

MONETARY  
HISTORY OF  
DENMARK



# **Monetary History of Denmark 2005-2020**



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# Foreword

This volume 7 of *Monetary History of Denmark* covers the period from 2005 to 2020 – 15 very eventful years in the monetary history of Denmark. This period saw a global financial crisis and pressure on the Danish krone in 2008, a sovereign debt crisis in Europe from 2010 to 2012, a Danish krone crisis in 2015 and a prolonged upswing in the Danish economy which was brought to an abrupt end by the coronavirus pandemic in 2020.

Following the global financial crisis, financial regulation was overhauled to make the sector more resilient and prevent similar crises in the future. Nominal interest rates continued their protracted downward trend in the post-crisis period, and in the second half of the 2010s negative nominal interest rates became the new normal. Consumer payment habits changed significantly, with digital card and mobile payments replacing cash as the preferred means of payment in physical trade in goods and services. Following the sharp drop in the use of cash, it was no longer financially viable for Danmarks Nationalbank to produce new banknotes and coins internally, so production was outsourced. And new types of risks in the financial sector raised awareness: cybercrime as a result of rapid digitalisation and risks derived from climate change and the transition to a more carbon-neutral economy.

Volume 7 ends at the conclusion of 2020 when great uncertainty still surrounded the prospects for recovery of the Danish and international economies after the coronavirus pandemic. Uncertainty related to the roll-out and efficacy of coronavirus vaccines, and it was also uncertain whether the coronavirus pandemic would leave a more permanent mark on economic structures, e.g. in relation to consumption patterns, global supply chains and digitalisation. So, it will be up to a future volume in the series to address the long-term economic impacts of the coronavirus pandemic, along with other post-2020 events, including the Russian invasion of Ukraine and the high inflation experienced by Denmark and other countries.

The book includes a number of text boxes with quotes, especially from Governor speeches over the years. These quotes help to give an impression of the zeitgeist of the time and make topics more vivid.

The author is Kim Abildgren, Chief Adviser at Danmarks Nationalbank. Since autumn 2019, a small working group has been working through the topics and draft chapters of the book. In addition to the author, members of this working group were Governors Lars Rohde and Per Callesen and former Governor Hugo Frey Jensen. Former Governors Nils Bernstein, Jens Thomsen and Torben Nielsen have contributed valuable comments on the draft of the book. Many employees of Danmarks Nationalbank have also made a huge contribution by commenting on drafts of various parts of the book and assisting with linguistic editing, graphical layout and verification of the contents of the book.



# The Danish economy before the financial crisis outbreak in 2008

During 2008, the world economy suffered the most severe peacetime setback since the Great Depression of the 1930s. The crisis started with financial market turmoil in the summer of 2007 after the onset of the US housing market drop. The turmoil escalated in earnest to a global financial crisis in the autumn of 2008.

In Denmark, the crisis became the fastest economic downturn since the end of World War II, and the economic reversal in Denmark was strongly rooted in the international economy. But the crisis in Denmark was exacerbated by the previous overheating of the Danish economy with high price increases for residential and commercial real estate, strong credit growth and fiscal accommodation.

Prices in the housing and real estate market soared until the mid-2000s, partly due to the freezing of property value taxes in 2001 and the introduction of housing loans with deferred amortisation in 2003. Before the crisis, price bubble elements were seen for housing, commercial real estate and agricultural land, as price increases were amplified by expectations of further increases.

The strong credit growth in the years leading up to the financial crisis was at the expense of bank lending quality, and regulatory easing was utilised for further credit expansion rather than for building up buffers against losses. In addition, Danish banks generated a large customer funding deficit financed largely by short-term borrowing in the international money and capital markets. As a result, the banks were vulnerable when the global financial crisis escalated and paralysed international financial markets.

Fiscal policy was too accommodative before the crisis, thus reinforcing the overheating of the Danish economy with labour market pressures. The accommodative policy contrasted with the stabilising role that had characterised fiscal policy since Denmark's transition to the fixed exchange rate policy in the early 1980s.

## From US housing market downturn to global financial crisis

During 2008, the world economy suffered the most severe peacetime setback since the Great Depression of the 1930s.<sup>1</sup>

The financial market turmoil began in the summer of 2007 in the wake of the US housing market downturn.<sup>2</sup> US house prices had been soaring in the first part of the 2000s, but in 2006 there were clear signs of a slowdown in the US housing market. In 2007, house prices started to decline, while the ratio of non-performing housing loans rose, see charts 1.1 and 1.2.

The spotlight was directed at the growing share of defaults on loans to less creditworthy customers (subprime loans). An example of subprime loans could be loans to customers with a previous history of debt servicing problems, who had very poor repayment capacity, or who could only make a limited down payment. Subprime loans accounted for around 15 per cent of all outstanding housing loans at the end of 2006, and by mid-2007 around 15 per cent of subprime loans were non-performing. Many of the subprime loans had deferred amortisation, and in some cases they were teaser loans with particularly low interest rates for the first 2-3 years of the loan term.<sup>3</sup>

The US market for subprime loans was large, and lenders had extensively sold off the credit risk by issuing different types of bonds secured by these loans. Many of the bonds had received high credit ratings based on assumptions about loss risks that later turned out not to hold true. The bonds had been sold to banks and investors around the world. Some of the investors were investment companies, in several cases with close links to large banks through ownership or liquidity guarantees. Such exposures were not always clearly stated in the banks' financial statements.<sup>4</sup> So when losses on subprime loans began to materialise, there was great uncertainty about which banks could directly or indirectly risk losses. The uncertainty caused banks in both the USA and Europe to become unwilling to grant each other uncollateralised loans. The result was that trading in money markets around the world more or less came to a standstill.

The money market slowdown initially led to a liquidity crisis for the banking system, which central banks responded to by providing extra liquidity to the financial sector. Later, during 2008, it became clear that the losses of some of the world's major financial enterprises were so severe that their solvency and financial stability were at risk.

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1 See Kim Abildgren and Jens Thomsen, A tale of two Danish banking crises, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

2 For a list of important events during the financial crisis, see *Annex A: List of events* in Kim Abildgren, Nicolaj Albrechtsen, Mark Strøm Kristoffersen, Søren Truels Nielsen and Rasmus Tommerup, The short-term Danish interbank market before, during and after the financial crisis, *Danmarks Nationalbank Working Paper*, No. 99, November 2015.

3 See *Danmarks Nationalbank Monetary Review 2nd quarter 2007*; *Danmarks Nationalbank Financial stability 2008*; Jakob Windfeld Lund, Turmoil in the financial markets, *Danmarks Nationalbank Monetary Review*, Vol. 46(3), September 2007.

4 See *Danmarks Nationalbank Financial stability 2008*.

### US house prices began to drop in 2007

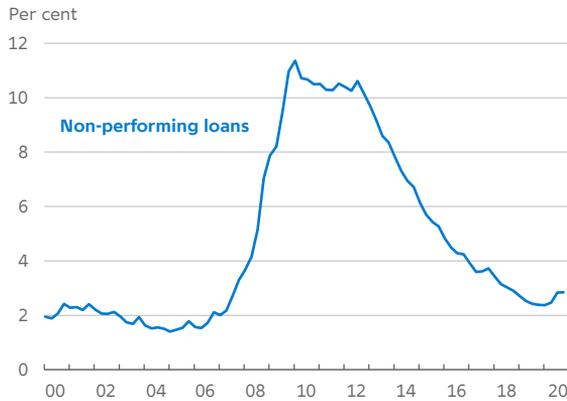
Chart 1.1



Note: S&P/Case-Shiller U.S. National Home Price Index.  
Source: Federal Reserve Bank of St. Louis, FRED database.

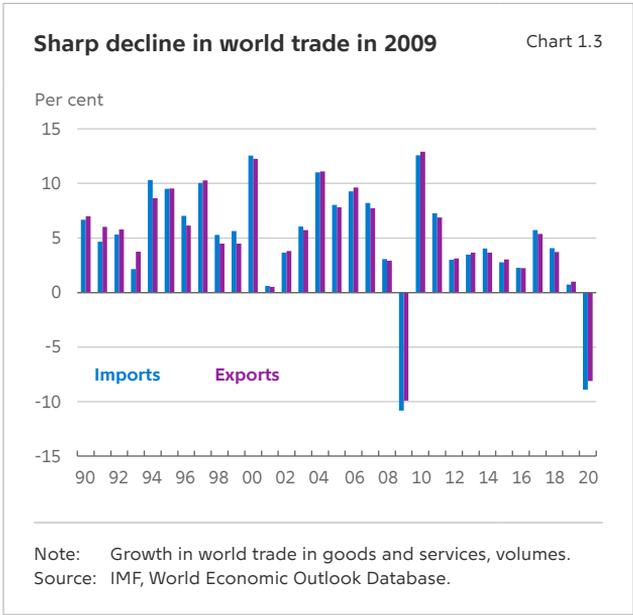
### Non-performing US housing loans rose from 2007

Chart 1.2



Note: Share of banks' non-performing lending for single-family houses. Quarter-end.  
Source: Federal Reserve Bank of St. Louis, FRED database.

The crisis escalated in earnest in the autumn of 2008.<sup>5</sup> In September 2008, the US authorities took control of the two major mortgage credit institutions Fannie Mae and Freddie Mac, which accounted for almost half of all housing loans and housing guarantees in the US market.<sup>6</sup> The US authorities also chose to rescue the large, troubled insurance company AIG, while letting the investment bank Lehman Brothers fail. These events amplified the global shift in confidence in the financial system as reflected, inter alia, in a sharp decline in world trade, see chart 1.3. Governments and central banks in many countries, including Denmark, had to resort to comprehensive relief measures to save economic and financial stability.



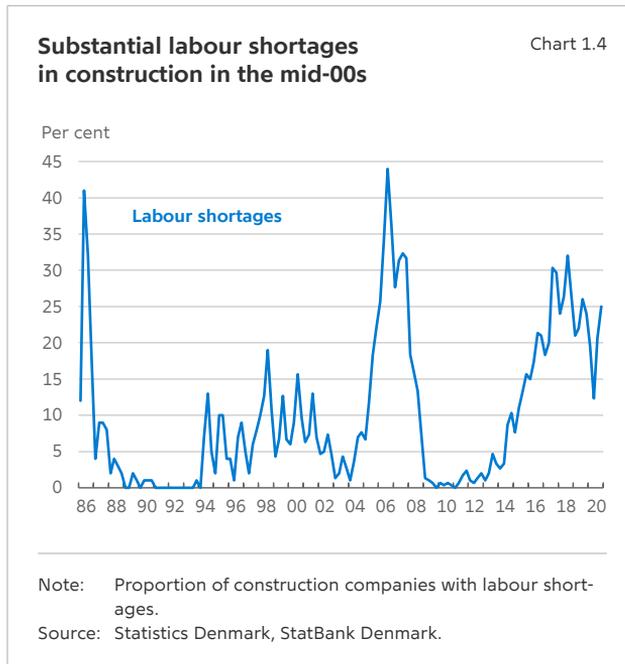
**Overheated Danish economy before the financial crisis**

The Danish economy was already in a slowdown phase before the global financial crisis really intensified in the autumn of 2008. In the 4th quarter of 2007, both house prices and the seasonally adjusted quarterly real gross domestic product (GDP) fell.

The pre-crisis reversal in Denmark came after several years of strong boom and pressure on production resources. Employment reached an all-time high in 2007 and unemployment fell to around 2 per cent of the labour force at the end of the year. This was the lowest unemployment rate since the early 1970s.<sup>7</sup> The labour market pressure meant that companies in

5 See Danmarks Nationalbank, The international financial crisis, *Monetary Review 4th quarter 2008*.  
6 See Danmarks Nationalbank *Financial stability 2nd half 2008*.  
7 See Danmarks Nationalbank *Report and Accounts 2007*.

many industries and the public sector were facing problems recruiting the desired labour.<sup>8</sup> Labour shortages in the years leading up to the financial crisis were particularly evident in building and construction, see chart 1.4. Here, companies of all sizes and types reported labour shortages, with little regional variation in vacancies.<sup>9</sup> Labour shortages contributed to stronger wage growth in Denmark over an extended period compared to Denmark's trading partners, weakening wage competitiveness relative to abroad.<sup>10</sup>



Before the financial crisis really set in, the outlook was for a soft landing after the overheating of the Danish economy. Thus, in its spring projection from the 1st quarter of 2008, Danmarks Nationalbank expected a 1 per cent increase in real GDP in 2009.<sup>11</sup> But when the international financial crisis escalated in the autumn of 2008, what occurred instead was the fastest economic downturn since the end of World War II. Real GDP

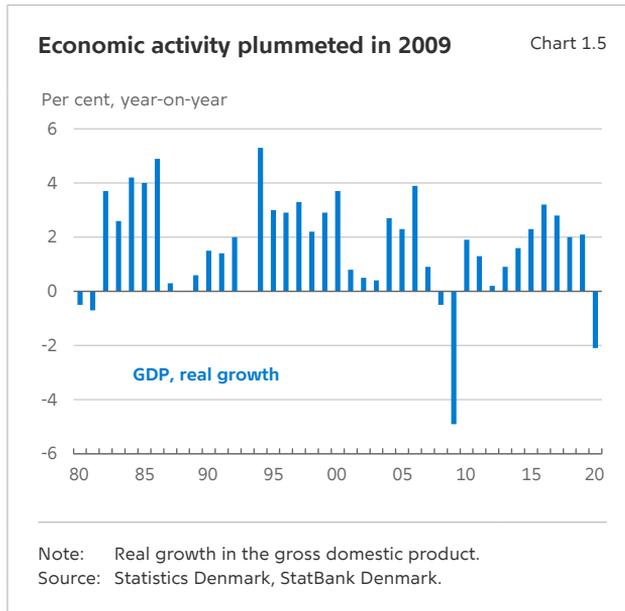
8 See Troels Kromand Danielsen and Casper Winther Jørgensen, Spare capacity in the labour market, *Danmarks Nationalbank Monetary Review*, Vol. 54(3), September 2015.

9 See Svend Greniman Andersen and Andreas Kuchler, Once again labour shortage in construction, *Danmarks Nationalbank Analysis*, No. 15, September 2017.

10 See *Danmarks Nationalbank Report and Accounts 2006*; *Danmarks Nationalbank Report and Accounts 2007*; Duy T. Huynh-Olesen, Kamilla Kristensen and Johanne Dinesen Riishøj, Eksportformåen og lønkonkurrenceevne (Export performance and wage competitiveness), *Danmarks Nationalbank Working Paper*, No. 67, March 2010.

11 See *Danmarks Nationalbank Monetary Review 1st quarter 2008*.

dropped by around 5 per cent in 2009, see chart 1.5. This was about 6 percentage points lower than expected in the projection from the 1st quarter of 2008. About two thirds of this could be attributed to lower export market growth and thus lower activity in Danish export companies.<sup>12</sup>



### On the risk of overheating of the economy in the mid-00s

“Demand is still strong – and perhaps a little too strong. We do not know for certain. But the day we do know that things are going too fast, we will have some unpleasant years ahead. At that point it will be too late to make adjustments without considerable costs.”

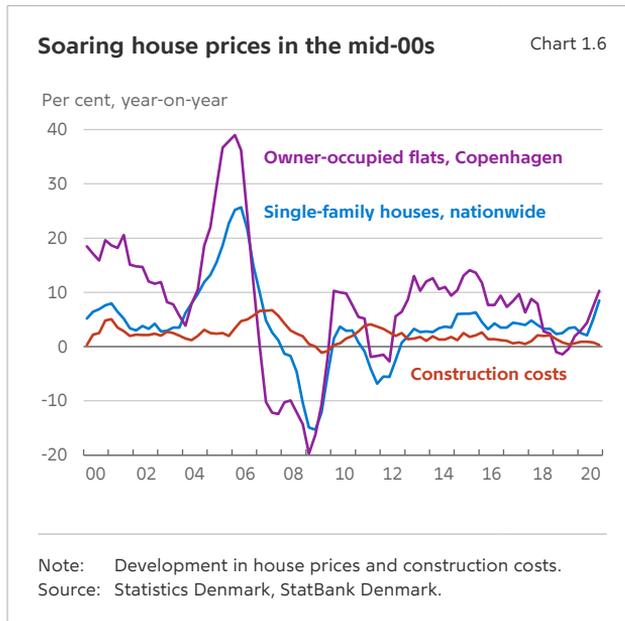
Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 30 November 2005.

### Strong house price increases were boosted by frozen property value tax and deferred amortisation loans

The overheating of the Danish economy in the mid-00s was characterised by soaring house prices, not least in the market for owner-occupied flats in Copenhagen, see chart 1.6. The house price hikes were partly attributable to higher household disposable incomes and relatively low interest rates.

<sup>12</sup> See Morten Spange, Can crises be predicted?, *Danmarks Nationalbank Monetary Review*, Vol. 49(2), June 2010.

But other factors also came into play, such as changes in housing taxation and new types of housing loans. The sharp increases in house prices relative to construction costs resulted in increased construction activity as new construction became more attractive when the price of existing housing rose. Rising house prices also led to strong growth in home equity, which could be mortgaged and converted into consumption and home improvements. This contributed to the overheating of the economy.<sup>13</sup>

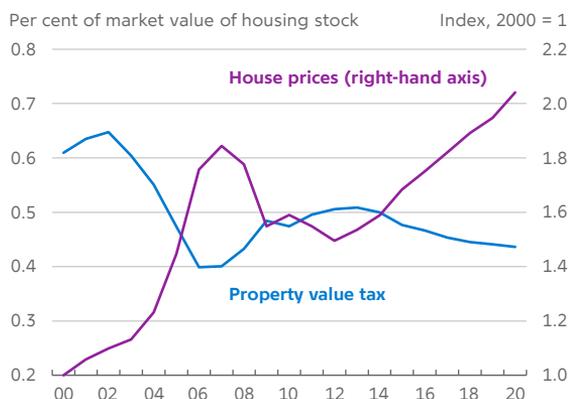


The rise in house prices was further reinforced by the freeze of property value taxes in connection with the 2001 tax freeze. The tax freeze in monetary terms meant that effective taxation fell as house prices rose, see chart 1.7. Before the housing tax freeze, taxes depended on property values, so they helped to dampen house price fluctuations. The freezing of property value taxes in 2001 had thus removed an important automatic stabiliser in the economy.<sup>14</sup>

<sup>13</sup> See Jens Bang-Andersen, Tina Saaby Hvolbøl, Paul Lassenius Kramp and Casper Ristorp Thomsen, Consumption, income and wealth, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,1), June 2013.

<sup>14</sup> See Jan Overgaard Olesen and Erik Haller Pedersen, Housing stock and housing tax in a regional perspective, *Danmarks Nationalbank Monetary Review*, Vol. 45(3), September 2006; Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen and Susanne Hougaard Thamsborg, The housing bubble that burst: Can house prices be explained? And can their fluctuations be dampened?, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

**Property value taxes fell as house prices rose in the mid-00s** Chart 1.7



Note: The house price index covers single-family houses.  
 Source: Statistics Denmark and Jan Overgaard Olesen and Erik Haller Pedersen, A statement of housing wealth, *Danmarks Nationalbank Working Paper*, No. 37, May 2006.

In October 2003, mortgage credit institutions were enabled to offer mortgage loans with deferred amortisation for up to ten years to finance owner-occupied homes and holiday homes.<sup>15</sup> The new type of housing loan did not reduce the cost of home consumption, since repayments represent savings and not costs. But given the lower first-year payments on deferred amortisation loans, they quickly became very popular. As a result, some home buyers were willing to pay higher house prices, adding to house price increases.<sup>16</sup>

Finally, from the mid-00s there were bubble elements in house prices. They were to some extent driven by home buyers' inflated expectations that prices would continue to rise, thus yielding capital gains.<sup>17</sup>

15 Even before the legislative amendment in 2003, mortgage credit institutions could provide deferred amortisation loans secured by real estate other than owner-occupied homes and holiday homes, and the banks were able to offer deferred amortisation loans and had started offering mortgage-like bank loans secured by real estate, see Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

16 See *Danmarks Nationalbank Financial stability 2003*; Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen and Susanne Hougaard Thamsborg, Developments in the market for owner-occupied housing in recent years – Can house prices be explained?, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,2), March 2011; Jesper Pedersen, What are the effects of changes in taxation and new types of mortgages on the real economy? – The case of Denmark during the 00's, *Danmarks Nationalbank Working Paper*, No. 113, March 2017.

17 See Kim Abildgren, Niels Lynggård Hansen and Andreas Kuchler, Overoptimism and house price bubbles, *Danmarks Nationalbank Working Paper*, No. 109, October 2016; Simon Juul Hviid, A leading indicator of house-price bubbles, *Danmarks Nationalbank Working Paper*, No. 114, April 2017.

### **On the introduction of deferred amortisation loans and house prices**

“Repayments constitute savings, and are not a housing cost. However, it is uncertain whether the new type of loan will gain ground, and if so, whether in the longer term it will stimulate housing prices, which traditionally are fixed on the basis of the net instalments on the home, including repayments.”

