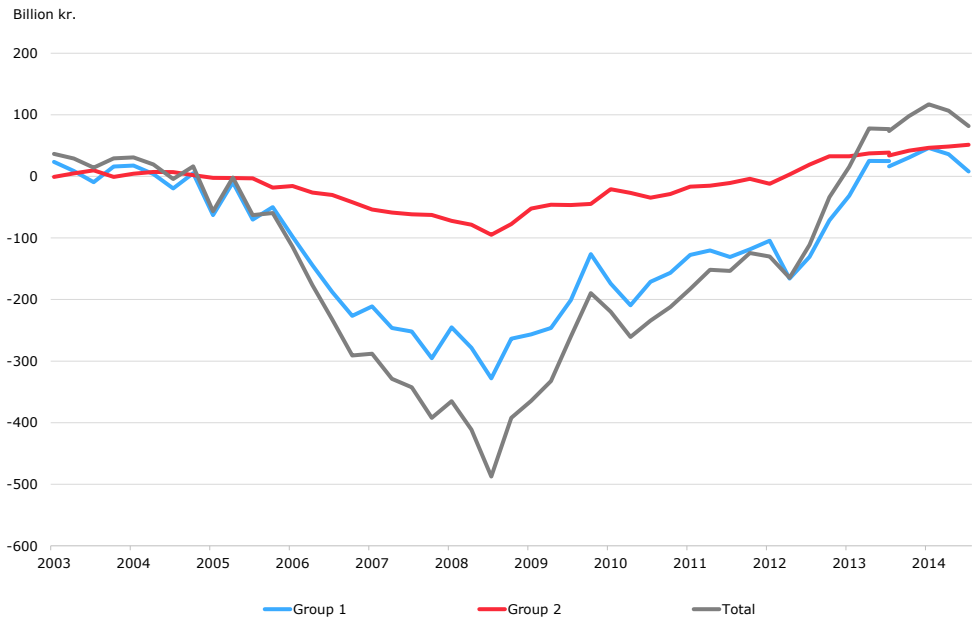


Note: Common Equity Tier 1 capital ratio is calculated as Common Equity Tier 1 capital divided by risk weighted exposures. Data breaks due to change of rules back in time. The transition to Basel II in 2007 impacts the calculation of risk weighted assets, among other things. This is reflected in the sharp increase in Common Equity Tier 1 capital ratio, particularly in terms of mortgage banks. No data was reported in the 1st quarter of 2007 due to the transition. As from the 1st quarter of 2014, the institutions have presented financial statements in accordance with the Capital Requirements Directive, CRD IV/CRR.

Source: Danish Financial Supervisory Authority and own calculations.

Block 2: Mitigate and prevent excessive maturity mismatch and market illiquidity

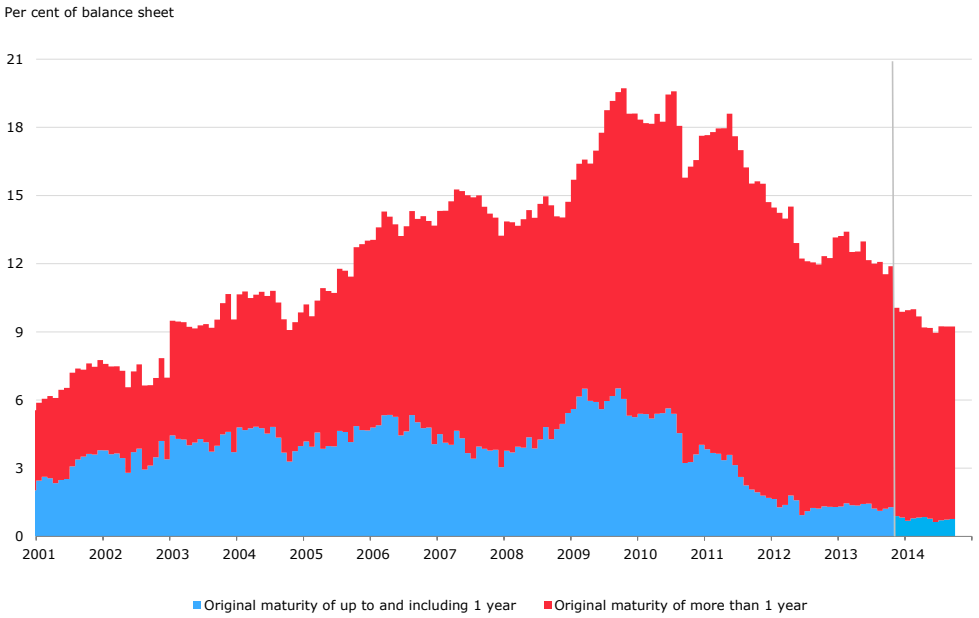
Banks' customer funding surplus vis-à-vis households and firms — Chart B.7



Note: The customer funding surplus is the difference between banking sector deposits and loans vis-à-vis counterparties that are not monetary financial institutions. The customer funding surplus is calculated exclusive of repo transactions. Data breaks from the 4th quarter of 2013 due to the transition to new balance sheet and interest rate statistics for monetary financial institutions.