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Quote from *Danmarks Nationalbank Monetary Review 1st quarter 2003*.

### **On the risk of a house price bubble in the mid-00s – 1**

“House prices have risen and risen while the interest rate has been very low and it has become easier to borrow. The option of deferred-amortisation loans has been taken up more than most people had expected. Therefore the question is now being raised of whether there is a property-market bubble, and if there is, when the bubble will burst. Nobody can give a clear answer to that.”

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Quote from Governor Bodil Nyboe Andersen's speech at the Annual Meeting of the Association of Danish Mortgage Banks, 28 April 2005.

### **On the risk of a house price bubble in the mid-00s – 2**

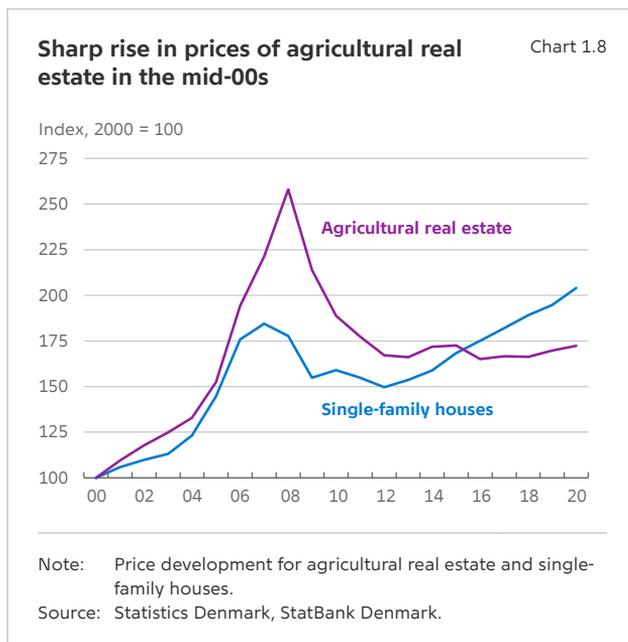
“Surveys show that in some parts of the market there are widespread expectations that cash prices will continue to rise at a higher rate than inflation in general. This entails a risk that residential investments are made on a speculative basis to achieve a capital gain, rather than just a home.”

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Quote from *Danmarks Nationalbank Monetary Review 1st quarter 2006*.

## Prices of agricultural and commercial real estate rose even more sharply than house prices

In the pre-crisis years, land prices and thus agricultural real estate prices rose even more sharply than house prices, see chart 1.8. It subsequently became clear that prices per hectare thus fell completely out of step with the returns that could be obtained by cultivating the land.<sup>18</sup> Consequently, banks had to make large impairment charges when land prices fell again.



The sharp rise in land values was widely utilised as collateral for further indebtedness. At the end of 2009, agriculture's debt to Danish banks and mortgage credit institutions corresponded to more than 15 times the industry's average gross factor income in the years 2000-09. This was predominantly variable rate debt, which made agriculture sensitive to interest rate increases. Moreover, some of the loans were in Swiss francs without hedging the exchange rate risk.<sup>19</sup>

Commercial real estate prices also rose significantly prior to the financial crisis, see chart 1.9. Turnover of commercial real estate was high, especially in Copenhagen, and often the same property was traded several times within a short time.<sup>20</sup> The reversal of commercial real estate prices after the outbreak of the financial crisis also resulted in large bank impairment charges.

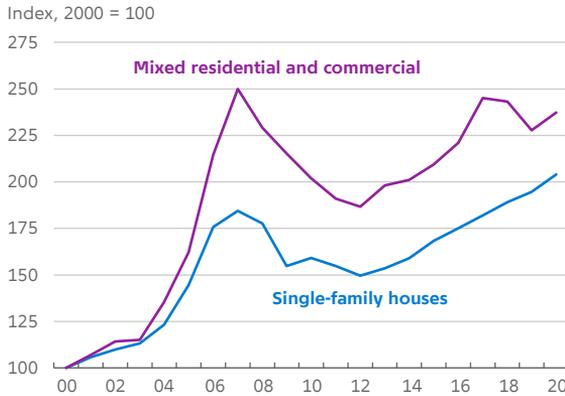
<sup>18</sup> See Birgitte Vølund Buchholst, Peter Askjær Drejer and Erik Haller Pedersen, Danish agriculture, *Danmarks Nationalbank Monetary Review*, Vol. 53(2), June 2014.

<sup>19</sup> See *Danmarks Nationalbank Financial stability 2010*.

<sup>20</sup> See *Danmarks Nationalbank Financial stability 2nd half 2016*.

### Soaring commercial real estate prices in the mid-00s

Chart 1.9



Note: Price development for commercial real estate (mixed residential and commercial) and single-family houses.  
Source: Statistics Denmark, StatBank Denmark.

### On the consequences of the land price bubble for Danish agriculture

“Often loans were granted in the expectation that land prices would rise further, which to some extent contributed to pushing up prices even more. These are the classical characteristics of a bubble: expectations become self-fulfilling for a while – until sentiment changes and the bubble bursts. The result of all this is a heavily indebted agricultural sector and many farms with low solvency ratios.”

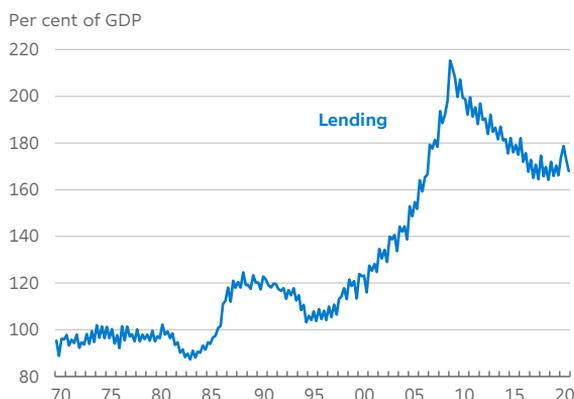
Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Association of Local Banks, Savings Banks and Cooperative Banks in Denmark, 8 May 2014.

### Strong credit growth and large customer funding deficits made banks vulnerable

Banks and mortgage credit institutions increased their lending sharply in the mid-00s. Measured relative to GDP, lending to Danish households and companies increased by around 50 percentage points from the end of 2004 to mid-2008, see chart 1.10.

### Strong growth in loans to households and companies in the mid-00s

Chart 1.10



Note: Domestic lending by banks and mortgage credit institutions. Excl. lending to the MFI-sector. Annualised GDP.

Source: Kim Abildgren, A Chart & Data Book on the Monetary and Financial History of Denmark, *Working Paper*, May 2017 (as amended).

### On lending growth and credit quality in the mid-00s – 1

“The banking institutions are still robust, but for the small institutions in particular the exposure to rising losses has increased. This is attributable to such factors as the high growth in lending and reduced capital reserves (...) Banking institutions with high lending growth also tend to have the greatest credit risk on their lending portfolios.”

Statement by Governor Bodil Nyboe Andersen in the press release *Financial stability 2005*, 12 May 2005.

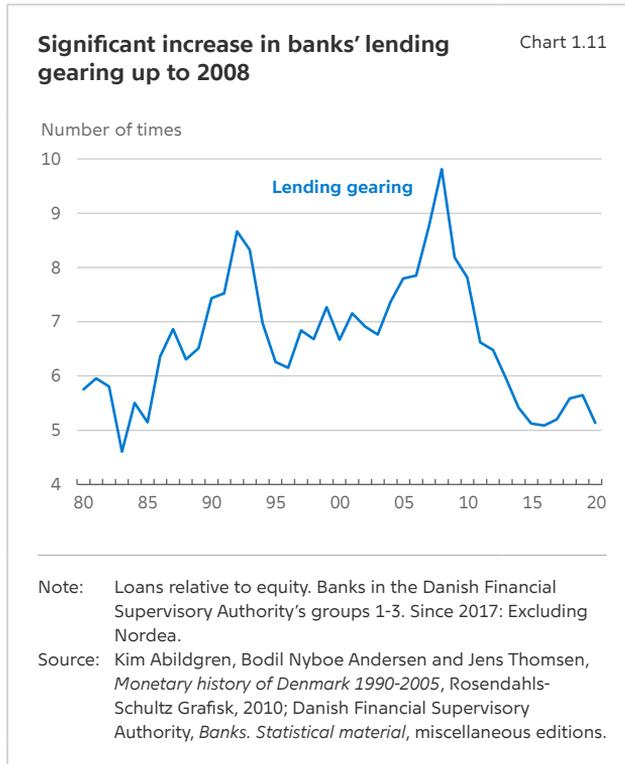
### On lending growth and credit quality in the mid-00s – 2

“Times are good for the banks, and lending is growing. Good times are also when losses are seen as a thing of the past, and credit quality may deteriorate. Not in one’s own bank, but among competitors.”

Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 30 November 2005.

The strong growth in bank lending in the pre-crisis years was at the expense of credit quality. This was particularly the case for corporate lending, given the insufficient correlation between corporate financial ratios and bank lending.<sup>21</sup> This was later evidenced by large bank impairment charges.

The significant growth in bank lending was not accompanied by corresponding growth in equity. The result was a strong increase in the banks' lending gearing of equity in the mid-00s, see chart 1.11.



The increase in lending gearing was partly a result of new international accounting and capital adequacy rules. The transition to new accounting standards in 2005 meant that banks no longer had to make impairment charges on loans according to a precautionary principle on the basis of

21 See Kim Abildgren and Andreas Kuchler, Credit and business cycles, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,1), June 2013; Kim Abildgren, Carina Moselund Jensen, Mark Niels Strøger Hansen, Mark Strøm Kristoffersen, Andreas Kuchler and Oxana Skakoun, Corporate capital structure, productivity and access to financing, *Danmarks Nationalbank Monetary Review*, Vol. 53(4), December 2014.

a probable risk of loss.<sup>22</sup> Now there had to be an objective indication of depreciation prior to the impairment charge.<sup>23</sup> This resulted in a lower impairment requirement, which was used to further increase credit granting rather than compensate by increasing individual solvency needs. In other words, banks' buffers against losses were eroded.

### **On the relaxation of bank regulation prior to the financial crisis**

"In overall terms, this is a considerable relaxation of the capital requirements and provisions. So it is important that the boards and managements of the various banks consider carefully how much capital they need in order to ensure an appropriate buffer in case of unforeseen adverse events."

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Quote from Governor Bodil Nyboe Andersen's speech at the Annual Meeting of the Danish Bankers Association, 1 December 2004.

The transition to new capital adequacy rules (Basel II) in 2007 was another factor contributing to lending gearing. The transition entailed easing of capital requirements for most Danish banks. This was due to lower risk weights, i.e. lower capital stock requirements per krone lent, for exposures with household customers and small and medium-sized enterprises.<sup>24</sup> Some banks chose to take advantage of the more lenient capital requirements for additional lending.

During the strong lending growth in the years after the turn of the millennium, banks accumulated a substantial customer funding deficit, largely financed by issuing short-term bonds and borrowing from credit institutions abroad. This was a new situation compared to the 1980s and 1990s when banks' deposits and lending largely balanced, see chart 1.12. Short-term financing via international money and capital markets is usually less stable and more sensitive to changes in the institutions' own creditworthiness than deposits and long-term bond financing.<sup>25</sup>

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22 The discretionary element inherent in the precautionary principle allowed banks to build up "hidden reserves" for bad times. But discretionary provisions also made it possible for banks to postpone the taxation of profits, see Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, 2013.

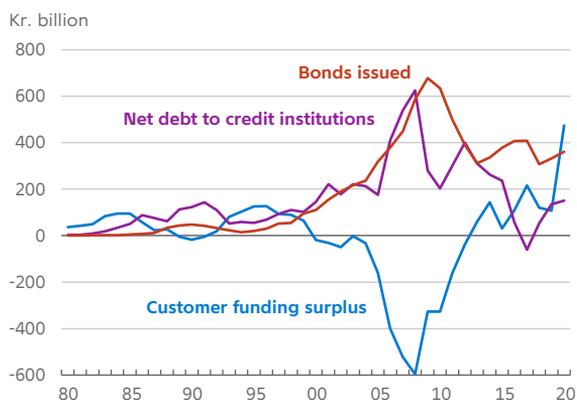
23 See *Danmarks Nationalbank Financial stability 2007*; Borika Babic, Credit institutions and procyclicality, *Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009.

24 See Lisbeth Borup and Dorte Kurek, Proposal for a Directive on new capital-adequacy rules (Basel II), *Danmarks Nationalbank Monetary Review*, Vol. 44(1), March 2005.

25 See *Danmarks Nationalbank Financial stability 2002*; *Danmarks Nationalbank Financial stability 2003*; *Danmarks Nationalbank Financial stability 2006*; *Danmarks Nationalbank Financial stability 2007*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

## Banks built up a substantial customer funding deficit in the mid-00s

Chart 1.12



Note: Banks in the Danish Financial Supervisory Authority's groups 1-3. Since 2017: Excluding Nordea.

Source: Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary history of Denmark 1990-2005*, Rosendahls-Schultz Grafisk, 2010; Danish Financial Supervisory Authority, *Banks. Statistical material*, miscellaneous editions.

### On risks associated with banks' large customer funding deficits – 1

"The banking institutions' net debt to other credit institutions and their bond issues have risen as the deposit surplus has declined.

In connection with the change in the balance-sheet structure it is important to evaluate the refinancing risk associated with the types of funding used. In periods of tighter credit expansion than at the present time, debt to other credit institutions is typically less stable than deposits in terms of actual maturity and volume."

Quote from *Danmarks Nationalbank Monetary Review 2nd quarter 2001*.

This shift in bank funding structure contributed greatly to the need for comprehensive public intervention to support the banking sector during the financial crisis when banks' access to funding via the international money and capital markets deteriorated sharply, see chapters 2 and 3.

## On risks associated with banks' large customer funding deficits – 2

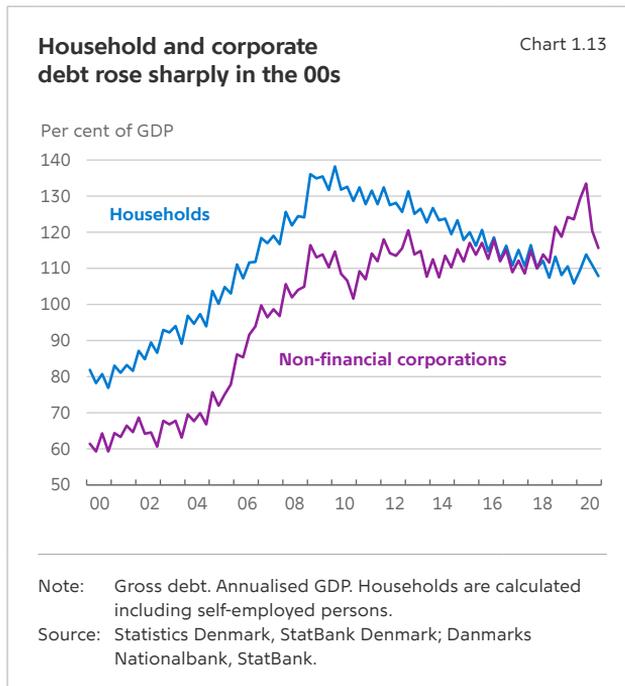
“The difference between banks' lending and deposits has increased considerably in recent years. Total lending now exceeds total deposits by a three-digit billion kroner amount. So the banks have become increasingly dependent on financial markets to raise money-market loans from other banks and to issue securities both nationally and internationally. The individual bank will also find it important to maintain access to these sources of financing. These sources are more sensitive than traditional deposits to changes in market conditions and the assessment of the individual bank's financial performance. This could make the banks more vulnerable.”

Quote from Governor Nils Bernstein's speech at the Annual Meeting of the Danish Bankers Association, 6 December 2006.

## Indebted homeowners and companies cut spending and investment when the financial crisis hit

The strong credit growth in the pre-crisis years led to a significant increase in household and corporate debt, see chart 1.13.

The high level of debt contributed to intensifying the overheating of the Danish economy prior to the crisis and the depth of the subsequent cyclical downturn.



Homeowners with high debt relative to property value or income had higher consumption relative to income than other homeowners in the pre-crisis years. But when the crisis hit and consolidation was needed, the highly mortgaged homeowners sharply reduced consumption.<sup>26</sup> This reflected heightened crisis awareness, uncertainty about the future finances of families and tighter credit standards.

Similarly, companies with high debt levels (relative to the value of total assets) reduced their investments more during the crisis than companies with lower debt ratios.<sup>27</sup>

### **Fiscal accommodation exacerbated the pre-crisis overheating of the economy**

The Danish economy operated significantly above its capacity limit in the years before the financial crisis outbreak. This can be illustrated by the output gap, i.e. the difference between actual real GDP and potential real GDP. Potential real GDP is an estimate of how much can be produced without generating labour market pressures, see chart 1.14.

#### **On the need for pre-crisis fiscal tightening**

“Although this is not considered to be the most likely course of events, the risk of detrimental overheating of the economy is growing. Against this background Danmarks Nationalbank has recommended – and continues to recommend – measures to dampen the overall increase in demand in order to ensure sustained favourable economic development in Denmark.

Danmarks Nationalbank has noted that the government has adopted a wait-and-see approach.”

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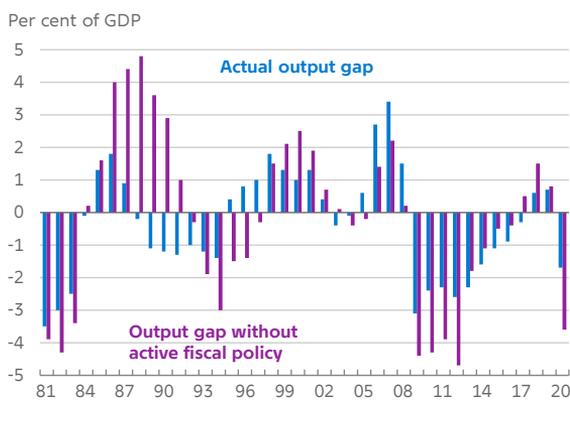
Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 6 December 2006.

26 See Asger Lau Andersen, Charlotte Duus and Thais Lærkholm Jensen, Household debt and consumption during the financial crisis, *Danmarks Nationalbank Monetary Review*, Vol. 53(1), March 2014; Asger Lau Andersen, Charlotte Duus and Thais Lærkholm Jensen, Household debt and consumption during the financial crisis: Evidence from Danish micro data, *Danmarks Nationalbank Working Paper*, No. 89, March 2014; Simon Juul Hviid and Andreas Kuchler, Consumption and savings in a low interest-rate environment, *Danmarks Nationalbank Working Paper*, No. 116, June 2017; Svend Greniman Andersen, Stine Ludvig Bech, Simon Juul Hviid and Andreas Kuchler, Coronavirus temporarily lowers private consumption, *Danmarks Nationalbank Economic Memo*, No. 7, June 2020.

27 See Andreas Kuchler, Firms’ leverage and investment, *Danmarks Nationalbank Monetary Review*, Vol. 54(3), September 2015.

### Fiscal accommodation contributed to widening the output gap in the years 2006-07

Chart 1.14



Note: The output gap without active fiscal policy is calculated by stripping the actual output gap of the multi-annual fiscal impact on real GDP.

Source: Own calculations based on Ministry of Finance, *Financial statement 2000*; Ministry of Finance, *Economic Survey*, miscellaneous editions; Ministry of Economic Affairs and the Interior, *Economic Survey*, miscellaneous editions.

As the accommodative fiscal policy added to total demand, it contributed to exacerbating the overheating of the economy and labour market pressures before the crisis. Public budgets were overrun, not least in municipalities and regions<sup>28</sup>, making fiscal policy more accommodative than planned.<sup>29</sup> Although a large government surplus did exist in 2006, this was due to the favourable economic situation and high tax revenue from North Sea oil and gas production.<sup>30</sup> The output gap would have been narrower with less fiscal accommodation.

The mid-00s contrasted with the otherwise stabilising role of fiscal policy characteristic of Denmark since the transition to the fixed exchange rate

28 Viewed in isolation, the municipal reform in 2007 entailing merger of municipalities also gave rise to increased investments etc. and municipal budget overruns in 2006, see Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; Pernille Bomholdt Nielsen and Morten Hedegaard Rasmussen, Public expenditure management in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 51(2,1), June 2012.

29 See Box 4, *Development in government consumption*, *Danmarks Nationalbank Monetary Review 3rd quarter 2010*; Niels Blomquist, Anders Møller Christensen and Erik Haller Pedersen, Economic developments in Denmark and Sweden in recent years, *Danmarks Nationalbank Monetary Review*, Vol. 49(4), December 2010.

30 See *Danmarks Nationalbank Report and Accounts 2006*.

policy in the early 1980s.<sup>31</sup> In the 1980s and 1990s, fiscal policy helped to dampen output gap fluctuations.

### **The financial crisis was not foreseen**

The financial crisis, the financial sector's lack of resilience and the serious economic consequences of the crisis were not foreseen by the relevant authorities and central banks, either in Denmark or abroad.<sup>32</sup>

As mentioned earlier, real GDP in Denmark declined by around 5 per cent in 2009, while the expectation in Danmarks Nationalbank's Monetary Review, 1st quarter 2008, was a 1 per cent increase. The extensive reversal of the Danish economy caused by the financial crisis also took other institutions by surprise. In their spring 2008 forecasts, the Danish Economic Councils and the International Monetary Fund, IMF, expected real GDP growth in Denmark in 2009 of 0.8 per cent and 0.5 per cent, respectively.<sup>33</sup>

The unexpected depth of the crisis can also be illustrated by means of Danmarks Nationalbank's stress scenarios in its Financial stability reports. As recently as January 2009, the most severe stress scenario was based on real GDP declining by only 2.4 per cent in 2009, see chart 1.15.

In the spring of 2008, based on its projections and stress scenarios, Danmarks Nationalbank assessed that it could not be ruled out that individual banks would encounter problems. However, it was found that the Danish financial sector was robust and able to withstand significant economic and financial shocks.<sup>34</sup> This assessment of financial sector soundness proved not to hold true after the global financial crisis escalated in the autumn of 2008.

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31 See *Danmarks Nationalbank Monetary Review 1st quarter 2008*; *Danmarks Nationalbank Monetary Review 3rd quarter 2012 – Part 1*; Jesper Pedersen, A Taylor Rule for Fiscal Policy in a Fixed Exchange Rate Regime, *Danmarks Nationalbank Working Paper*, No. 90, June 2014.

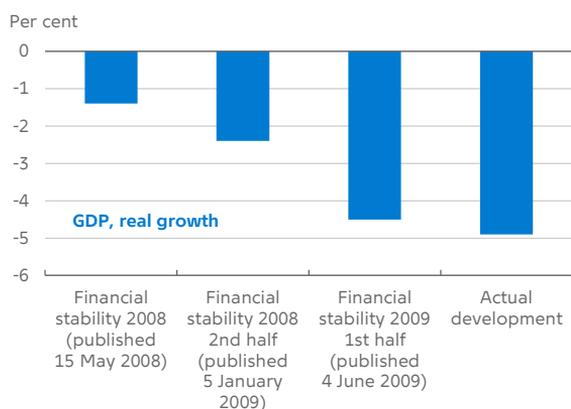
32 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

33 See Danish Economic Councils, *Danish Economy*, spring 2008; IMF, *World Economic Outlook*, April 2008.

34 See *Danmarks Nationalbank Financial stability 2008*; opinion of Governor Nils Bernstein in the press release *Financial stability 2008*, 15 May 2008.

**Actual decline in GDP in 2009 was greater than assumed in Danmarks Nationalbank's stress test**

Chart 1.15



Note: Real GDP growth in 2009 in Danmarks Nationalbank's most severe stress scenario.

Source: Danmarks Nationalbank, *Financial stability*, miscellaneous editions; Statistics Denmark, StatBank Denmark.





# Bank failures and bank rescue packages

Many Danish banks were failing after the onset of the financial crisis and had to cease as independent companies, including four of the 15 largest banks. Roskilde Bank was the first medium-sized bank to become troubled. Like many of the failing banks, it had experienced sharp lending growth in the pre-crisis years and had significant exposure to the real estate market. Roskilde Bank received liquidity support from Danmarks Nationalbank in July 2008 and later had to be resolved.

To address the banking sector crisis the central government had to step in with numerous measures and rescue packages to protect financial stability and avoid the crisis developing into a credit crunch that would keep creditworthy households and companies from borrowing. One of the measures was to implement a guarantee scheme providing full guarantee, for a period of two years, to all depositors and others for claims on banks, and credit institutions were given the opportunity to receive government capital injections. A government resolution company (Finansiel Stabilitet) was also established to deal with failing banks.

In 2012, the government set up an expert committee (the Rangvid Committee) to look into the causes of the financial crisis and assess the tightening measures already implemented after the crisis. The committee concluded that the financial crisis was the result of many national and international factors and that the crisis had been costly to the Danish economy. The committee considered it positive that capital and liquidity requirements for banks were tightened as a follow-up to the crisis. The committee also recommended changing property taxation to bring it back into sync with house price developments. Moreover, the committee pointed out that, regardless of regulatory measures, it would never be possible to completely prevent a new financial crisis from emerging in the future.

## The financial crisis caused many banks to fail

The first Danish bank to get into trouble during the financial crisis was bankTrelleborg. The bank's liquidity situation had suddenly deteriorated significantly after it had violated provisions in borrowing contracts<sup>1</sup>, and it was unable to meet a higher solvency requirement from the Danish Financial Supervisory Authority (FSA). It was a relatively small bank with a balance sheet of kr. 8 billion, and the situation was addressed by merging bankTrelleborg with Sydbank in January 2008. BankTrelleborg was not discontinued as a direct result of the financial crisis, but it was the first of many banks to be discontinued during the financial crisis.

Roskilde Bank was the first medium-sized bank to become troubled, and a large number of banks were failing during the crisis and had to be discontinued as independent businesses, including 4 of the 15 largest banks. There were about 150 banks in Denmark before the financial crisis, and in the period from 2008 until August 2013, a total of 62 banks were discontinued. However, many of these institutions were small and some discontinuations were not a direct consequence of the crisis but a continuation of the downward trend in the number of banks that had prevailed for several decades prior to the crisis. 19 institutions had to be discontinued following capital requirements from the Danish FSA because they could not raise the required capital.<sup>2</sup>

### Bank rescue packages and crisis management measures

Box 2.1

October 2008	Bank Rescue Package 1: 2-year government guarantee for depositors' and other unsecured creditors' claims on banks. A government resolution company (Finansiel Stabilitet) was established to deal with failing banks.
Autumn 2008	Ban on short selling of bank equities, changed accounting rules and agreement on financial stability in the pension field.
February 2009	Bank Rescue Package 2 (Credit Package): Government capital injections to credit institutions. In continuation of Bank Rescue Package 2, credit institutions were allowed to purchase individual government guarantees.
June 2010	Bank Rescue Package 3 (Exit Package): Model for orderly resolution of (small and medium-sized) failing banks.
August 2011	Bank Rescue Package 4 (Consolidation Package): Incentives for sound banks to take over failing banks.
March 2012	Bank Rescue Package 5 (Development Package): Initiatives to ensure funding access for small and medium-sized enterprises.

1 Contractual provisions on pledging matters (negative pledge), *Danmarks Nationalbank Financial stability 2008*; *Danmarks Nationalbank Financial stability 2nd half 2008*.

2 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; Danish Financial Supervisory Authority, *Key figures from the Danish Financial Supervisory Authority 2007*.

As part of the crisis management process, the central government had to step in with several measures and rescue packages, see the overview in box 2.1. These measures were intended to protect financial stability and avoid the crisis turning into a credit crunch that would keep creditworthy households and companies from borrowing.

### **Roskilde Bank's failure in the summer of 2008**

With a balance sheet of kr. 37 billion, Roskilde Bank became the first medium-sized bank to get into serious trouble, having to be resolved.<sup>3</sup>

In the pre-crisis years, Roskilde Bank had experienced very sharp lending growth and had had large real estate exposures. That made the bank vulnerable when the crisis hit. According to the subsequent legal investigation, the causes of the bank's troubles included its high risk profile with modest excess capital adequacy, deficient credit case management and a poor credit culture. Furthermore, the investigation stated that:

*"... large and small property developers alike were "queuing up" in the bank because it was quick and easy to borrow money from Roskilde Bank without observing the usual formal banking requirements and documentation of credit quality, etc. In addition, the bank had a sales-oriented credit culture and extremely lax credit case management, i.e. the usual credit craftsmanship had lower priority. The guidelines for credit processing were not followed, and the bank's central credit function, Team Kredit, had neither the power nor the clout or resources to demand compliance with the rules."<sup>4</sup>*

In November 2006, Roskilde Bank raised its solvency need to 10.75 per cent following a request from the Danish Financial Supervisory Authority (FSA),<sup>5</sup> but by 2008 there was a need for a much higher solvency ratio. When preparing the financial statements for the 1st half of 2008, Roskilde Bank's management found that significantly larger impairment charges were to be made than previously assumed. The bank's board of directors considered that the publication of this information could lead to a run on the bank with customers withdrawing their deposits on a massive scale. Roskilde Bank therefore contacted the Danish FSA and Danmarks Nationalbank.

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3 See *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Report and Accounts 2009*; Danmarks Nationalbank, Roskilde Bank, *Monetary Review 3rd quarter 2008*; press release from Danmarks Nationalbank and Danish Financial Supervisory Authority of 10 July 2008; Governor Nils Bernstein's opening statement at a press conference on Roskilde Bank on 25 August 2008 at 11.00 am; *Danmarks Nationalbank Financial stability 2nd half 2008*; stock exchange announcement from Roskilde Bank A/S, 10 July 2008; stock exchange announcement from Roskilde Bank A/S, 24 August 2008.

4 Quote from the memo *Summary of legal investigation of certain matters at Roskilde Bank* dated 5 August 2009, prepared by attorneys Mogens Skipper-Pedersen and Henrik Stenbjerre.

5 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

Danmarks Nationalbank concluded that the circumstances of Roskilde Bank posed a significant threat to financial stability in Denmark. At that time, Roskilde Bank was Denmark's 8th largest bank with a high degree of foreign funding. If Roskilde Bank suspended payments at a time of international financial market turmoil, this could have negative knock-on effects on other Danish banks. The banking sector overall had a customer funding deficit of around kr. 600 billion and was therefore highly dependent on being able to borrow in the international money and capital markets.

On 10 July 2008, following discussions with the Ministry of Economic and Business Affairs, the Danish FSA and the Danish Bankers Association, Danmarks Nationalbank made an unlimited credit facility available to Roskilde Bank at an interest rate 2 percentage points above Danmarks Nationalbank's lending rate. Given Roskilde Bank's inability to provide satisfactory collateral, the Danish government and the financial sector (Det Private Beredskab) committed to provide a guarantee to Danmarks Nationalbank.<sup>6</sup> Founded by the Danish Bankers Association in June 2007, Det Private Beredskab was an association for the resolution of failing commercial banks, savings banks and cooperative banks.<sup>7</sup>

The liquidity guarantee from Danmarks Nationalbank of 10 July 2008 was subject to a number of conditions. Roskilde Bank was not allowed to use the guarantee for acting aggressively in the banking market or for investing in new activities other than natural activities related to the day-to-day running of the banking business. Furthermore, it was a requirement that the bank must be sold in whole or in part within a short period of time.<sup>8</sup>

After an extensive sales process, it became clear on 22 August 2008 that no one wished to acquire Roskilde Bank, either in full or in part. Potential buyers had expressed strong uncertainty about the quality of the bank's credit exposures and the bank's credit culture in general. In addition, the bank's external auditors had identified a need for further impairment charges to such an extent that the bank would no longer be able to meet the capital requirements of the Danish Financial Business Act.

Even though Roskilde Bank's problems were largely self-inflicted, Danmarks Nationalbank considered it necessary to rescue Roskilde Bank to protect

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6 On 4 September 2008, the Finance Committee of the Folketing (Danish parliament) approved a document on a government guarantee for any losses suffered by Danmarks Nationalbank in connection with the unlimited credit facility (beyond the first kr. 750 million, covered by the guarantee from Det Private Beredskab), see document no. 199 to the Finance Committee of the Folketing (Danish parliament) on *Endorsement of provision of a government guarantee to cover Danmarks Nationalbank's possible losses on liquidity provision to Roskilde Bank A/S (in Danish only)*.

7 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-Schultz Grafisk, 2010.

8 See the reply from the Ministry of Economic and Business Affairs to section 8, question 1, to document no. 197 submitted by the Finance Committee on 16 July 2008.

financial stability. The Danish banking sector's foreign creditors could find it difficult to assess whether Roskilde Bank was a unique case. Any losses on lending to Roskilde Bank could have a negative knock-on effect on other Danish banks which were also largely dependent on foreign funding.

Over the weekend of 23 and 24 August 2008, negotiations took place between Roskilde Bank on the one hand and Danmarks Nationalbank and Det Private Beredskab on the other hand to find a solution, as no legal and organisational framework for orderly resolution of banks existed before the financial crisis. The result of the negotiations was that on 24 August, Det Private Beredskab and Danmarks Nationalbank – in agreement with the government – took over all assets and liabilities in Roskilde Bank except share capital and subordinated loan capital. Danmarks Nationalbank had experience with bank resolution from its involvement in the resolution of Varde Bank in the 1990s and early 2000s.<sup>9</sup> The acquisition of Roskilde Bank was notified to the European Commission under the EC Treaty rules on state aid and was approved by the Danish Competition and Consumer Authority.<sup>10</sup>

### **On the rescue of Roskilde Bank and the bank's credit culture**

"We find that Roskilde Bank's circumstances are now posing a significant threat to financial stability in Denmark. In this context, it is particularly important that a number of other Danish banks also depend on access to funding via the international capital markets. Any losses occurring on lending to Roskilde Bank would therefore have a negative knock-on effect on other Danish banks.

(...)

Roskilde Bank has had very large exposure to the real estate market, in an unfortunate combination with a lax credit culture. As a result, the bank has not proved viable on its own, so we have had to ensure a sound resolution in this way."

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Quote from Governor Nils Bernstein's opening statement (in Danish only) at a press conference about Roskilde Bank on 25 August 2008.

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9 See Niels C. Andersen and Jens Dalgaard, Resolution of Varde Bank, *Danmarks Nationalbank Monetary Review*, Vol. 44(4), 2005.

10 See press release *State aid: the Commission approves Danish rescue package for Roskilde Bank*, European Commission, 31 July 2008; press release *The Danish Competition and Consumer Authority approves the acquisition of Roskilde Bank*, Danish Competition and Consumer Authority, 1 September 2008.

Roskilde Bank's activities were continued in a new bank in which Danmarks Nationalbank and Det Private Beredskab injected capital. Should losses occur in connection with the acquisition and resolution of Roskilde Bank, Det Private Beredskab's contributed capital of kr. 750 million was to be used before Danmarks Nationalbank's contributed capital. The government would ask the Finance Committee of the Folketing (Danish parliament) for a government guarantee to protect Danmarks Nationalbank from possible losses.<sup>11</sup>

A number of Roskilde Bank's branches were acquired by Nordea, Spar Nord Bank and Arbejdernes Landsbank at the end of September 2008, while the remainder of the bank – primarily corporate customers – was put into liquidation. The actual operation of Roskilde Bank was handled by a professional board of directors with insight into banking operations<sup>12</sup> together with the executive management of Roskilde Bank. In October 2008, under Bank Rescue Package 1 a government-owned company (Finansiel Stabilitet) was established for the orderly resolution of failing banks, see below. Finansiel Stabilitet acquired Roskilde Bank on 10 August 2009.

#### **Bank Rescue Package 1 from October 2008**

In the first period of the financial crisis, Danmarks Nationalbank implemented many extraordinary measures to generally provide banks with liquidity in kroner and foreign currency, see chapter 3. Furthermore – in addition to the liquidity guarantee to Roskilde Bank of 10 July 2008 – Danmarks Nationalbank provided separate liquidity support to two individual banks: EBH Bank and Amagerbanken.<sup>13</sup>

The financial crisis escalated in autumn 2008, and it became clear in both Denmark and other countries that the crisis now posed a real threat to

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11 On 27 November 2008, the government guarantee was approved by the Finance Committee of the Folketing (Danish parliament) by document No. 25 of 4 November 2008 on *Government guarantee concerning Danmarks Nationalbank's possible losses on the acquisition and resolution of Roskilde Bank*.

12 See press release *New board of directors in Roskilde Bank, Danmarks Nationalbank, 29 August 2008*.

13 Danmarks Nationalbank provided liquidity support to EBH Bank on 22 September 2008, partly covered by loss guarantees from a number of banks. At the end of 2008, Danmarks Nationalbank's lending to EBH Bank amounted to kr. 1 billion. Furthermore, on 5 October 2008 (the very day the political agreement on Bank Rescue Package 1 with a general government guarantee to the banking sector was concluded), Amagerbanken obtained an agreement with Danmarks Nationalbank on a short-term loan facility of up to kr. 3 billion. Amagerbanken was able to utilise the facility from 6 October 2008, and its drawings on the facility were repaid to Danmarks Nationalbank by the end of 2008. See *Danmarks Nationalbank Report and Accounts 2008*; stock exchange announcement no. 18-2008 from EBH Bank A/S, 22 September 2008; *Danmarks Nationalbank Financial stability 2nd half 2008*; Brian Liltoft Andreasen and Ulrik Løgtholdt Poulsen, *Handling distressed banks in Denmark, Danmarks Nationalbank Monetary Review*, Vol. 50(3,1), 2011; Stock Exchange Announcement No. 25-2008 from Amagerbanken, 10 October 2008; The Danish Financial Supervisory Authority's report, 24 August 2011, on the process leading up to the bankruptcy of Amagerbanken A/S, including the role of the Danish FSA during this process, from the Minister for Economic and Business Affairs, the Business Affairs Committee (ERU) (general part), compilation: 2010-11 (1st compilation), Annex 346.

financial stability. It was no longer just a liquidity crisis that central banks could alleviate by injecting liquidity into the banking system. Bank solvency came into question and much more extensive measures were needed to restore calm and confidence in the financial markets.<sup>14</sup>

On 30 September 2008, Ireland became the first EU member state to announce a government guarantee for the banking sector. Initially, the guarantee did not comprise branches of foreign banks, which therefore came under pressure in the Irish market. This was particularly the case for Danske Bank, which had acquired a number of activities in Ireland and Northern Ireland in 2005. The activities in Ireland had been transformed from a subsidiary to a branch of Danske Bank in 2007.<sup>15</sup>

Danmarks Nationalbank and the government found that now was the time to establish a general government guarantee for the Danish banking sector, and on Sunday 5 October 2008, the government concluded an agreement on this with a broad majority of the other parties in the Folketing (Danish parliament). The result was Bank Rescue Package 1. It contained the following main elements:

- For a 2-year period until 30 September 2010, the claims of all depositors and other unsecured creditors on Danish banks and branches of foreign banks in Denmark were fully secured. The government guarantee was very extensive (kr. 4,200 billion corresponding to around 250 per cent of Denmark's GDP). The general aim was to ensure that banks' access to money markets – including markets abroad – was restored. The government guarantee ensured that a lending bank's credit risk was not on the borrowing bank, but on the central government. Under the government guarantee, insurance companies and pension funds, for example, could also grant loans to banks without risk of loss.
- The government established a resolution company, Finansiell Stabilitet, which could take over and liquidate failing banks if a private sector solution could not be found.
- A ban was imposed on dividend payments from banks, and new share buy-back programmes were no longer allowed. Furthermore, no new share option programmes were to be entered into and existing programmes were not to be extended.
- Banks were subject to a number of restrictions on lending growth and risk taking to ensure that the period of government guarantee was not abused.
- The Danish FSA was given more resources for increased supervision and a critical review of financial regulation.

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14 See *Danmarks Nationalbank Financial stability 2nd half 2008*; *Danmarks Nationalbank Financial stability 1st half 2009*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, 2013; Danmarks Nationalbank, *The international financial crisis, Monetary Review 4th quarter 2008*.

15 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

## On the government guarantee under Bank Rescue Package 1

“Many banks had gradually changed their business models during the boom, among other things, financing the strong lending growth by borrowing in the money and capital markets. Short-term loans constituted a not inconsiderable part. When markets froze in the autumn of 2008, the government had to issue a guarantee covering all deposits and loans to banks for two years. A guarantee that corresponded to 2.5 times Denmark’s gross domestic product. This was by no means a trivial guarantee, and we should all rejoice in the Kingdom that it has now expired on 1 October and been replaced by much smaller guarantees. In my opinion, we must never again find ourselves in a situation where a guarantee of that magnitude and content becomes necessary. In future, in addition to normal deposits from ordinary customers, banks’ funding must consist much more of long-term loans, even if they are more expensive, and solid liquidity reserves must be established.”

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Quote from Governor Nils Bernstein’s speech (in Danish only) at Politiken’s conference *Lessons from the financial crisis*, 12 November 2010.

Politically, a financial sector contribution to the government guarantee scheme was considered important. Participation in the scheme was voluntary for banks, but they had to be members of Det Private Beredskab. Almost all Danish banks joined the scheme, and in total the banks contributed kr. 25 billion (guarantee commission of kr. 15 billion and loss guarantee of kr. 10 billion) to Bank Rescue Package 1. The banks’ payment was determined on the basis of, among other things, calculations from the Ministry of Economic and Business Affairs and Danmarks Nationalbank of what was assessed to be in line with market conditions.