Source: Danmarks Nationalbank.

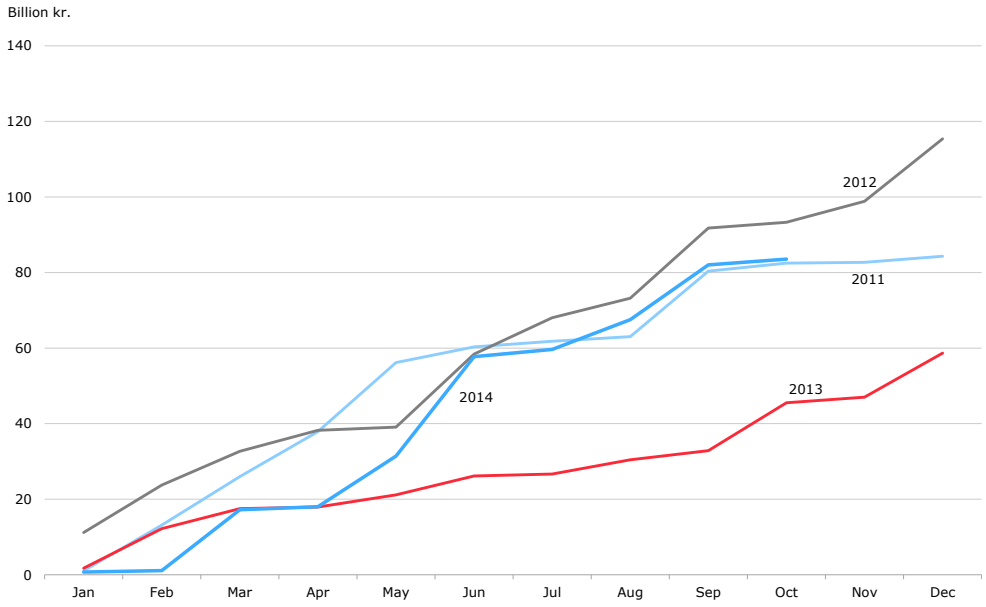
Banks' outstanding debt instruments by original maturity — Chart B.8



Note: The chart illustrates the composition of banks' outstanding debt securities broken down by maturity. Data breaks from the 4th quarter of 2013 due to the transition to new balance sheet and interest rate statistics for monetary financial institutions.

Source: Danmarks Nationalbank.

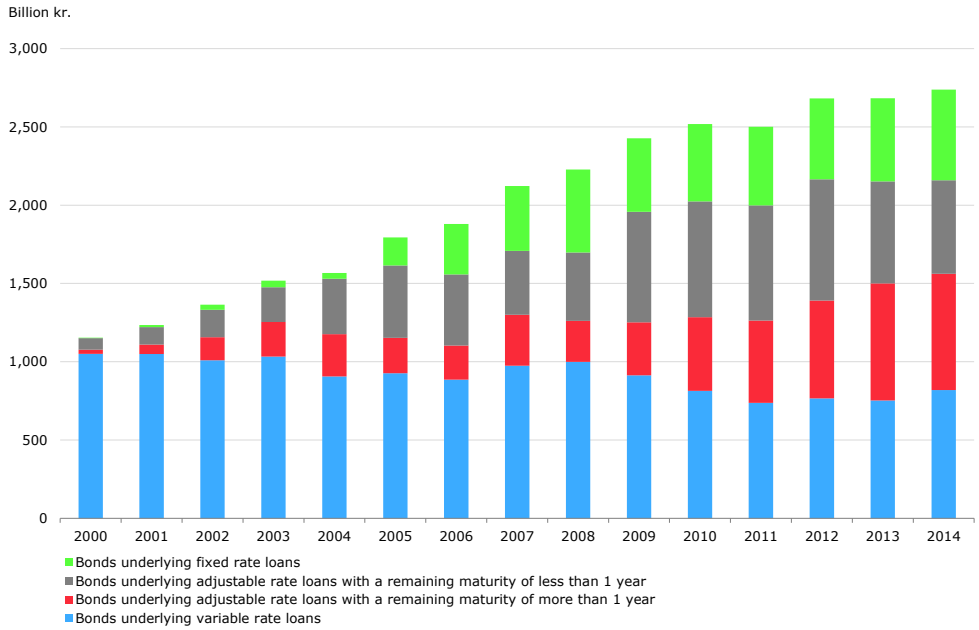
Banks' issue of debt and capital instruments — Chart B.9