The announcement of the agreement on Bank Rescue Package 1 did not immediately entail any notable improvement of Danish banks’ access to liquidity. In order to help create calm until the final adoption by the Folketing (Danish parliament), Danmarks Nationalbank issued a press release on 8 October 2008. The press release stated that until the bill was passed, Danmarks Nationalbank would take care of any problem banks, as had been the case with Roskilde Bank and several others.<sup>16</sup>

The Act on Bank Rescue Package 1 was adopted on 10 October and was approved by the European Commission on the same day under the state aid rules.<sup>17</sup> The bank rescue package then had a positive effect on banks’ access to liquidity.

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16 See press release *The agreement on the national guarantee*, Danmarks Nationalbank, 8 October 2008.

17 See press release *The European Commission announces that the Danish financial stability safeguard scheme is compatible with the Common Market*, Ministry of Economic and Business Affairs, 10 October 2008.

Like Denmark, most other EU member states implemented government guarantee schemes for their banking sectors in the wake of Ireland's announcement of a government guarantee on 30 September 2008.

### **Other regulatory measures in autumn 2008**

In addition to Bank Rescue Package 1, autumn 2008 also saw other regulatory measures.

Share price declines gave rise to speculation in further price drops via short selling, i.e. investors borrowing shares and selling them in the hope of being able to buy them back cheaply before the expiry of the loan term. Several countries, including the USA and the UK, imposed temporary bans on short selling of financial shares during September in an attempt to limit price falls and calm the market down. In mid-October, Denmark followed suit with a general ban on short selling of Danish bank shares.<sup>18</sup>

Changes in accounting rules were also introduced in efforts to stabilise the financial markets. In view of the illiquid markets and sharp price declines, the International Accounting Standard Board adopted a revision of international accounting standards in October 2008. The revision gave listed banks certain options of retroactive asset reclassification of their balance sheets from 1 July 2008. These options related to assets included in trading books, which would normally have to be valued at fair value incorporating changes in value in the profit. The reclassification under the new rules enabled banks to prevent large unrealised capital losses from affecting profit and equity. The European Commission approved the new accounting standards in mid-October 2008, and some large Danish banks (including Danske Bank) chose to exercise the new options.<sup>19</sup>

The Danish mortgage credit market was also hit by the market turmoil in September and October 2008. The yield spread between mortgage and government bonds widened substantially, partly as a result of foreign investors' sales of Danish mortgage bonds. This widening affected Danish pension companies, as the value of their holdings of mortgage bonds (assets) decreased, while the value of their liabilities (life insurance provisions) remained unchanged because mortgage bond yields were not included in the discount yield curve applied for calculation of life insurance provisions. The abnormal market conditions could force several pension companies to divest some of their mortgage bond holdings. This could amplify market fluctuations and give rise to self-reinforcing spirals, which could ultimately have consequences for pension savers and homeowners in the form of falling prices and rising interest rates.

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18 See *Danmarks Nationalbank Financial stability 2nd half 2008*; Danmarks Nationalbank, *The international financial crisis, Monetary Review 4th quarter 2008*.

19 See *Danmarks Nationalbank Financial stability 2nd half 2008*; *Danmarks Nationalbank Financial stability 1st half 2009*; Kim Abildgren and Jens Thomsen, *A tale of two Danish banking crises, Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

At the end of October 2008, the Ministry of Economic and Business Affairs, the Danish FSA and the trade association Insurance & Pension Denmark entered into an agreement on financial stability in the pension area aimed at preventing pension companies from being forced to divest Danish mortgage bonds. One of the initiatives in the agreement was to temporarily include the mortgage yield in the yield curve used in the calculation of pension companies' liabilities. All else equal, the inclusion resulted in a reduction of around 0.5 per cent in the present value of pension companies' liabilities.

Immediately after the announcement of the agreement on financial stability in the pension area, mortgage bond yields fell, so a large part of this challenge no longer applied. The agreement was extended by another year at the end of October 2009.<sup>20</sup>

### **Bank Rescue Package 2 (Credit Package) from January 2009**

In many countries, the financial crisis made private market capital injections to banks difficult. At the same time, the higher uncertainty implied an increase in financial market expectations of banks' capital buffers. These factors increased the risk of a sharp decline in lending activity in the banking sector due to capital shortage and thus the risk of a genuine credit crunch. In such a situation, creditworthy households and companies would be refused loans, with negative consequences for the economy. That is why the authorities in many countries focused on strengthening banks' capital base.<sup>21</sup> In the United States, government capital injection schemes to the banking system were implemented in the autumn of 2008, see box 2.2. In several EU member states, the bank rescue packages from the autumn of 2008 also included schemes enabling government capital injections to banks.

#### *Bank Rescue Package 2 in brief*

At the Annual Meeting of the Danish Bankers Association in December 2008, Governor Nils Bernstein called for a temporary facility with government capital injections to solvent Danish banks to be implemented in order to avoid the risk of a credit crunch in Denmark.<sup>22</sup> This was followed up in the financial stability report published by Danmarks Nationalbank on 5 January 2009.<sup>23</sup> Based on stress tests, it was estimated that a capital injection to the

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20 See *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Report and Accounts 2009*; *Danmarks Nationalbank Financial stability 2nd half 2008*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; Kim Abildgren and Jens Thomsen, *A tale of two Danish banking crises*, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

21 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; *Danmarks Nationalbank Financial stability 1st half 2009*; Danmarks Nationalbank, *The international financial crisis*, *Monetary Review 4th quarter 2008*; *Danmarks Nationalbank Danish Government Borrowing and Debt 2008*.

22 See Governor Nils Bernstein's speech at the Annual Meeting of the Danish Bankers Association on 8 December 2008; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

23 See *Danmarks Nationalbank Financial stability 2nd half 2008*; Danmarks Nationalbank's press release *Financial stability 2nd half 2008*, 5 January 2009.

Danish banking sector of around kr. 70 billion would ensure that the banks could continue to fulfil their credit intermediation task, even when exposed to strong economic shocks. That would reduce the risk of a credit crunch.

**Government capital injections to US banks in autumn 2008**

Box 2.2

On 20 September 2008, the US Treasury Department announced a support package, Troubled Asset Relief Program (TARP), for the government's purchase of troubled assets from financial institutions for up to 700 billion dollars, among other measures. A condition for TARP participation was that the financial institution would issue shares or other subordinated capital to the government.

Before TARP became effective, it was adjusted to focus primarily on capital injections rather than purchases of troubled assets. In mid-October 2008, 9 large US banks chose to strengthen their capital base by selling shares to the government for just over 125 billion dollars as part of TARP, and more financial institutions followed suit in November.

TARP strengthened the capital base of US banks and thus their lending capacity. In December 2008, the large US automotive companies General Motors Corp. and Chrysler also received direct loans from TARP.

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Source: See *Danmarks Nationalbank Monetary Review 4th quarter 2008*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

On 18 January 2009, the government reached an agreement on Bank Rescue Package 2 (Credit Package) with a broad majority of the other parties in the Folketing (Danish parliament). The agreement was adopted by the Folketing on 3 February 2009 in the form of the Act on government capital injections into credit institutions.<sup>24</sup> Bank Rescue Package 2 contained the following main elements:

- Until 30 June 2009, solvent banks and mortgage credit institutions were enabled to apply for government capital injections in the form of hybrid core capital (i.e. subordinated loan capital). If all credit institutions took full advantage of the offer, the institutions would receive around kr. 100 billion in new capital from the government (approx. kr. 75 billion for banks and kr. 25 billion for mortgage credit institutions).
- A new 3-year export loan scheme was established in what was then Eksport Kredit Fonden (now EKF Denmark's Export Credit Agency) of kr. 20 billion.

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<sup>24</sup> See press release *Agreement on credit package finalised*, Ministry of Industry, Business and Financial Affairs, 18 January 2009; *Danmarks Nationalbank Financial stability 1st half 2009*; Kim Abildgren and Jens Thomsen, *A tale of two Danish banking crises*, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

- It was decided to further strengthen the Danish Financial Supervisory Authority. In addition, it was decided that credit institutions would, in future, publish their individual solvency needs in order to increase transparency of their risk exposure.<sup>25</sup>
- An increase in the coverage of ordinary deposits in banks was implemented via the Guarantee Fund for Depositors and Investors from kr. 300,000 to the equivalent of 50,000 euro (about kr. 375,000) from 30 June 2009 and the equivalent of 100,000 euro (about kr. 750,000) from 1 October 2010, when the general government guarantee under Bank Rescue Package 1 expired.<sup>26</sup>

### **On the need for a Bank Rescue Package 2 with government capital injection to banks**

“Against this background, Danmarks Nationalbank believes that it is necessary for Denmark to implement a temporary arrangement where, as a supplement to the capital that can be raised on the private market, a temporary capital injection can be made to well-run Danish banks on terms that are as close to the market as possible. This has been done in other countries, and it should be done in good time, before it becomes obvious to everyone that it is required.

(...)

As I said, the aim is to avoid an actual credit crunch in Denmark, i.e. a situation in which even creditworthy borrowers – households and businesses – are refused loans, with a negative impact on the real economy.”

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Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 8 December 2008.

### *Government capital injections*

The government capital injection scheme under Bank Rescue Package 2 was designed as a voluntary scheme. The authorities’ assessment was that a system of compulsory government capital injections would raise issues

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25 Previously, in a joint open letter, Danmarks Nationalbank and the Danish Financial Supervisory Authority had called for the publication of the credit institutions’ individual solvency needs, see press release *Danmarks Nationalbank and the Danish Financial Supervisory Authority call for a European initiative on transparency* from Danmarks Nationalbank, 27 June 2008; Joint statement by Danmarks Nationalbank and the Danish Financial Supervisory Authority on *How can regulations help to restore the confidence in the soundness of financial markets and institutions?*, 27 June 2008; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

26 See Guarantee Fund for Depositors and Investors, *Report and Financial Statements 2008*; Directive 2009/14/EC of the European Parliament and of the Council of 11 March 2009 amending Directive 94/19/EC on deposit-guarantee schemes as regards the coverage level and the payout delay; Danish Act No 338 of 1 May 2009 amending the Act on a guarantee fund for depositors and investors, the Financial Stability Act and the Act on government capital injections into credit institutions.

in relation to the constitutional provisions on expropriation. That is why a compulsory scheme was not considered viable. An alternative could have been a voluntary scheme with the government contributing equity capital instead of hybrid core capital, but there was no political support for significant government involvement in the operation of Danish banks. Moreover, an equity capital model would make the scheme unavailable to savings banks and cooperative banks, in which case another solution would have to be found for them. The voluntary scheme with hybrid core capital, on the other hand, could be directly applied to all institutions and was also applied to government capital injections in most other EU member states. In connection with the negotiations on Bank Rescue Package 2, it was also discussed whether part of the payment to the government for capital injections into a bank organised as a public limited company should be a share in any subsequent increases in the price of the bank's shares. However, such a model was rejected in favour of the model of injecting hybrid core capital at a fixed interest rate.<sup>27</sup>

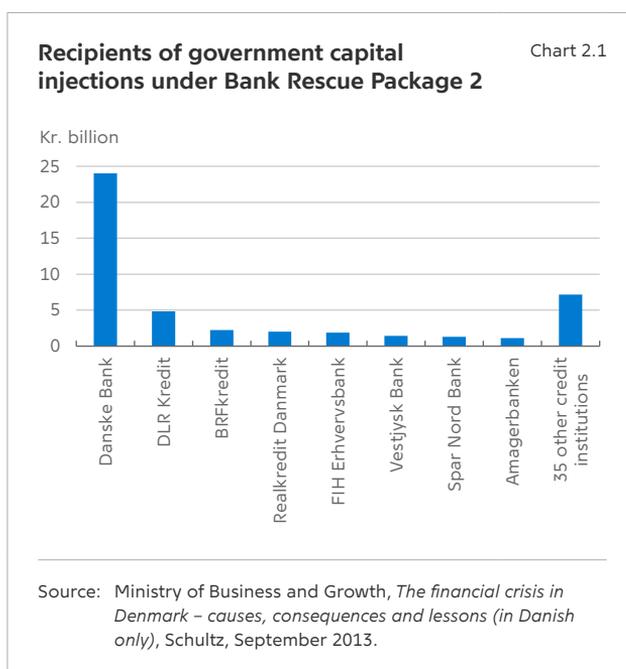
Applications for capital injections under Bank Rescue Package 2 were to be submitted to the Ministry of Economic and Business Affairs and were processed by a temporary task force with the assistance of the Danish FSA and external financial experts. The applications were to be finalised by the end of 2009, and the decision on an application for capital injections was to be made by the Minister for Economic and Business Affairs on the basis of a recommendation from the Coordination Group for Government Capital Injections, consisting of representatives from the Ministry of Economic and Business Affairs, the Ministry of Finance, the Prime Minister's Office and Danmarks Nationalbank.

In accordance with EU guidelines, credit institutions had to pay interest to the government on the capital injection, reflecting the government's risk on each institution. After the capital injection, the institution had to have Tier 1 capital of at least 12 per cent to ensure sufficient lending capacity. The capital injection was also subject to a number of conditions, including requirements for lending policy, executive salaries and dividend policy. The credit institutions were also obliged to report on a semi-annual basis on the development of their loans, and the relevant ministry (Ministry of Economic and Business Affairs at the time of the conclusion of Bank Rescue Package 2) was to prepare a credit availability report every six months.

Overall, 43 credit institutions chose to receive capital injections totalling kr. 46 billion at an average yield to maturity of 10.08 per cent, see chart 2.1. Consequently, there was no need for the total capital injection foreseen under Bank Rescue Package 2. The facility was not fully utilised because the financial markets became more stable from the summer of 2009. Thus, 7 credit institutions withdrew their applications after finding cheaper financing in the market.

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<sup>27</sup> See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

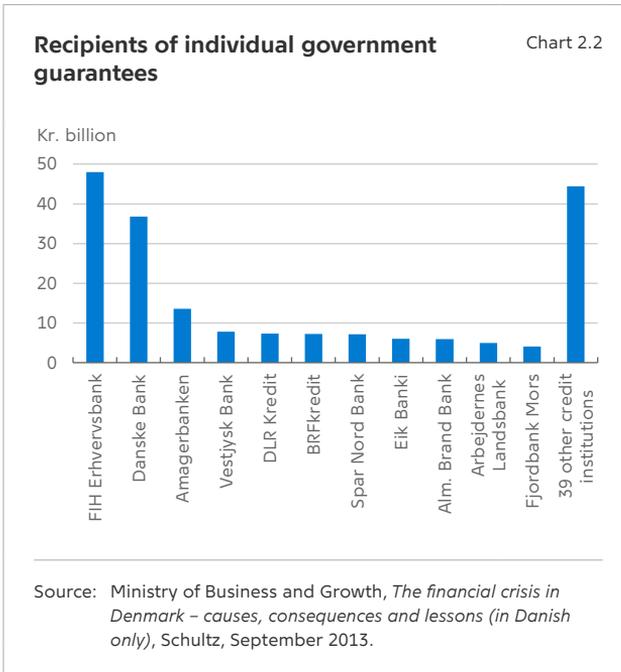


#### *Individual government guarantees*

Following Bank Rescue Package 2, an amendment to the Financial Stability Act allowed solvent credit institutions – subject to approval by the European Commission – to purchase individual government guarantees on non-subordinated unsecured debt, including loans in foreign currency, until 31 December 2010. The individual government guarantees were administered by Finansiel Stabilitet, with maturities of up to three years. This gave Danish credit institutions a better opportunity to prepare for the expiry of the general government guarantee under Bank Rescue Package 1 on 30 September 2010. Moreover, the scheme put the institutions on an equal footing with those in several other EU member states that had provided banks with government guarantees for up to five years.

By the end of 2010, 57 credit institutions had signed an agreement with Finansiel Stabilitet on guarantee commitments totalling kr. 338 billion. However, a number of the institutions chose not to utilise the commitment. From the summer of 2009, large, well-capitalised institutions tended to find it more advantageous to take out longer-term loans without additional purchase of government guarantees. Therefore, only 50 credit institutions actually made issuances totalling kr. 193 billion with individual government guarantees, see chart 2.2.<sup>28</sup>

<sup>28</sup> See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; *Danmarks Nationalbank Financial stability 2010*; *Danmarks Nationalbank Monetary Review 1st quarter 2011, Part 1*.



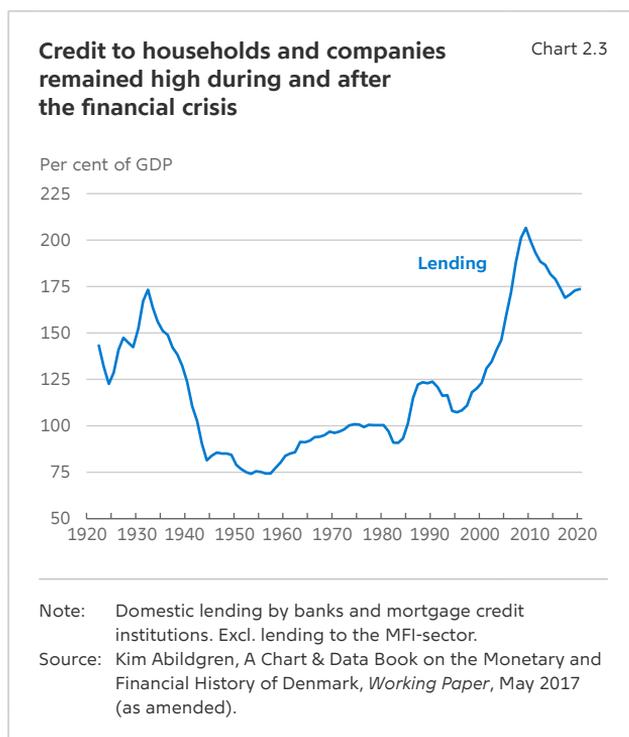
*Credit developments after Bank Rescue Package 2*

In its financial stability report for the 1st half of 2009, Danmarks Nationalbank assessed that Bank Rescue Package 2 had reduced the risk of a credit crunch in the Danish economy, and Danmarks Nationalbank's subsequent analyses did not find any evidence of a general credit crunch either.<sup>29</sup> Neither did Statistics Denmark's confidence indicators give the impression of a general credit crunch, as only a limited part of companies during the financial crisis cited financial constraints as the main reason for production constraints. However, there was no doubt that many companies found it more difficult to obtain bank loans after the outbreak of the financial crisis. This experience reflected the deterioration of companies' ability to pay caused by the weak cyclical development. This pattern was also familiar from normal cyclical downturns without a financial crisis.

After a number of years of strong lending growth prior to the crisis, banks' corporate credit standards needed to be significantly tightened, as their credit standards in the pre-crisis years had not sufficiently reflected companies' financial ratios. The tightening of credit standards contributed to dampening credit growth.

<sup>29</sup> See Danmarks Nationalbank *Financial stability 1st half 2009*; Danmarks Nationalbank *Monetary Review 3rd quarter 2009*; Danmarks Nationalbank *Monetary review 3rd quarter 2010*.

Total corporate and household credit from banks and mortgage credit institutions remained at a high level both during and after the financial crisis, viewed over a longer period, see chart 2.3.<sup>30</sup>



### Bank Rescue Package 3 (Exit Package) from June 2010

The general government guarantee under Bank Rescue Package 1 expired on 30 September 2010. At the same time, the possibility of Finansiell Stabilitet taking over failing banks for the purpose of orderly resolution ceased. Unless statutory amendments were implemented, failing banks would then generally suspend their payments or go into compulsory liquidation. Such a situation would have a number of consequences. First of all, depositors with claims above the deposit guarantee limit and other large creditors would get claims on a bankruptcy estate that would only be paid as dividends once the estate was finally settled, which could take many years, as experience shows. In addition, depositors' online banking services and payment cards, etc., would be closed immediately, and borrowers would have their loans terminated. Finally, forced sale of the assets of a bank under compulsory liquidation would normally mean that creditors could suffer heavy losses. Compulsory liquidation was therefore

<sup>30</sup> See Kim Abildgren, Birgitte Vølund Buchholst, Atef Qureshi and Jonas Staghøj, Real economic consequences of financial crises, *Danmarks Nationalbank Monetary Review*, Vol. 50(3,2), September 2011; Kim Abildgren and Andreas Kuchler, Banks, credit and business cycles, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,2), June 2013.

not an appropriate way to resolve a bank, and there was a risk of returning to a state of government bailout of troubled banks.

Bank Rescue Package 3, which was adopted by the Folketing (Danish parliament) on 25 June 2010 and entered into force on 1 October 2010, implemented a model for orderly resolution of small and medium-sized failing banks. With this model, shareholders and large creditors would be the ones footing the bill for losses, not taxpayers.<sup>31</sup> This was also the principle that would later apply to EU regulation in this area, see chapter 7.

The resolution scheme under Bank Rescue Package 3 did not exclude other solutions in the form of private transfers. The starting point was that the model in Bank Rescue Package 3 would only come into play if a market solution could not be found. And it was up to the individual failing bank whether it would be resolved under the new scheme in Bank Rescue Package 3 or according to the rules for ordinary bankruptcy proceedings.

If a failing bank decided on resolution via the model in Bank Rescue Package 3, Finansielt Stabilitet had to establish a subsidiary to take over the activities of the failing bank and carry out an orderly resolution. This ensured that customers of a failing bank were not required to find a new bank at short notice.

### **On the resolution scheme in Bank Rescue Package 3**

“From society’s point of view it is, as I have previously underscored, not important whether the individual bank survives, but whether sound activities can continue without interruption. People must be able to access their accounts, use their debit cards, pay their bills on time, etc. Unfortunately, the current legislation does not make it mandatory for banks to join the scheme, but merely to decide at a general meeting whether they want to join the scheme now. If they say no, this generates uncertainty as to whether they will join if the need arises.

During its recent visit, the IMF took a positive approach to the Danish winding-up scheme and recommended that banks which do not join beforehand are subjected to additional capital requirements. I hope we find a voluntary solution, and today I will merely encourage banks to join the scheme at their forthcoming general meetings.”

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Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 6 December 2010.

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31 See *Danmarks Nationalbank Report and Accounts 2010*; *Danmarks Nationalbank Report and Accounts 2011*; *Danmarks Nationalbank Financial stability 2011*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; *Danmarks Nationalbank’s response to Consultation on the Act on amendment of the Financial Stability Act, the Financial Business Act, the Act on a guarantee fund for depositors and investors, etc.* of 7 April 2010.

At their next annual general meeting after the implementation of Bank Rescue Package 3, banks had to decide whether to join the scheme in advance. Danmarks Nationalbank encouraged the banks to do so, but the annual general meetings of the vast majority of banks did not want to make such a preliminary commitment. They preferred to leave it up to the bank's board of directors to decide on the resolution form if and when this would be relevant.

#### *Amagerbanken and Bank Rescue Package 3*

The resolution scheme under Bank Rescue Package 3 was first applied in February 2011, when Amagerbanken was failing.<sup>32</sup> As mentioned earlier, Amagerbanken had received liquidity support from Danmarks Nationalbank in 2008. Amagerbanken was the 9th largest bank in Denmark and had, in the pre-crisis years, experienced sharp lending growth, especially in real estate financing. These exposures were subject to large impairment charges which required injection of new capital in December 2009 and September 2010. However, a review of the bank's exposures showed a need for further impairment charges, and Amagerbanken's board of directors had to conclude on Friday 4 February 2011 that the bank had negative equity and no longer met the statutory solvency requirements. As it proved impossible to reach a market solution, the board of directors decided to let the bank be resolved through Finansielt Stabilitet in accordance with the model in Bank Rescue Package 3.

Amagerbanken's shareholders and owners of subordinated capital had to regard their entire investment as lost, and unsecured creditors had their claims reduced in so far as they were not covered by the Guarantee Fund for Depositors and Investors. It was noted internationally that not only shareholders but also creditors had to bear losses.

On Monday 7 February 2011, a newly founded subsidiary bank of Finansielt Stabilitet (Amagerbanken af 2011) opened its doors to customers. Amagerbanken's registration number and account with Danmarks Nationalbank had previously been transferred to the new bank. Given that this was the first application of the resolution scheme under Bank Rescue Package 3, there was some uncertainty among a few of Amagerbanken's foreign counterparties who would not risk executing payments to Amagerbanken af 2011. Consequently, for a short period of time, the new bank was prevented from making anything other than purely domestic payments. However, the majority of customers were not affected by the transfer and could continue to use their payment cards and online banking as usual. In addition, both customers and counterparties could make payments to the new bank without risking that the money would be lost in the bankruptcy estate of Amagerbanken.

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<sup>32</sup> See Brian Liltoft Andreasen and Ulrik Løgtholdt Poulsen, Handling distressed banks in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 50(3,1), September 2011.

### On “Armageddon Bank”

“As no acquirer or investor could be found in such a short period of time (i.e. over the weekend), the supervisory board of the bank elected for the bank to be wound down under the new Danish legislation approved in June 2010 and in force since 1 October 2010. Hence, all the assets and some liabilities have been transferred to a new company, Amagerbanken af 2011 A/S, which is wholly owned by Financial Stabilitet A/S, the government’s bank resolution fund. Equity and subordinated debt are to stay at the bankrupt entity and hence most likely be wiped out.

(...)

Unsurprisingly, we hear that Amagerbanken has been nicknamed “Armageddon Bank” in some of the more hyperbolic circles of the bank debt investment community.”

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Quote from the article *Armageddon Bank* by Tracy Alloway in Financial Times Alphaville, 17 February 2011.

The resolution scheme under Bank Rescue Package 3 sent a clear signal that, in future, banks’ large creditors would have to expect losses if the bank was failing. This corresponded to the conditions for creditors in other private sector companies and, in Denmark’s Nationalbank’s view, it contributed to reducing banks’ risk-taking and creating a more robust financial system.

In the wake of the first application of the resolution scheme under Bank Rescue Package 3, the credit rating agency Moody’s downgraded several Danish banks, citing a reassessment of the likelihood that the Danish government would, in future, bail out a bank without losses to creditors.

There was no evidence that the introduction of the resolution scheme under Bank Rescue Package 3 in 2010 led to any significant increase in the interest rates at which small and medium-sized banks could borrow in the Danish money market compared to interest rates for large banks.<sup>33</sup> The same applied in connection with the resolution of Amagerbanken in February 2011 and the subsequent application of the resolution scheme in Bank Rescue Package 3 to Fjordbank Mors in June 2011.<sup>34</sup>

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33 See Kim Abildgren, Nicolaj Albrechtsen, Mark Strøm Kristoffersen, Søren Truels Nielsen and Rasmus Tommerup, *The short-term Danish interbank market before, during and after the financial crisis*, *Danmarks Nationalbank Working Paper*, No. 99, November 2015.

34 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

### On Bank Rescue Package 3 and the rating of Danish banks

“Moody’s has downgraded a number of Danish banks. It had to come as a logical consequence of Bank Rescue Package III, which has been in force since 1 October 2010 (...) In my view, Bank Rescue Package III is the right system. We cannot continue to have the government underpin the banks’ major creditors. Moody’s downgrade will undoubtedly increase the banks’ funding costs, which will to a higher degree reflect the risks assumed by the banks. The combined effects of Bank Rescue Package III will contribute to creating a more robust and self-sustaining financial system that takes fewer risks.”

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Statement by Governor Nils Bernstein in the press release *Moody’s and Danish banks*, 16 February 2011.

### Bank Rescue Package 4 (Consolidation Package) from August 2011

On 25 August 2011, the government reached an agreement on Bank Rescue Package 4 with a broad majority of the other parties in the Folketing (Danish parliament).<sup>35</sup> The purpose of the agreement was to give sound banks a greater incentive to take over, in full or in part, a failing bank. Bank Rescue Package 4 contained two main elements:

- A dowry scheme with two different models was implemented. The first model provided for the possibility for a sound bank to obtain a dowry from the Guarantee Fund for Depositors and Investors and the government in connection with the full takeover of a failing bank (excluding share capital and subordinated capital). In the second model, Finansiel Stabilitet could obtain a dowry from the Guarantee Fund for Depositors and Investors and the government in connection with the acquisition of all parts of a failing bank (except share capital and subordinated capital) and subsequently transfer the healthy parts of the bank to another healthy bank. This transfer would cover at least all exposures to household customers. It was a prerequisite for the application of the dowry scheme that the solution resulted in lower costs for both the Guarantee Fund for Depositors and Investors and the government compared with a situation where the failing bank was resolved according to the model in Bank Rescue Package 3.
- In order to support the consolidation of banks, a system of individual government guarantees in the event of merger was introduced. Until the end of 2013, this enabled banks to apply, subject to conditions, for an individual government guarantee until the end of 2016 in connection with merger, if the merger would entail redemption of existing senior debt or if at least one of the two merging banks had an individual government guarantee.

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<sup>35</sup> See *Danmarks Nationalbank Report and Accounts 2011*; *Danmarks Nationalbank Financial stability 2012*; *Danmarks Nationalbank Monetary Review 3rd quarter 2011*, Part 1; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

The dowry scheme in Bank Rescue Package 4 was first used in October 2011 in connection with Sparekassen Sjælland's takeover of parts of the failing Max Bank. Thanks to the dowry from the Guarantee Fund for Depositors and Investors and the government, Max Bank could be handled without losses to depositors and other non-subordinated creditors. In April 2012, a dowry was granted for Sparekassen Kronjylland's acquisition of the activities of the failing Sparekassen Østjylland and Den Jyske Sparekasse's takeover of the activities of the failing Spar Salling Sparekasse.

The individual government guarantee under the Bank Rescue Package 4 scheme was granted on two occasions in March 2012. One was the merger between Vestjysk Bank and Aarhus Lokalbank, the other was the merger between Den Jyske Sparekasse and Sparekassen Farsø.

### **Bank Rescue Package 5 (Development Package) from March 2012**

At the beginning of March 2012, a political agreement on the last crisis management package (Bank Rescue Package 5) was reached between the parties behind the previous bank rescue packages. The aim of the agreement was to ensure access to financing for small and medium-sized enterprises in particular.<sup>36</sup> Bank Rescue Package 5 generally contained three elements:

- The agreement enabled Finansiel Stabilitet to take over and liquidate a portfolio of FIH Erhvervsbank's real estate-related loans that the bank had accumulated in the pre-crisis years. This would provide FIH Erhvervsbank with liquidity for servicing debt with individual government guarantees. FIH Erhvervsbank had loans with individual government guarantees totalling kr. 42 billion maturing in 2012 and 2013, but the bank faced significant challenges in refinancing this debt. If the bank was unable to carry out the refinancing, the government would be obliged to repay the government guaranteed debt. If the repayment were to be handled through the settlement of existing loans, it would require a sharp lending reduction in FIH Erhvervsbank and thus reduce the bank's ability to function as a specialist business bank for small and medium-sized enterprises. In July 2012, Finansiel Stabilitet acquired real estate exposures worth kr. 17.6 billion from FIH Erhvervsbank. The transfer took place at estimated market values and in accordance with state aid rules. Furthermore, Finansiel Stabilitet was guaranteed full compensation from FIH Erhvervsbank's parent company (FIH Holding) for any financial losses in connection with the settlement of the real estate exposures.<sup>37</sup> It was part of Bank Rescue Package 5 that the FIH model would be available to other banks that were in the same situation as FIH and able to meet loss guarantee requirements, etc. Alm. Brand Bank publicly stated that it would take a closer look at the model, but it was not applied to other banks.

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<sup>36</sup> See the press release *The development package – initiatives to promote financing of especially small and medium-sized enterprises*, Ministry of Business and Growth, 2 March 2012; *Danmarks Nationalbank Report and Accounts 2012*; *Danmarks Nationalbank Monetary Review 1st quarter 2012, Part 1*; *Danmarks Nationalbank Financial stability 2012*.

<sup>37</sup> FIH Erhvervsbank was later resolved and discontinued in 2016, see Danish Financial Supervisory Authority, *Banks. Market development 2016*.

- Plans were tabled to establish an institution for funding the agricultural sector. The aim was to give viable farms better access to funding for new activities. The background for this initiative was that Finansiel Stabilitet had had difficulties selling acquired, viable farms to other banks. In May 2012, the Danish Bankers Association, the Danish Agriculture & Food Council, Nykredit, DLR Kredit and Finansiel Stabilitet entered into an agreement to establish Landbrugets Finansieringsbank, LFB (financing bank for agriculture), with a capital base of kr. 300 million. Subject to approval by the relevant farmer, LFB could take over viable agricultural exposures from both Finansiel Stabilitet and other banks.<sup>38</sup>
- The EKF export credit scheme, introduced under Bank Rescue Package 2, was increased by kr. 15 billion. Moreover, Vækstfonden was enabled to issue subordinated loans to small and medium-sized enterprises within a framework of kr. 500 million.

### **Strong lending growth and significant exposure to the real estate sector in failing banks**

The financial crisis affected the entire financial sector, but some banks were more exposed than others. Several of the banks that were failing and had to be discontinued during the financial crisis differed from the banking sector as a whole on a number of key parameters. They had had strong pre-crisis lending growth, many large exposures, high customer funding deficits and significant exposure to the real estate sector. Many of the banks that ceased operations in the second half of the 1980s and early 1990s were also characterised by high lending growth and large real estate exposures.<sup>39</sup>

Moreover, banks that went into compulsory liquidation or were acquired by other banks during the financial crisis were, on average, less efficient at providing services in the most cost-efficient way than the surviving banks. Consolidation in the banking sector during the financial crisis thus contributed to an increase in average efficiency in the sector.<sup>40</sup>

### **The crisis resulted in large impairment charges on banks' loans to agriculture, construction and real estate**

Banks' impairment charges increased significantly in 2008, in particular for loans to agriculture, construction and real estate, see chart 2.4. This extensively constituted lending to the same sectors of the economy that had resulted in high bank loan impairment charges in the early 1990s.

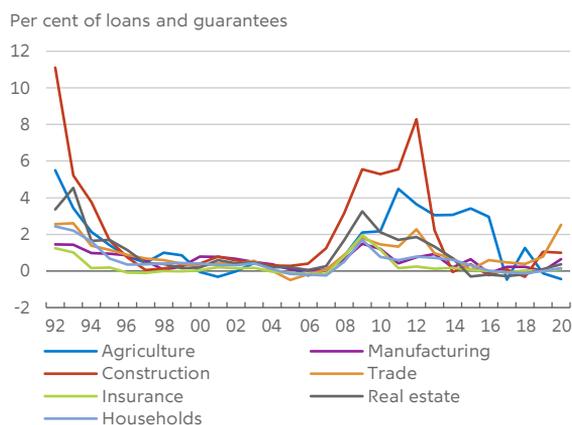
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38 In 2017, it was decided to proceed with gradual resolution of LFB and hand over the administration of LFB's loan portfolio to DLR Kredit, see press release *Liquidation of Landbrugets Finansieringsbank and transfer of administration of loan portfolio, etc. to DLR Kredit, LFB*, 15 August 2017; press release *Liquidation of the activities of Landbrugets Finansieringsinstitut (formerly Landbrugets Finansieringsbank)*, Finansiel Stabilitet, 31 May 2021.

39 See *Danmarks Nationalbank Financial stability 2nd half 2008*; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; Kim Abildgren and Jens Thomsen, *A tale of two Danish banking crises, Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

40 See Kim Abildgren, Nikolai Møller Andersen, Mark Strøm Kristoffersen and Andreas Kuchler, *Productivity and cost-efficiency in the Danish financial sector, Danmarks Nationalbank Monetary Review*, Vol. 52(4,2), December 2013.

**Significant increase in banks' impairment charges on loans to agriculture, construction and real estate in 2008** Chart 2.4



Note: Banks' impairment charges. *Agriculture* includes hunting, forestry and fishing. *Manufacturing* includes raw material extraction and energy supply. *Construction* includes building and construction. *Trade* includes trade, transport, hotels and restaurants, as well as information and communication. *Insurance* includes financing (excluding credit institutions) and insurance. *Real estate* includes real estate, other private industries and the public sector. *Households* include wage earners and pensioners, etc., but not the self-employed. Lending to private individuals with real estate as collateral is included under households and not under real estate. Since 2017: Excluding Nordea.

Source: Kim Abildgren and Jannick Damgaard, Models for banks' loan impairment charges in stress tests of the financial system, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,2), March 2012; Danish Financial Supervisory Authority, *Banks. Statistical material*, miscellaneous editions.

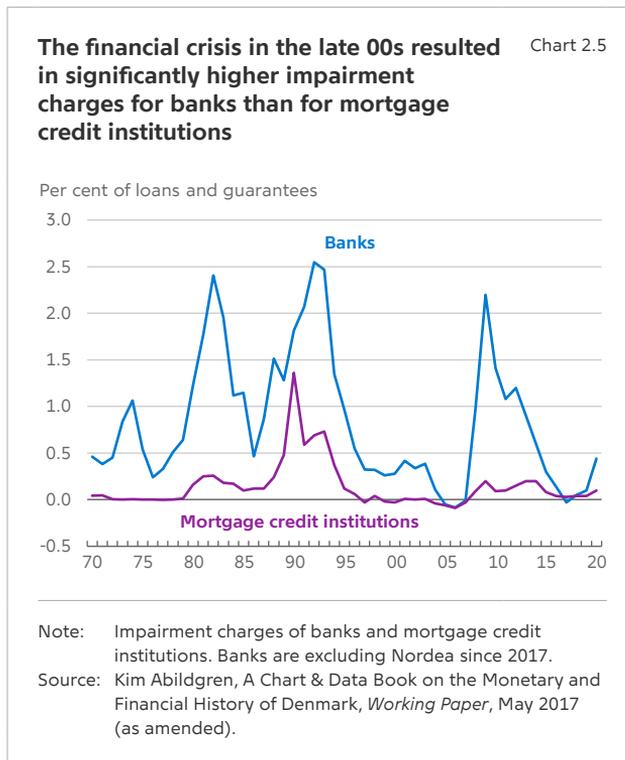
On the other hand, impairment charges on loans to households were relatively low during the financial crisis. The reason is that unemployment was still at a very low level despite its growth. In addition, household finances benefited from the low short-term and long-term housing loan interest rates after tax.<sup>41</sup>

Seen in a slightly longer perspective, bank impairment charge ratios during the financial crisis were in line with those of the recessions of the early 1980s and early 1990s, see chart 2.5. However, in this context, it must be taken into account that the economic downturn during

<sup>41</sup> See Kim Abildgren and Jens Thomsen, A tale of two Danish banking crises, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

the financial crisis – and thus banks’ impairment charges – would undoubtedly have been greater if the many comprehensive government support measures in the form of bank rescue packages, etc. had not been implemented.<sup>42</sup>

Mortgage credit institutions’ impairment charges were at a much lower level during the financial crisis than in the late 1980s and early 1990s. This was associated with a significantly lower level of unemployment and enforced sales of homes. The low impairment charges during the financial crisis gave mortgage credit institutions room for increased lending, which helped to meet credit demand from households and companies at a time when the banking sector needed to reduce its lending exposure. This shift between bank and mortgage loans had also been seen in previous crises in the banking sector (1922-33 and 1987-93).<sup>43</sup>



42 See Kim Abildgren and Jannick Damgaard, Models for banks’ loan impairment charges in stress tests of the financial system, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,2), March 2012.

43 See Kim Abildgren and Andreas Kuchler, Banks, credit and business cycles, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,2), June 2013.

### **Expert committee on the lessons of the financial crisis**

In January 2012, the government set up an expert committee to look into the causes of the financial crisis and assess the tightening measures already implemented after the crisis.<sup>44</sup> The committee was chaired by Professor Jesper Rangvid and consisted of representatives from Danmarks Nationalbank, the Danish Financial Supervisory Authority, the Ministry of Finance, the Ministry of Economic Affairs and the Interior and the Ministry of Business and Growth, as well as five expert members<sup>45</sup>. The committee was provided with secretariat assistance from staff from the ministries, the Danish Financial Supervisory Authority and Danmarks Nationalbank. After 33 meetings, the committee presented its comprehensive report (the Rangvid report) in September 2013.<sup>46</sup> In its report, the committee stated that the financial crisis arose as a consequence of complicated interplay between many national and international factors:

*“... relatively high and seemingly sustainable economic growth, which engendered widespread optimism and underestimation across the board of risk, pro-cyclical fiscal policy, pro-cyclical regulation of the financial sector, loose financing terms, risk-seeking credit institutions and inadequate corporate governance in a number of financial institutions.”<sup>47</sup>*

According to the committee, Denmark – being a small, open economy – could not have avoided being hit by the international financial crisis, and the crisis and its severity had generally not been predicted, either in Denmark or abroad. At the same time, however, the committee also found that the Danish economy and a significant part of the Danish credit institutions had placed themselves in a vulnerable position in several respects before the onset of the crisis.<sup>48</sup>

Before the crisis, fiscal policy in Denmark was procyclical. Consequently, fiscal policy did not dampen the pre-crisis boom, but increased pressure on the labour market and the economy in general.

There were price bubbles in the markets for private owner-occupied housing (single-family houses and owner-occupied flats), residential

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44 See press release *Committee on the causes of the financial crisis established*, Ministry of Business and Growth, 24 January 2012.

45 Professor Anders Grosen, Professor Finn Østrup, Professor Peter Møgelvang-Hansen, former bank CEO Peter Schütze and former Governor of Danmarks Nationalbank Jens Thomsen.

46 See the communication *Report from the committee on the causes of the financial crisis*, Ministry of Business and Growth, 18 September 2013; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

47 Quote from Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (English summary)*, Schultz, September 2013.

48 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

rental properties and agricultural land. The freezing of property value taxes and new types of mortgage loans had helped stimulate housing demand. The large price increases, especially for commercial real estate, had been accompanied by large loans to finance trading and construction of properties, especially from small and medium-sized banks. And inadequate corporate governance made some of these banks unnecessarily vulnerable:

*“A number of small and medium-sized financial institutions’ lending rose very sharply before the crisis and often concentrated on few sectors, primarily commercial real estate. During the years prior to the crisis, several of these banks were characterised by inadequate corporate governance, including weak boards of directors, with no specific experience or knowledge about financial matters, and poor credit skills in the form of careless lending and weak credit competences.”<sup>49</sup>*

Danish banks’ large customer funding deficits made them sensitive to liquidity fluctuations in the international financial markets. In this context, the committee emphasised that there was a lack of sufficient awareness among the banks during the pre-crisis years that market financing might “dry up”.