Note: The chart comprises banks included in the Danish Financial Supervisory Authority's groups 1 and 2. Long-term financing comprises securities with a term to maturity of more than one year, and data covers banks' issue of senior debt, covered bonds, additional Tier 1 capital and other subordinated capital.

Source: Danmarks Nationalbank.

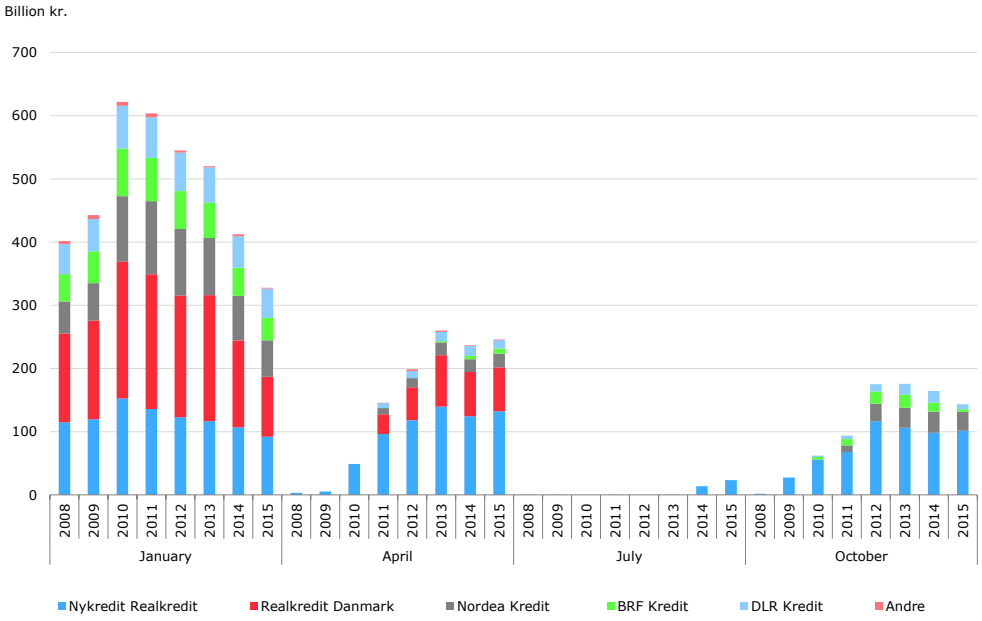
Outstanding mortgage bonds by type — Chart B.10



Note: The chart illustrates the remaining time to maturity of mortgage banks' outstanding mortgage bonds. Thus, short-term fixed rate bonds underlying variable rate loans with a remaining time to maturity of less than one year also include adjustable rate loans with a remaining time to maturity of three or five years and less than one year until refinancing.

Source: Danmarks Nationalbank.

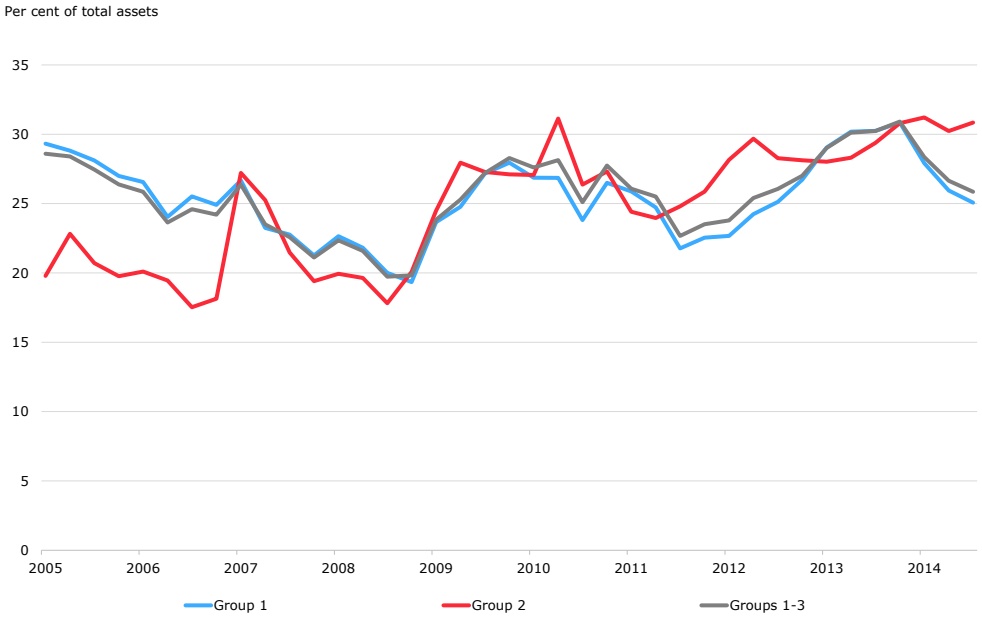
Maturing bonds for financing adjustable-rate loans — Chart B.11