The easing of financial regulation in the years leading up to the crisis was mentioned by the committee, as the easing was used for increased lending, reducing the banks’ capital cushioning at an inappropriate time in the business cycle.

The committee also highlighted Danmarks Nationalbank’s communications with warnings about the overheating of the Danish economy prior to the crisis. The report mentioned that Danmarks Nationalbank had pointed out various risks in the financial sector, but that communication in this area had not been so clear. Furthermore, it subsequently transpired that Danmarks Nationalbank (and the Danish FSA) had underestimated the liquidity risks associated with the banks’ large customer funding deficits:

*“In the years up to the crisis, Nationalbanken highlighted various risks associated with the financial institutions’ business model, including the high growth in lending. Overall, however, Nationalbanken considered the banking sector to be robust right up to the summer of 2008. Therefore, Nationalbanken’s communications concerning the risks in the financial sector did not stand out as clearly as the bank’s warnings about the Danish*

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<sup>49</sup> Quote from Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (English summary)*, Schultz, September 2013.

*economy overheating, even bearing in mind that the actual fall-off in the economy turned out to be appreciably steeper than foreseen, as a result of the international financial crisis escalating in autumn 2008. After the crisis, it can be concluded that Nationalbanken and the FSA underestimated the liquidity risks that might arise as a result of the rapidly growing and very large deposit deficit accumulated in the financial institutions prior to the crisis, just as monitoring of the financial institutions' liquidity risks was inadequate.*<sup>50</sup>

Clearer and more targeted communication of messages was one of the things Danmarks Nationalbank addressed after the crisis. In addition, Danmarks Nationalbank and the Danish FSA jointly established a new, detailed monitoring system to increase the authorities' insight into the liquidity risks assumed by the banks.<sup>51</sup>

As one of the positive elements, the Rangvid Committee highlighted that work had been launched at international level to increase capital and liquidity requirements for banks in light of the crisis.<sup>52</sup> Specifically for Denmark, the committee recommended changing property taxation to bring it back into sync with house price developments.<sup>53</sup> However, the committee also pointed out that it would never be possible to completely prevent a new financial crisis from emerging in the future. This applied regardless of the regulatory and supervisory measures taken.<sup>54</sup>

Capital, liquidity and housing taxation were some of the main topics characterising the regulatory follow-up to the crisis.

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50 Quote from Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (English summary)*, Schultz, September 2013.

51 See *Danmarks Nationalbank Report and Accounts 2009; Danmarks Nationalbank Report and Accounts 2010*.

52 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

53 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

54 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

### **On warnings from Danmarks Nationalbank before the crisis**

“It can be questioned whether our warning was strong enough – I’ll come back to that – but we did warn.

(...)

When tax cuts were introduced in 2004, Danmarks Nationalbank stated they were only justifiable if there was willingness to make corresponding tightening later when the economic situation so demanded. In 2006, Danmarks Nationalbank proposed that fiscal policy be tightened. And we repeated that later. The government did not take this advice. Nor was it supported by the opposition. And when, in 2006, I proposed a tightening of mortgage credit institutions’ loan limits: Limited political response! In the spring of 2008, before the financial crisis peaked, I advocated allowing the recession to be reflected in unemployment, but this idea was loudly rejected by both sides of the political spectrum, never mind that unemployment was below 2 per cent at the time, and there were acute labour shortages, with the result that Danish wage growth was much faster than in other countries.”

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Quote from Governor Nils Bernstein’s speech (in Danish only) at Politiken’s conference *Lessons from the financial crisis*, 12 November 2010.

### **On the recommendations of the report from the committee on the causes of the financial crisis**

“The committee concludes that conducting discretionary economic policy is difficult, so automatic stabilisers play an important role. Specifically, the committee recommends changing the structure of property taxation to bring it back into sync with house prices. Danmarks Nationalbank has previously advised this.

The report deals with the requirements for credit institutions’ capital ratios, and the committee makes several suggestions on how to ensure robust and transparent capitalisation for the institutions in future. This is an important area that should be looked into further, in the opinion of Danmarks Nationalbank.”

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Statement by Governor Lars Rohde (in Danish only) in connection with the publication of the report from the committee on the causes of the financial crisis, 18 September 2013.

### **Notable socio-economic costs of the financial crisis**

It is always difficult to quantify the extent to which a financial crisis exacerbates a business cycle.<sup>55</sup> This is due to the complicated interaction between the real and financial parts of the economy. Historical experience from many countries shows that cyclical downturns with banking crises have lasted longer and been deeper than other cyclical downturns, and that cyclical recoveries after a banking crisis have been weaker than usual.

Both Danmarks Nationalbank's and the Rangvid Committee's analyses indicated that the international financial crisis in the late 00s had notable costs to the Danish economy in the form of lost output, at least in the short and medium terms. Not until 2014 did real GDP recover to above the 2007 level.<sup>56</sup> The output loss had many sources: the negative impact of the international economy; reluctance to lend in a crisis-stricken banking sector; increased uncertainty about the future economic outlook, leading to lower consumption and investment by households and companies; a break in business confidence that the banking sector could always provide credit and liquidity according to demand. Taken together, these factors reinforced the trend towards consolidation and debt reduction among companies and dampened investment activity and employment.

The socio-economic costs of the financial crisis would undoubtedly have been significantly higher if the government had not buoyed up the economy with comprehensive support measures in the form of guarantees and capital injections to protect financial stability.

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55 See Kim Abildgren, Birgitte Vølund Buchholst, Atef Qureshi and Jonas Staghøj, Real economic consequences of financial crises, *Danmarks Nationalbank Monetary Review*, Vol. 50(3,2), September 2011; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

56 See Danmarks Nationalbank, How has Denmark managed since the financial crisis?, *Theme*, [www.nationalbanken.dk](http://www.nationalbanken.dk), November 2018. The theme compares the development of real GDP in Denmark since 2007 with that in several neighbouring countries, including Sweden and Germany.



# Danmarks Nationalbank's credit facilities during the financial crisis

In the 2nd half of 2007, the turmoil in the US and European money markets spilled over into the Danish money market. Banks became uncertain about the credit rating of counterparties and their own liquidity situation and became reluctant to lend to each other in the money market.

In order to ensure krone liquidity for banks during the financial crisis, Danmarks Nationalbank, like other central banks, implemented many extraordinary crisis measures. For example, temporary credit facilities were established, and Danmarks Nationalbank's collateral basis was expanded to include more asset types.

However, even during the worst part of the financial crisis, banks mostly resorted to the pre-crisis credit facility and collateral basis. Consequently, Danmarks Nationalbank returned to its pre-crisis monetary policy instruments, with only a few adjustments, after the crisis. Nevertheless, the extraordinary measures were important, particularly for smaller banks. They enabled banks to a higher degree to meet the liquidity requirements of the Danish Financial Business Act. Moreover, the measures ensured that liquidity was available to solvent banks with market funding difficulties.

A number of banks had made themselves particularly vulnerable prior to the crisis by building up substantial customer funding deficits, extensively financed by short-term borrowing in the international money and capital markets. In autumn 2008, given the dollar and euro liquidity shortfall among Danish banks, Danmarks Nationalbank, like several other central banks, concluded agreements with the Federal Reserve, Fed, and the European Central Bank, ECB, enabling Danmarks Nationalbank to lend considerable volumes of dollars and euro to the banks.

### Monetary policy in the pre-crisis years

In the years leading up to the financial crisis, there was little need for adjustments of monetary policy instruments. Monetary policy instruments are a collective term for the credit and deposit facilities that Danmarks Nationalbank makes available to most banks and mortgage credit institutions, also known as monetary policy counterparties. Danmarks Nationalbank uses monetary policy instruments to provide the banking system with liquidity in kroner and control the short-term interest rate for the sake of the krone exchange rate.

By the end of 2006, 115 banks and mortgage credit institutions made up Danmarks Nationalbank's monetary policy counterparties, and all banks and mortgage credit institutions had access to become counterparties. The institutions that chose not to be monetary policy counterparties managed their liquidity through accounts with other banks.<sup>1</sup> Typically, smaller banks obtained liquidity through other banks.

Before the financial crisis, Danmarks Nationalbank made by and large use of the instruments introduced in April 1992.<sup>2</sup> At the beginning of 2007, monetary policy counterparties had access to two facilities at Danmarks Nationalbank:<sup>3</sup>

- Counterparties had the option of purchasing 14-day certificates of deposit (CDs) or taking out 14-day monetary policy loans against collateral in regular open market operations on the last business day of each week. It was up to the counterparties themselves to decide the volume of such transactions at the given interest rate.
- Moreover, counterparties were able to make current account deposits accruing interest at the current account rate, which was lower than the CD rate at the time. The lower current account rate gave counterparties an incentive to plan their liquidity needs and actively exchange liquidity on market terms via the money market rather than passively placing liquidity in current accounts at Danmarks Nationalbank.

Danmarks Nationalbank conducted extraordinary open market operations with purchase and sale of certificates of deposit when the need arose to adjust liquidity in the money market. This was typically the case in connection with known fluctuations in central government payments or large, unexpected liquidity fluctuations.

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1 See Danmarks Nationalbank, *Monetary policy in Denmark*, 3rd edition 2009.

2 See chapter 3 in Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

3 See *Danmarks Nationalbank Report and Accounts 2006*.

A limit applied to monetary policy counterparties' current account deposits at the end of the monetary policy day<sup>4</sup>. The total limit was around kr. 25 billion, consisting of the sum of the current account limits of individual counterparties. The purpose of the current account limits was to prevent the build-up of large current account deposits at Danmarks Nationalbank that could be used for speculation in interest rate adjustments and exchange rate fluctuations. The size of the current account limit scheme was designed not to hinder daily settlement of payments.

The most important change to monetary policy instruments in the pre-crisis years was the maturity transition from 14 to 7 days for monetary policy loans and CDs in May 2007. The purpose of the maturity adjustment was to dampen large fluctuations in the day-to-day (overnight or tomorrow-next) interest rate in connection with expectations of interest rate changes, see box 3.1. This was a purely technical and smooth adjustment<sup>5</sup> and the 7-day maturity corresponded to the maturity of euro area monetary policy loans.

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4 The monetary policy day at the beginning of 2007 was from 16:00 to 15:30 the following day. In connection with the transition to a new payment system (Kronos2), the opening time was changed on 20 August 2018 from 16:00 to 16:30. The monetary policy day was changed to run from 17:30 to 16:45 the following day with effect from 29 October 2018 in connection with the connection of Danish kroner to Target2-Securities, see press release *Publication times change as a result of Target2-Securities connection*, Danmarks Nationalbank, 29 October 2018.

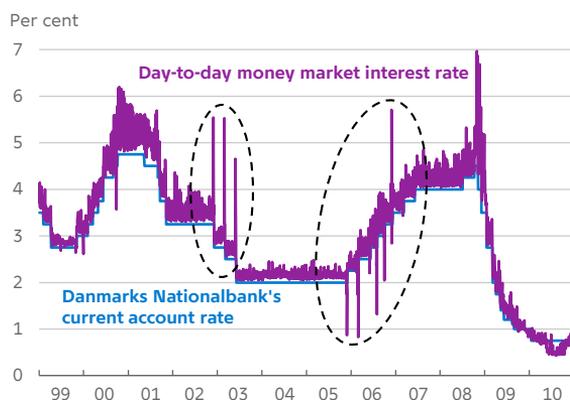
5 See *Danmarks Nationalbank Report and Accounts 2007*.

### Shorter maturities of monetary policy loans and CDs to reduce fluctuations in day-to-day money market interest rates

Box 3.1

In periods of expectations of interest rate increases in the euro area – and thus also in Denmark – the day-to-day (overnight or tomorrow-next) interest rate sometimes fluctuated strongly in the Danish money market before May 2007, see chart.

#### Large fluctuations in money market interest rates on certain days before May 2007



Note: Danmarks Nationalbank's current account rate and day-to-day money market interest rate. The day-to-day interest rate is the tomorrow-next interest rate.

Source: Danmarks Nationalbank.

Banks and mortgage credit institutions did not want to tie up liquidity for a 14-day period by buying CDs if they expected an interest rate increase before the certificates matured. In these situations, there would be ample liquidity in the money market and very low day-to-day interest rates. Given the limits for current account deposits, the day-to-day interest rate could even fall below the current account rate. This occurred on several occasions in 2006, for instance. Conversely, during periods of expected interest rate decline there was substantial interest in purchasing 14-day certificates of deposit maturing after the time of an interest rate reduction. This could lead to liquidity shortfalls in the money market and large increases in day-to-day interest rates. This was seen, for example, in the first part of 2003.

By changing from 14-day to 7-day maturities with effect from 3 May 2007 both monetary policy loans and CDs matured on the day that an interest rate adjustment would take effect, meaning that they would not span an interest rate adjustment.

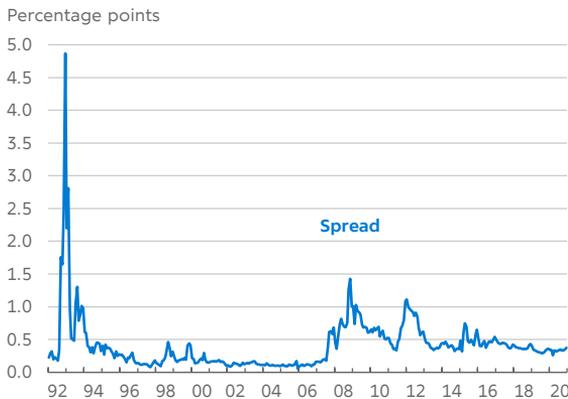
Source: *Danmarks Nationalbank Monetary Review 1st quarter 2007.*

### The Danish money market froze during the financial crisis

The US financial market turmoil caused by losses on subprime loans spread to financial markets in Europe in the 2nd half of 2007. Even though Danish banks' direct exposure to US subprime loans was modest<sup>6</sup>, developments in the US and European money markets had a knock-on effect on the Danish money market. Banks became uncertain about the credit rating of counterparties and their own liquidity situation and became reluctant to lend to each other in the money market. This was reflected, inter alia, in a wider spread between uncollateralised and collateralised money market interest rates and a shift towards collateralised lending, see charts 3.1 and 3.2. The dysfunctional interbank credit market was partly replaced by accounts with Danmarks Nationalbank as the crisis evolved. Thus, banks with excess liquidity chose to place it at Danmarks Nationalbank rather than lend to other banks. Banks with a liquidity need therefore had to borrow from Danmarks Nationalbank rather than from the money market.

**Spread between uncollateralised and collateralised money market interest rates widened in 2nd half of 2007**

Chart 3.1



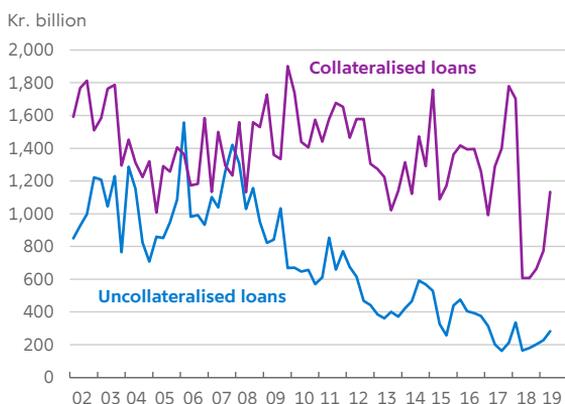
Note: Spread between uncollateralised and collateralised 3-month money market interest rates. Monthly observations. The uncollateralised interest rate is the Cíbor rate. The collateralised interest rate relates to repo transactions up to and including July 2011 and subsequently T-bills.

Source: Kim Abildgren, A Chart & Data Book on the Monetary and Financial History of Denmark, *Working Paper*, May 2017 (as amended).

6 Several large Danish banks had liquidity commitments to structured investment vehicles that invested in subprime-related products, and their holdings of capital certificates in the investment vehicles tended to be smaller, see *Danmarks Nationalbank Financial stability 2008*.

**The financial crisis caused uncollateralised lending in the money market to fall in the years after 2007**

Chart 3.2



Note: Turnover of day-to-day lending in the money market. Quarterly observations. The latest observation is from the 2nd quarter of 2019 when the statistics were discontinued. *Uncollateralised lending* includes overnight (O/N), tomorrow-next (T/N) and spot-next (S/N) loans. *Collateralised lending* consists of repo transactions and FX swaps (with one leg in kroner).

Source: Danmarks Nationalbank, StatBank.

Like other central banks, Danmarks Nationalbank implemented several extraordinary measures to support banks' access to liquidity as the crisis developed into a general liquidity crisis and an actual financial crisis where financial stability was threatened.<sup>7</sup>

In the initial phase of the crisis, there was no need to expand banks' and mortgage credit institutions' access to borrow from Danmarks Nationalbank. Firstly, as mentioned, all banks and mortgage credit institutions had the opportunity to access Danmarks Nationalbank's weekly open market operations to obtain the amount of krone liquidity they demanded at the given interest rate and against collateral. A wide range of securities could be used as collateral for loans at Danmarks Nationalbank. Secondly, certain banks had built up contingency liquidity in the form of a CD portfolio to guarantee them access to liquidity outside Danmarks Nationalbank's regular open market operations.

<sup>7</sup> See Morten Kjærgaard and Lars Risbjerg, Financial turmoil, liquidity and central banks, *Danmarks Nationalbank Monetary Review*, Vol. 47(1), March 2008; Niels Arne Dam and Lars Risbjerg, Central bank measures and balance sheets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 48(4), December 2009; Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

After the initial phase of the crisis, measures were needed to support banks' and mortgage credit institutions' access to funding. In May and September 2008, Danmarks Nationalbank established temporary credit facilities (loan bills and solvency loans, see below) to support the liquidity situation of smaller banks in particular. These credit facilities were only used to a limited extent, but the measures, together with temporary expansions of Danmarks Nationalbank's collateral basis, were important for institutions' ability to meet the liquidity requirements of the Financial Business Act. Moreover, the measures ensured that liquidity was available to solvent banks with market funding difficulties.

In order to supplement banks' access to liquidity and support a smooth expiry process for the individual government guarantees introduced following Bank Rescue Package 2, Danmarks Nationalbank also established temporary credit facilities in 2011 and 2012 (6-month and 3-year loans, respectively) and temporarily expanded the collateral basis for loans.

For all the temporary credit facilities, the interest rate on the loans was linked to Danmarks Nationalbank's lending rate, possibly with a premium. This was important to ensure that Danmarks Nationalbank's interest rate policy could defend the fixed krone exchange rate.

By the end of 2013, the situation had become so stable that Danmarks Nationalbank could begin to phase out the last temporary facilities.<sup>8</sup> This largely marked a return to Danmarks Nationalbank's pre-crisis monetary policy instruments.

Besides the measures to support banks' access to krone liquidity during the crisis, Danmarks Nationalbank, like several other central banks, also lent dollars and euro on the basis of agreements with the Fed and the ECB to address liquidity shortfalls in dollars and euro among Danish banks in autumn 2008. Lending in foreign currency aimed to safeguard banks' access to liquidity in foreign currency, not to manage the krone exchange rate.

### **Temporary credit facilities at Danmarks Nationalbank**

#### *Loan bills*

In May 2008, Danmarks Nationalbank gave access to borrow against a new type of bond, i.e. loan bills. This special type of bond met certain standard terms set by Danmarks Nationalbank. Loan bills could be issued by banks in Denmark that needed krone liquidity. Other banks and mortgage credit institutions purchasing loan bills could pledge them as collateral to Danmarks Nationalbank within certain limits of their core capital. In addition, banks purchasing loan bills could include them in their liquidity under the Financial Business Act. Thus, a bank's liquidity would not be burdened if it placed excess liquidity in loan bills issued by other banks.

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<sup>8</sup> See Danmarks Nationalbank's press release *Normalization of collateral basis and termination of 6-month loans*, 2 December 2013.

A total of 49 banks issued loan bills during the crisis. The outstanding amount increased significantly in autumn 2008, reaching around kr. 30 billion. The loan bills issued were only to a small extent pledged as collateral for loans at Danmarks Nationalbank. In October and November 2008, when the facility was used the most, 4-5 institutions pledged loan bills to Danmarks Nationalbank totalling up to kr. 1.5 billion.<sup>9</sup>

### On loan bills

“Like a can of oil, the facility is intended to lubricate the exchange of liquidity among banks.

Extensive use of the facility is not a criterion of success. Our mere acceptance of loan bills as eligible collateral means that the bills form part of the liquidity reserve of the bank or mortgage credit institution acquiring it. So even if the loan bills are not posted as loan collateral with Nationalbanken, the facility may have a positive impact.”

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Statement by Governor Nils Bernstein in press release *Danmarks Nationalbank opens a new secured lending facility*, 9 May 2008.