Note: The chart illustrates the annual breakdown of outstanding mortgage bonds underlying adjustable rate loans maturing before 2015. Data for future maturity of bonds is based on outstanding volume at end-September 2014. Factors such as repayments and premature redemptions mean that the amount to be refinanced is lower.

Source: Danmarks Nationalbank.

Banks' liquid assets as a ratio of total exposures — Chart B.12

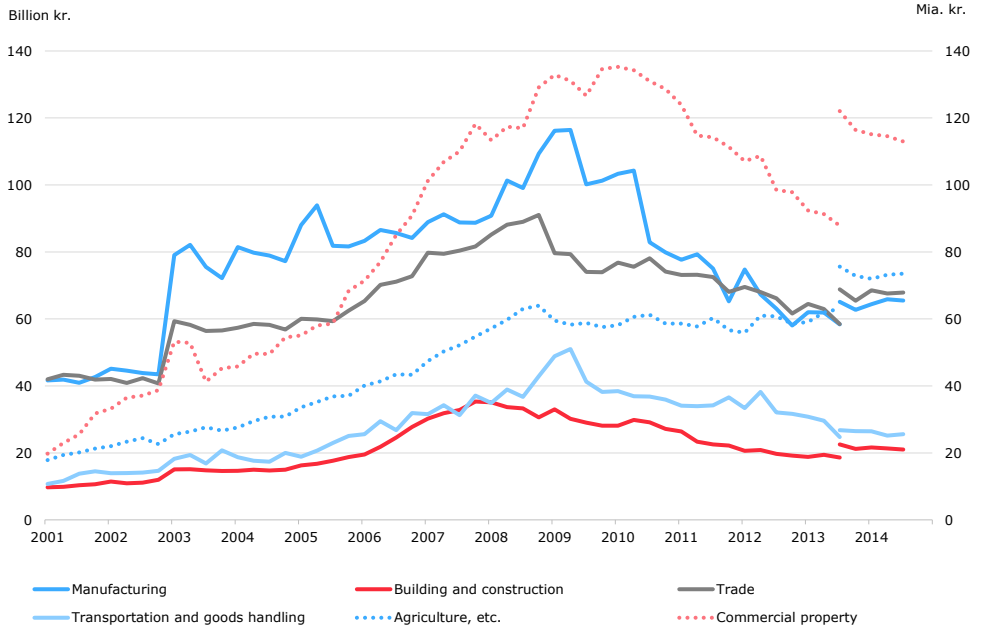


Note: Liquid funds included in the Section 152 liquidity requirement, cf. the Danish Financial Business Act, including cash in hand, current account deposits and certificates of deposit not used as collateral, fully secure and liquid demand deposits with credit institutions and insurance companies, etc., liquid securities not used as collateral and credit commitments. The groups are identical to the Danish Financial Supervisory Authority's groups 1, 2 and 3.

Source: Danish Financial Supervisory Authority.