### *Credit facility based on excess capital adequacy*

In September 2008, Danmarks Nationalbank introduced the credit facility based on excess capital adequacy. This facility enabled banks and mortgage credit institutions to apply for a credit limit at Danmarks Nationalbank on the basis of their statutory excess capital adequacy, less a margin of 1 percentage point. The credit limit could be included in the banks' liquidity under the Financial Business Act.

The key element of the credit facility based on excess capital adequacy was a credit rating upon application subject to a statement from management and auditors on the calculation of excess capital adequacy, rather than pledging collateral to Danmarks Nationalbank.<sup>10</sup> This was the first time Danmarks Nationalbank made general uncollateralised lending available since the discontinuation of access to uncollateralised intraday credit in the second half of the 1990s.<sup>11</sup>

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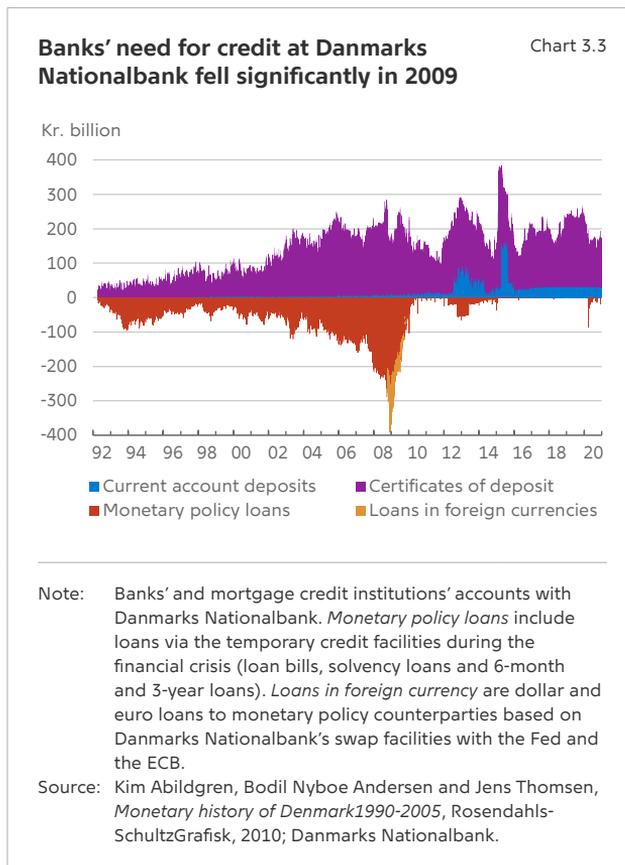
9 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

10 See Kirsten Elisabeth Gürtler and Marianne Rosenbeck, Danmarks Nationalbank's collateral basis – new asset types in a legal perspective, *Danmarks Nationalbank Monetary Review*, Vol. 52(3,1), September 2013; Danmarks Nationalbank, The international financial crisis, *Monetary Review 4th quarter 2008*.

11 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

The total solvency credit limit peaked in April 2009 at kr. 13.7 billion. Of the 38 institutions with a credit limit, only 2 utilised it to raise loans. These loans were between kr. 10 and 25 million.<sup>12</sup>

One of the reasons for the limited use of loan bills and the credit facility based on excess capital adequacy was the implementation of Bank Rescue Package 1 in October 2008 that gave depositors and other unsecured creditors full guarantee for their claims on banks for a 2-year period. This made it easier for banks to borrow in the money market. Another reason was that in June 2009 a margin was introduced between Danmarks Nationalbank's lending rate and certificate of deposit rate in order to give banks and mortgage credit institutions an incentive to offset liquidity differences via the money market to a greater extent rather than using Danmarks Nationalbank's lending and deposit facilities. Overall, Bank Rescue Package 1 and the interest margin led to a significant decline in the raising of monetary policy loans at Danmarks Nationalbank, see chart 3.3.



12 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

### *6-month and 3-year loans*

In the latter part of 2011 and the beginning of 2012, Danmarks Nationalbank granted monetary policy counterparties access to raise 6-month and 3-year collateralised loans in order to supplement banks' access to liquidity and to facilitate the transition at the expiry in 2012-13 of the individual government guarantees introduced in continuation of Bank Rescue Package 2. Furthermore, banks could include the 3-year loans in the Danish FSA's targets for stable financing.<sup>13</sup> Danmarks Nationalbank introduced the possibility of raising 3-year loans at the end of 2011 when the ECB introduced 3-year loans for euro area monetary policy counterparties.

Only very few banks utilised the 6-month credit facility.<sup>14</sup> On the other hand, there was greater demand for 3-year loans, with an outstanding amount totalling kr. 53 billion at the end of 2012. At that time, 3-year loans accounted for almost all of monetary policy lending.<sup>15</sup> The 3-year loans could be redeemed early on a weekly basis six months after the loans were taken out. This was effected for a large share of the loans.<sup>16</sup>

### **Temporary expansions of Danmarks Nationalbank's collateral basis**

The collateral basis for loans at Danmarks Nationalbank was expanded several times during the financial crisis. The objective of the expansions was twofold. Firstly, they enabled monetary policy counterparties to use a larger share of their assets as collateral for loans at Danmarks Nationalbank. Secondly, they allowed banks to include assets in their statutory liquidity under the Financial Business Act.<sup>17</sup>

In September 2008, the collateral basis was expanded to include e.g. investment fund shares and listed and unlisted shares. For example, the expansion to include unlisted shares enabled banks to provide collateral in the form of shares issued by their jointly owned companies, e.g. PBS and VP Securities.

The expansion of the collateral basis in September 2008 was used only to a lesser extent as a basis for loans at Danmarks Nationalbank. At the end of April 2009, 18 Danish banks and mortgage credit institutions had pledged

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13 See Danmarks Nationalbank, New credit facilities at Danmarks Nationalbank, *Monetary Review 4th quarter 2011 – Part 1*; Lars Risbjerg and Thomas Sangill, Liquidity of Danmarks Nationalbank and the banks, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012.

14 See Danmarks Nationalbank, Normalisation of the collateral basis and discontinuation of 6-month loans, *Monetary Review 4th quarter 2013 – Part 1*.

15 See *Danmarks Nationalbank Report and Accounts 2012*.

16 See *Danmarks Nationalbank Financial stability 2013*; *Danmarks Nationalbank Financial stability 1st half 2014*.

17 See Astrid Henneberg Poffet, Pledging of collateral to Danmarks Nationalbank, *Danmarks Nationalbank Monetary Review*, Vol. 49(2), June 2010; Lars Risbjerg and Thomas Sangill, Liquidity of Danmarks Nationalbank and the banks, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012; Kirsten Elisabeth Gürtler and Marianne Rosenbeck, Danmarks Nationalbank's collateral basis – new asset types in a legal perspective, *Danmarks Nationalbank Monetary Review*, Vol. 52(3,1), September 2013.

shares etc. for a total of around kr. 3 billion, of which about kr. 1 billion in unlisted shares. In comparison, the total value of collateral pledged to Danmarks Nationalbank at the end of April 2009 was kr. 332 billion. Thus, even during the worst part of the crisis, banks predominantly resorted to the pre-crisis collateral basis for loans at Danmarks Nationalbank.<sup>18</sup>

Several other changes to the collateral basis were implemented during the crisis, including the expansion in October 2011 to include banks' credit claims of good quality. The purpose of the October 2011 expansion was to give banks better access to liquidity prior to the expiry of individual government guarantees. Credit claims constituted by far the largest asset item on the banks' balance sheets, and the banks had credit claims with a collateral value of around kr. 400 billion which met the requirements for inclusion in the collateral basis. Credit claims approved as eligible at Danmarks Nationalbank could be included in banks' liquidity under the Financial Business Act.

However, the need to use credit claims of good quality as collateral for loans at Danmarks Nationalbank was limited. In July 2013, credit claims for around kr. 35 billion were eligible as collateral for loans at Danmarks Nationalbank, and only about 20 per cent was pledged to Danmarks Nationalbank. Pledged credit claims accounted for about 6 per cent of all assets pledged to Danmarks Nationalbank as collateral for loans.

#### **Danmarks Nationalbank's lending in dollars and euro**

In the pre-crisis years Danish banks had built up a large customer funding deficit (including in the banks' foreign entities), extensively financed by short-term loans in the international money and capital markets. When the international financial crisis escalated in autumn 2008, a dollar and euro liquidity shortfall arose among Danish banks. The large Danish banks accounted for most of the customer funding deficit, but the small and medium-sized banks also had a significant customer funding deficit and need for foreign currency, to which they virtually only had access via the large banks.<sup>19</sup>

Especially the US market for issuance of short-term debt securities in dollars – so-called commercial papers (CPs) – performed poorly during the financial crisis.

Danish banks' need for liquidity in dollars and euro was met in three ways:

Firstly, the Fed set up a Commercial Paper Funding Facility under which the central bank acquired 3-month CPs from financial institutions with a high

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18 See *Danmarks Nationalbank Financial stability 2nd half 2009*.

19 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, *The money and foreign exchange markets during the crisis, Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, 2013.

credit rating. For instance, at the end of October 2008, the Fed acquired CPs issued by Danske Bank for a total of just over 5 billion dollars.<sup>20</sup>

Secondly, during the crisis, a few large Danish banks had direct access to borrow both Swiss francs and dollars from the Swiss central bank via their foreign entities.

Last but not least, Danmarks Nationalbank established facilities for lending dollars and euro on the basis of swap facilities with the Fed and the ECB, respectively, in order to address the currency shortfall among Danish banks.

Danmarks Nationalbank's swap facility with the Fed was announced on 24 September 2008. The original limit was 5 billion dollars, but due to increasing international money market turmoil, the facility was expanded to 15 billion dollars already on 29 September 2008. Under this facility, the Fed lent dollars (secured by kroner) to Danmarks Nationalbank which offered dollar loans with a maturity of up to 3 months to the monetary policy counterparties via auction. The counterparties provided collateral for the currency loans to Danmarks Nationalbank using the same collateral basis as for Danmarks Nationalbank's normal monetary policy lending in kroner. The first auction took place already on 26 September 2008 and a total of 18 auctions were held during 2008 and 2009. The bid rate at the auctions had to be greater than or equal to a minimum bid rate set by the Fed. The need for the facility was underlined by the fact that demand at the first auctions was significantly above the quantity offered. The 15 billion dollar swap facility limit was fully utilised at the end of 2008, see chart 3.4. Demand at the auctions declined as problems with access to dollar liquidity diminished and the gap between auction interest rates and market rates widened.<sup>21</sup>

### On the swap facility with the Federal Reserve

"The crisis in the USA has made it more difficult for banks outside the USA to obtain funding in dollars. By increasing the size of its swap facility with the Federal Reserve, Danmarks Nationalbank, like other central banks, is expanding its capacity to provide credit in US dollars in order to facilitate the exchange of dollar funding."

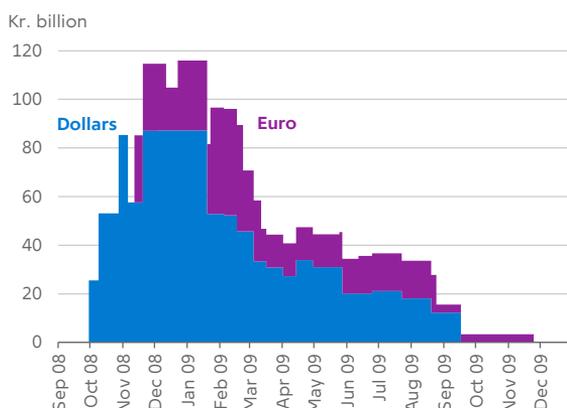
Statement by Governor Nils Bernstein in the press release *Extension of swap facility with the Federal Reserve*, 29 September 2008.

20 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

21 See the article Danmarks Nationalbank's euro and dollar auctions in *Danmarks Nationalbank Monetary Review 3rd quarter 2009*; Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

### Danmarks Nationalbank lent euro and dollars to monetary policy counterparties during the financial crisis

Chart 3.4



Note: Danmarks Nationalbank's dollar and euro lending to monetary policy counterparties under swap facilities with the Fed and the ECB.

Source: Danmarks Nationalbank, Danmarks Nationalbank's euro and dollar auctions, *Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009.

On 27 October 2008, Danmarks Nationalbank announced a similar swap facility with the ECB with a 12 billion euro limit. However, the largest volume of outstanding loans was only 5.9 billion euro and the bid volume was below the volume offered in all auctions. This reflects that some banks already had access to the ECB's monetary policy facilities through entities located in the euro area. However, the facility provided greater certainty regarding access to euro liquidity among banks that did not have access to euro through the ECB's monetary policy facilities.<sup>22</sup>

Dollar and euro lending under the swap facilities with the Fed and the ECB did not affect Danmarks Nationalbank's foreign exchange reserves or earnings. In fact, Danmarks Nationalbank re-lent currency from the Fed and the ECB, meaning that interest income from the banks that borrowed the currency from Danmarks Nationalbank corresponded to Danmarks Nationalbank's interest expenses to the two central banks.<sup>23</sup>

Danmarks Nationalbank also lent a relatively small amount of dollars and euro from its foreign exchange reserves via the FX swap market. Danmarks

<sup>22</sup> See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

<sup>23</sup> See *Danmarks Nationalbank Report and Accounts 2008*.

Nationalbank lent dollars secured by kroner totalling kr. 2.6 billion in mid-September 2008. These loans had a maturity of 4 days. At the beginning of October 2008, Danmarks Nationalbank lent euro secured by kroner for a total of kr. 16.8 billion with maturities of 1 week and 1 month.<sup>24</sup>

### **Contingency facility for timely dollar payments was not utilised**

It became clear that the large Danish banks' considerable customer funding deficits, financed through the international money and capital markets, were associated with considerable risk, given the dollar liquidity shortfall in autumn 2008.

Danske Bank, in particular, had put itself in a vulnerable situation. Danske Bank had closed its New York branch in 2005<sup>25</sup> but had, among other things, outstanding US CPs of around 20 billion dollars. Typically, the contracts for such loans contained strict provisions about the consequences of non-timely payment. For example, default on an obligation to pay interest on one loan could automatically mean that other loans of the same borrower were also considered non-performing and had to be repaid immediately. So, a bank could risk that failure to pay interest on a single foreign currency loan on time could result in immediate maturing of large parts of the bank's financing.<sup>26</sup>

The comprehensive government guarantee introduced by Bank Rescue Package 1 in October 2008 also covered foreign currency debt. Consequently, the government could be obliged to ensure the immediate payment of overdue claims on a bank's foreign currency debt. Danmarks Nationalbank therefore set up a contingency facility to ensure that the government could, if necessary, make dollar payments at very short notice in different time zones. As part of the contingency facility, Danmarks Nationalbank intensified its oversight of developments in banks' dollar funding and held meetings with relevant banks. However, the contingency facility for timely dollar payments was not utilised during the financial crisis.<sup>27</sup>

The regulatory follow-up to the crisis focused on banks having to adjust their risk management to be able to meet their payment obligations in both domestic and foreign currencies during periods of financial turmoil without government liquidity support. They could, for example, secure credit lines with banks in the relevant currencies and/or quick borrowing access

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24 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, *The money and foreign exchange markets during the crisis, Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

25 See Danske Bank, *Annual Report 2005*.

26 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, 2013.

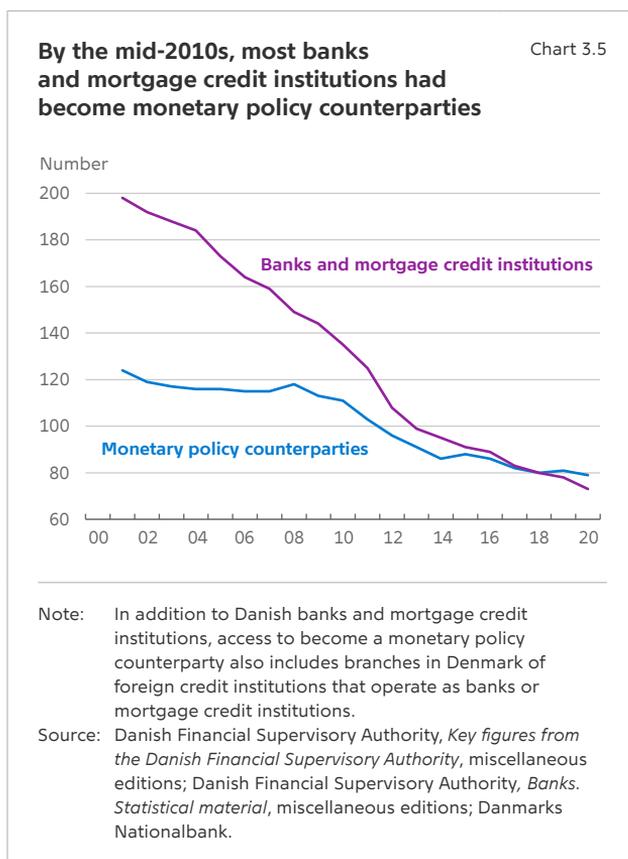
27 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; the clarification of the guarantee in Bank Rescue Package 1 regarding timely payment in the Act amending the Financial Stability Act of 3 February 2009; Comments on Bill for an Act amending the Financial Stability Act submitted on 21 January 2009 by the Minister for Economic and Business Affairs.

at central banks by exercising the option of being a monetary policy counterparty in the relevant countries.

### Good experience with monetary policy instruments during the financial crisis

Danmarks Nationalbank's monetary policy instruments at the onset of the financial crisis in 2007 proved to provide a flexible basis for supplying the banking system with krone liquidity during the crisis. It is true that Danmarks Nationalbank, like other central banks, had to set up temporary credit facilities and expand the types of assets eligible as collateral for loans at Danmarks Nationalbank. However, even during the worst part of the financial crisis, banks predominantly resorted to the pre-crisis credit facility and collateral basis.

The limited use of the new measures was due to several factors. Firstly, Danmarks Nationalbank had a broad group of monetary policy counterparties, and all banks and mortgage credit institutions had access to become counterparties. Before the financial crisis, a number of banks and mortgage credit institutions had chosen not to be monetary policy counterparties. By the mid-2010s, virtually all banks and mortgage credit institutions had become monetary policy counterparties, see chart 3.5.



Secondly, there were no quantitative restrictions on banks' and mortgage credit institutions' access to borrow in Danmarks Nationalbank's weekly open market operations. Everyone was free to obtain the amount of krone liquidity they demanded at the given interest rate.

Thirdly, a wide range of securities could be used as collateral for loans at Danmarks Nationalbank. The collateral basis consisted primarily of government and mortgage bonds in kroner and euro, and the total outstanding amount of these securities was around kr. 2,700 billion. Monetary policy counterparties held about one third of them.<sup>28</sup>

Finally, the CD rate and the lending rate were identical until mid-2009, so it was at no cost for the individual counterparty to build up contingency liquidity in certificates of deposit by raising monetary policy loans and using the funds to buy certificates of deposit. At the onset of the financial crisis in August 2007, counterparties had made use of this approach to build up contingency liquidity totalling around kr. 50 billion.<sup>29</sup> By holding a CD portfolio a counterparty could – if necessary – quickly raise liquidity in the money market by selling the CDs or pledging them as collateral for loans or by reselling them to Danmarks Nationalbank in connection with extraordinary open market operations.

At the end of 2013, Danmarks Nationalbank began phasing out the last of the series of temporary credit facilities and expansions of the collateral basis introduced during the financial crisis. This marked a return to Danmarks Nationalbank's pre-crisis monetary policy instruments, apart from a few adjustments. The principal adjustment was the introduction, in June 2009 as mentioned earlier, of a margin between Danmarks Nationalbank's lending rate and certificate of deposit rate in order to give banks and mortgage credit institutions an incentive to offset interbank liquidity differences via the money market to a greater extent rather than resorting to Danmarks Nationalbank's lending and deposit facilities.<sup>30</sup>

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28 See Danmarks Nationalbank, *Monetary policy in Denmark*, 3rd edition 2009.

29 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

30 Moreover, in December 2011, Danmarks Nationalbank supplemented its monetary policy instruments with the possibility of conducting liquidity-adjusting open market operations outside the normal instruments. This could be deposits with Danmarks Nationalbank, lending against assets in Danmarks Nationalbank's general collateral basis as collateral or lending against foreign exchange as collateral (FX swaps). The interest rate and maturity would reflect market conditions, and the open market operations could take place via auction or as bilateral transactions with individual counterparties, see Danmarks Nationalbank, Supplementary instruments in Danmarks Nationalbank's liquidity management, *Monetary Review 4th quarter 2011 – Part 1; Danmarks Nationalbank Report and Accounts 2011*. The possibility of liquidity-adjusting open market operations outside the normal instruments was introduced after a period of sluggish liquidity exchange in the money market leading to higher money market interest rates. However, by the end of 2020, this type of liquidity-adjusting open market operation had not yet been used. In order to strengthen its ability to lend liquidity in foreign currency in a crisis situation, Danmarks Nationalbank also entered into a framework agreement in 2020 on currency swap facilities in Scandinavian currencies with the central banks of Norway and Sweden, see Danmarks Nationalbank's press release *Scandinavian central banks in new cooperation*, 12 November 2020.