Block 3: Limit direct exposure concentrations

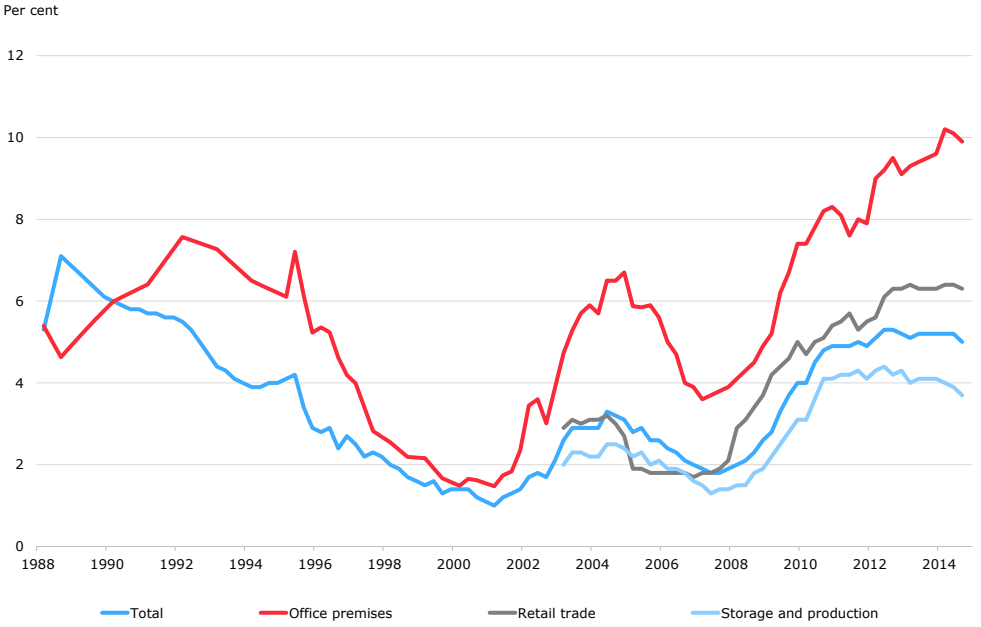
Banks' lending to selected industries — Chart B.13



Note: The chart illustrates outstanding loans to selected industries. A total of six industries out of the nomenclature's 21 industries are shown. The 'real property' industry comprises agents engaged in the purchase and sale of real property, leasing of real property and other property related activities such as property appraisal. Data breaks from the 4th quarter of 2013 due to the transition to new balance sheet and interest rate statistics for monetary financial institutions.

Source: Danmarks Nationalbank.

Vacant square metres in commercial properties as a ratio of estimated volume by property type — Chart B.14

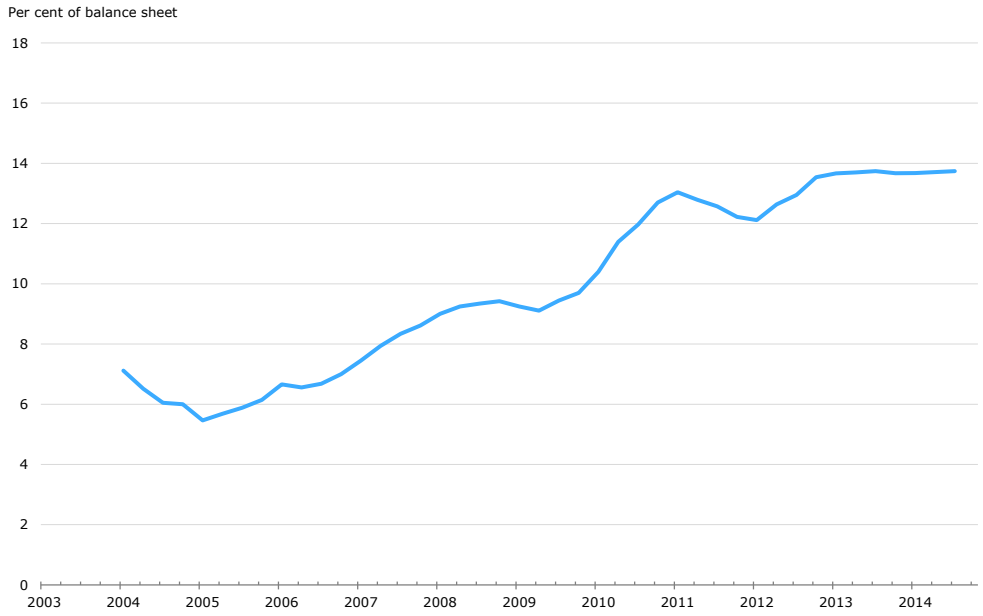


Note: Statistical data covers vacant premises advertised by lessors Aberdeen Asset Management Danmark, ATP ejendomme and DATEA.

Source: Ejendomsforeningen Danmark/Oline-ED Statistikken.

Block 4: Limit systemic risks related to indirect exposure concentrations (interconnectedness)

Interconnectedness in the form of lending activity between domestic credit institutions — Chart B.15



Note: Credit institution lending activity vis-à-vis domestic credit institutions is calculated as the average of inter-institutional deposits and credits. 4-quarter moving averages.

Source: Danmarks Nationalbank.