## Pressure on the krone during the financial crisis in 2008

The increased uncertainty during the financial crisis in autumn 2008 caused international investors to withdraw from minor currencies, and the Danish krone came under strong pressure to weaken against the euro. The pressure on the krone led to a widening of the spread between Danmarks Nationalbank's and the ECB's benchmark interest rates from 0.35 to 1.75 percentage points during October 2008, and it took until the end of August 2009 for the spread to return to the level of September 2008.

Danmarks Nationalbank sold foreign exchange for a net amount totalling around kr. 65 billion during September and October 2008 to stabilise the krone exchange rate. This made a sizeable dent in the foreign exchange reserve and it turned out not to be possible to increase the foreign exchange reserve rapidly through short-term government borrowing abroad. Consequently, the central government issuance of 30-year bonds in November and December 2008 played a significant role in countering the pressure on the krone and defending the Danish fixed exchange rate policy. The issuance gave Danish pension companies the opportunity to divest European bonds and instead buy the new government securities. This increased demand for Danish kroner.

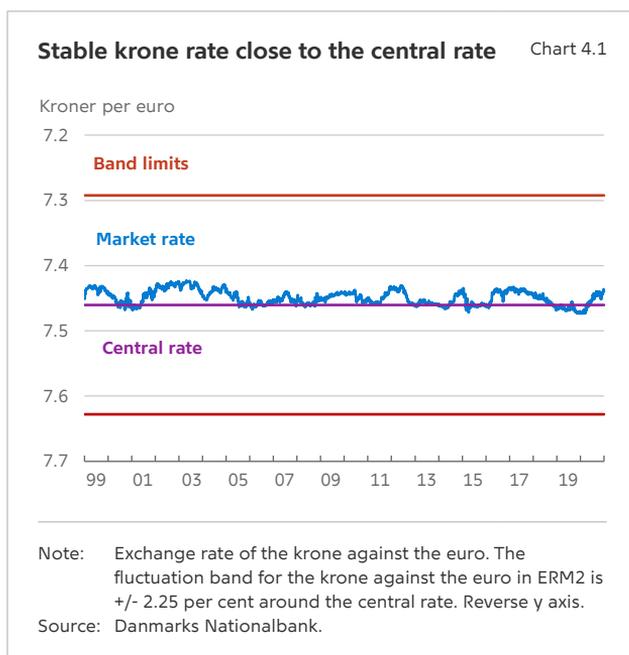
Following the pressure on the krone, Danmarks Nationalbank decided to expand the foreign exchange reserve considerably in order to send a strong signal of continued determination to defend the fixed krone exchange rate.

The course of events in October 2008 sparked a new debate about Denmark and the euro, as Danmarks Nationalbank had to raise interest rates in the middle of a financial crisis, while the ECB cut interest rates in the euro area. In November 2008, a debate was held in the Folketing (Danish parliament) on Danish participation in euro cooperation, followed by a consultation on the euro held by the parliamentary European Affairs Committee in January 2009. The consultation took place at a time when, for several years, opinion polls had shown that a majority of Danes had a positive attitude towards the euro. This subsequently changed with the outbreak of the European sovereign debt crisis.

### Calm krone exchange rate in the pre-crisis years

Denmark's monetary policy was in a familiar setting in the years leading up to the financial crisis.

Since 1999, Denmark had pursued a fixed exchange rate policy against the euro within the framework of the Exchange Rate Mechanism 2 (ERM2), and the exchange rate of the krone remained close to its central rate of kr. 7.46038 per euro, see chart 4.1. This continued the fixed exchange rate policy against the German D-mark introduced in the 1980s, and the central rate corresponded to a conversion of the krone's central rate vis-à-vis the D-mark between 12 January 1987 and the end of 1998 in the former Exchange Rate Mechanism (ERM).<sup>1</sup>



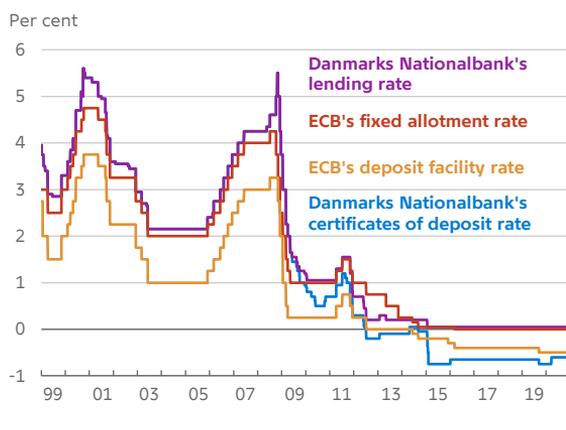
In the pre-crisis years, the foreign exchange market was normally calm without pressure on the krone, and Danmarks Nationalbank's interest rates usually mirrored the interest rates set by the ECB for the euro area, see chart 4.2. Given the calm foreign exchange market, there was little need for Danmarks Nationalbank to stabilise the krone by means of intervention purchases or sales of foreign exchange against kroner, see chart 4.3.

The only notable exception was in February 2006. In the first part of that month, the krone weakened as a result of foreign exchange outflows from Denmark. The foreign exchange outflows were the result of such factors

<sup>1</sup> See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

### Danmarks Nationalbank's interest rates closely mirrored the ECB's interest rates before 2008

Chart 4.2

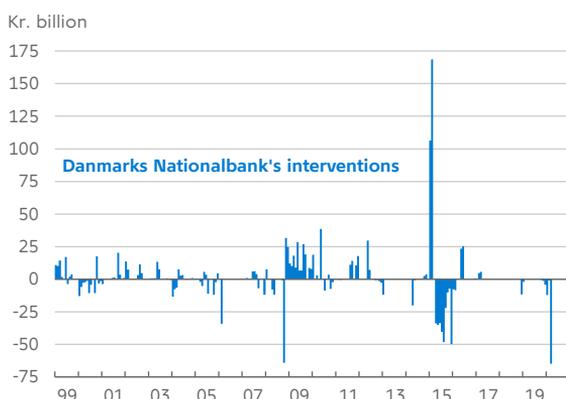


Note: Danmarks Nationalbank's and the ECB's benchmark interest rates. From 1999 to 27 June 2000, the ECB's fixed allotment rate covered the ECB's fixed allotment rate in main refinancing operations. The ECB's minimum bid rate was then applied until 14 October 2008, followed by the ECB's fixed allotment rate. Before 8 June 2009, Danmarks Nationalbank's lending rate was identical to the certificate of deposit (CD) rate.

Source: Danmarks Nationalbank and ECB website.

### Modest need for intervention to stabilise the krone rate before 2008

Chart 4.3



Note: Danmarks Nationalbank's net intervention purchases of foreign exchange. Interventions are accrued by value date.

Source: Danmarks Nationalbank, StatBank.

as the settlement of several private equity funds' acquisition of the telecommunications company TDC in relation to the previous owners. A significant part of TDC's former shareholders were non-residents who chose not to reposition in Danish securities.<sup>2</sup>

Danmarks Nationalbank sold foreign exchange totalling kr. 34 billion in the first part of February 2006 to stabilise the krone exchange rate. On 17 February 2006, the lending rate was raised, widening the spread between Danmarks Nationalbank's and the ECB's benchmark interest rates by 0.1 percentage points. This modest widening of the spread was enough to stop the capital outflows from Denmark and remove the pressure for the krone to weaken. This reflected a high degree of confidence in the fixed exchange rate policy.

### **Strong pressure on the krone in autumn 2008**

The increased uncertainty during the autumn 2008 financial crisis led to a general tendency among international investors to withdraw from smaller currencies. This caused pressure on exchange rates, and smaller currencies with floating exchange rates, such as the Swedish krona, depreciated. There was also strong pressure on the Danish krone to weaken against the euro, as non-residents withdrew from Danish securities and foreign banks reduced their krone deposits in Danish banks. There were signs that some investors were speculating in Denmark's ability to maintain the fixed exchange rate policy.<sup>3</sup>

The pressure for the Danish krone to weaken came after a period of negative spreads between Danmarks Nationalbank's lending rate and the ECB's marginal rate in the weekly tenders. The negative spread was due to higher demand for liquidity from euro area banks in the ECB's weekly tenders. So, the ECB's marginal rate rose in September to a considerably higher level than the ECB's minimum bid rate, which was otherwise normally the ECB's benchmark interest rate. The minimum bid rate was the lowest interest rate at which the ECB allowed banks to bid for liquidity loans in variable rate tenders.

In order to stabilise the krone exchange rate, Danmarks Nationalbank bought kroner against foreign exchange for a considerable amount from the end of September to the first part of October. But this was not enough to counteract the pressure on the krone, and on 7 October Danmarks Nationalbank announced that it would raise its interest

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2 See *Danmarks Nationalbank Report and Accounts 2006*; Peter Jayaswal, Mette Kornvig and Katrine Skjærbæk, Private equity funds, capital flows and the foreign-exchange market, *Danmarks Nationalbank Monetary Review*, Vol. 45(3), September 2006.

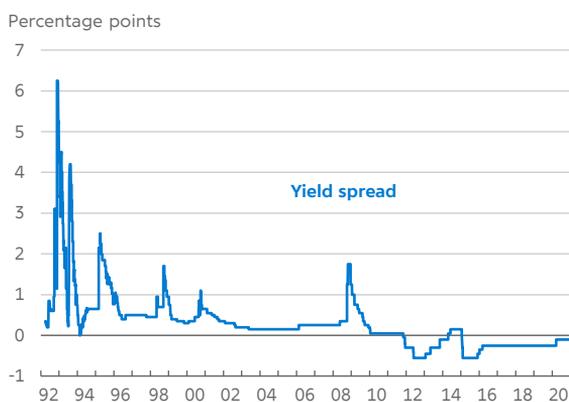
3 See *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Monetary Review 4th quarter 2008*; *Danmarks Nationalbank Monetary Review 1st quarter 2009*; Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011; Speech by Governor Nils Bernstein at Copenhagen Business School, 22 March 2010; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons*, Schultz, September 2013.

rates with effect from 8 October. The lending rate and the certificate of deposit (CD) rate were increased by 0.4 percentage points to 5 per cent.

After the interest rate increase, Danmarks Nationalbank continued to intervene in the foreign exchange market in order to stabilise the krone exchange rate. At midday on 8 October, the ECB announced a reduction of its minimum bid rate by 0.5 percentage points. On the same day, the ECB also announced that the allotment of liquidity in the weekly tenders would no longer be made at a variable marginal rate but at a fixed allotment rate equal to the minimum bid rate. This eliminated the problem of a marginal rate significantly above the minimum bid rate. Given that Danmarks Nationalbank kept its interest rates unchanged, the monetary policy interest rate spread between Denmark and the euro area widened to 1.25 percentage points, see chart 4.4.

**Significant widening of the monetary policy interest rate spread between Denmark and the euro area in 2008**

Chart 4.4



Note: Spread between monetary policy rates in Denmark and Germany (1992-98)/euro area (since 1999). For Denmark, Danmarks Nationalbank's lending rate is applied until 7 November 2013, and then the CD rate. For Germany, Deutsche Bundesbank's repo rate is applied. For the euro area, the ECB's fixed allotment rate in main refinancing operations is applied from 1999 to 27 June 2000. The ECB's minimum bid rate is then applied until 14 October 2008, followed by the ECB's fixed allotment rate until 7 November 2013. After that date, the ECB's deposit facility rate is applied.

Source: Danmarks Nationalbank, Deutsche Bundesbank and ECB.

At the end of October, Danmarks Nationalbank again bought kroner in the foreign exchange market to stabilise the krone, which was still under pressure as a result of continued outflows of foreign exchange. On 24 October, Danmarks Nationalbank raised its interest rates by a further 0.5 percentage points to 5.5 per cent. This widened the spread between Danmarks Nationalbank's and the ECB's benchmark interest rates to 1.75 percentage points. Danmarks Nationalbank could gradually start normalising its interest rates again only at the end of December 2008, and it took until the end of August 2009 for the spread to return to the level of September 2008.

### **On the cost of remaining outside the euro during a financial crisis**

“On top of the financial crisis, we were hit by severe currency unrest in October – the first such incident for more than 10 years. The unrest was not due to factors in the real economy and shows that when a global financial crisis occurs, a price must be paid for not adopting the euro. The currency unrest led to a considerable outflow of capital in a very short time, resulting in falling foreign-exchange reserve and a significant widening of the yield spread to the euro area.”

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Quote from Governor Nils Bernstein's speech at the Annual Meeting of the Danish Bankers Association, 8 December 2008.

Danmarks Nationalbank sold foreign exchange for a net amount totalling around kr. 65 billion during September and October 2008 to stabilise the krone, and market participants focused strongly on the size of Denmark's foreign exchange reserve. At the same time, it turned out not to be possible to rapidly increase foreign exchange reserve through short-term government borrowing abroad, as had been the case during the currency crisis in the early 1990s. This was due to the general illiquidity characterising the international money markets during the financial crisis in autumn 2008. The central government was only able to borrow in foreign exchange through its commercial paper programmes in mid-October 2008, when the foreign exchange reserve had shrunk to kr. 104 billion.<sup>4</sup>

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4 See Governor Nils Bernstein's speech at Copenhagen Business School, 22 March 2010; Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; Kim Abildgren and Jens Thomsen, Monetary Policy after the Crisis – Ten Lessons from a Fixed-Exchange-Rate Regime, in: Ernest Gnan, Ryszard Kokoszczynski, Tomasz Łyziak and Robert McCauley (eds.), *Monetary Policy after the Crisis, SUERF Studies*, Vol. 3, 2011.

## **Sales of 30-year government bonds helped defend fixed exchange rate policy**

The central government's issuance of 30-year bonds totalling about kr. 90 billion in November and December 2008 played a significant role in countering the pressure on the krone and defending Denmark's fixed exchange rate policy.<sup>5</sup> The issuance increased the demand for kroner to the extent that Danish investors divested European bonds to buy the new Danish government securities. The issuance also contributed to ensuring contingency liquidity for the central government during a period of high general uncertainty about government finances. The decision to issue 30-year government bonds was taken jointly by the government and Danmarks Nationalbank.<sup>6</sup>

The opening of the 30-year bond was announced at the beginning of November 2008.<sup>7</sup> Danmarks Nationalbank was able to buy back considerable amounts of foreign exchange the day after the announcement, and, overall, Danmarks Nationalbank was able to buy back foreign exchange of around kr. 56 billion in November and December 2008.

Prior to the announcement, Danmarks Nationalbank had been in contact with the ATP pension company. An understanding was reached that ATP would sell long-term bonds in euro if it became possible to buy 30-year Danish government bonds.<sup>8</sup> Given their long-term liabilities in kroner,

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- 5 See *Danmarks Nationalbank Danish Government Borrowing and Debt 2008*; Paul Lassenius Kramp, Jane Lee Lohff and Jens Pagh Maltbæk, Pension savings, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; Ministry of Finance reply to the Finance Committee's question no. 252 (general part) of 23 February 2017; Ministry of Finance reply to the Finance Committee's question no. 139 (general part) of 4 February 2021; Rigsrevisionen's report no. 15/2021 submitted to the Folketing (Danish parliament) with the Public Accounts Committee's comments on *The Ministry of Finance's issue of 30-year government bonds in 2008*, April 2022; *Ministerial report on the Public Accounts Committee's report on the Ministry of Finance's issue of 30-year government bonds in 2008* from the Ministry of Finance to the Public Accounts Committee, 29 June 2022; *Rigsrevisionen's memo on the report on the Ministry of Finance's issue of 30-year government bonds in 2008*, August 2022.
  - 6 See statement by Lars Løkke Rasmussen, Minister of Finance, in the press release *Amendment of the regulations of the Social Pension Fund*, Ministry of Finance, 3 November 2008.
  - 7 See the communication *Opening of 30-year government bond (4.5 per cent bullet loan 2039)* from Danmarks Nationalbank, 3 November 2008.
  - 8 See the memo *Considerations on the issuance of 30-year government bonds (in Danish only)* from Danmarks Nationalbank, 28 October 2008, as well as the memo *Understanding between ATP and Danmarks Nationalbank (in Danish only)* from Danmarks Nationalbank, 31 October 2008, attached to the Ministry of Finance letter *(in Danish only)* to the Finance Committee dated 22 November 2021 with *Supplementary information regarding the basis for the decision on the issuance of 30-year government bonds in 2008, in continuation of the reply to the Finance Committee's question no. 139 (general part) (2020-21)*. Danmarks Nationalbank noted ATP's intention to purchase adjustable-rate bonds for around kr. 100 billion at the auctions in December 2008. However, according to Danmarks Nationalbank's securities statistics, the insurance and pension sector's total nominal holdings of bonds underlying adjustable-rate loans in kroner only increased from kr. 93.7 billion at the end of November 2008 to kr. 107.3 billion at the end of January 2009.

Danish pension companies had a natural interest in buying long-term government bonds in kroner. Danmarks Nationalbank expected that other pension companies would also divest European bonds if it became possible to buy 30-year Danish government securities.

The target for the total outstanding amount in the new 30-year government bond was announced at the opening as around kr. 60 billion. This target was reached at the end of November 2008. Against the background of continued strong demand and a continued need to strengthen the foreign exchange reserve, the target for the outstanding issue was raised to around kr. 90 billion. The bond was sold on market terms with a yield spread to Germany on a par with comparable European countries, and the new security mainly went to Danish insurance and pension sector. ATP bought an amount of around kr. 50 billion, and the Danish insurance and pension sector as a whole bought an amount of around kr. 80 billion of the new 30-year bond.

Other sales of Danish government securities in the latter part of 2008 also increased the demand for kroner to the extent that market participants divested European bonds to buy Danish government securities.<sup>9</sup> In October 2008, 2-year government securities for an extraordinary amount of kr. 12 billion were issued, and the Social Pension Fund (SPF) sold government securities from its portfolio for around kr. 17 billion in November 2008.<sup>10</sup>

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9 See *Danmarks Nationalbank Danish Government Borrowing and Debt 2008*.

10 Prior to the financial crisis, the SPF had – in light of the declining government debt – increased focus on buying listed bonds other than government bonds, see *Danmarks Nationalbank Government debt policy. Strategy 2008*, 18 December 2007; *Danmarks Nationalbank Danish Government Borrowing and Debt 2007*. The SPF invested kr. 27 billion in 1-year adjustable-rate mortgage bonds at the auctions in December 2008. This contributed to hedging government interest costs in connection with the financing of social housing. The central government bore the risk of higher interest costs on the financing of social housing as a result of the rules on debt service support according to which the government paid the part of the debt service payment exceeding the residents' payment. Thus, central government payments increased if interest rates rose. The announcement in early November 2008 that the SPF would invest in short-term mortgage bonds at the December 2008 auctions was interpreted in the market as a signal that the government was willing to support the market in the event of further turmoil related to the crisis, see press release *Amendment of the Social Pension Fund Regulations*, Ministry of Finance, 3 November 2008; the communication *The investment strategy of the Social Pension Fund*, Danmarks Nationalbank, 3 November 2008; Birgitte Vølund Buchholst, Liquidity in Danish covered and government bonds, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011. In 2017, an agreement was reached on a new model for financing social housing to be financed in future based on government guaranteed mortgage bonds, which the central government could buy, financed by issuing government bonds (or drawing on the central government's account at Danmarks Nationalbank), see Johanne Dinesen Riishøj, The central government will buy the bonds to finance social housing in 2018, *Danmarks Nationalbank Analysis*, No. 25, December 2017; Jens Bindlev Agerholm, New financing of social housing strengthens the market for Danish government securities, *Danmarks Nationalbank Analysis*, No. 24, December 2018.

### **On the government issuance of 30-year bonds while the krone was under pressure**

“There was extensive demand in the Danish market for domestic bonds with longer maturities – particularly on the part of pension funds, which needed to hedge their long-term commitments. In November and December 2008, the Danish government took the extraordinary step of issuing 30-year bonds. As a result, Danish pension funds restructured their portfolios from foreign to domestic securities. This supported the krone.”

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Quote from Governor Nils Bernstein’s speech at Copenhagen Business School, 22 March 2010.

### **Need for larger foreign exchange reserve after krone pressure in 2008**

Danmarks Nationalbank’s monetary policy instruments – in conjunction with other measures – proved to be well suited to dealing with the strong pressure for the krone to weaken that arose in autumn 2008. This corresponded to the experience gained from the use of instruments to manage the exchange rate of the krone through the currency crises of the 1990s.

However, the course of events in autumn 2008 also illustrated that Danmarks Nationalbank could need very large amounts of foreign exchange for intervention in the event of strong pressure for the krone to weaken. Following the pressure on the krone, Danmarks Nationalbank decided to expand the foreign exchange reserve considerably in order to send a strong signal of continued determination to defend the fixed krone exchange rate.

### **On the need for a larger foreign exchange reserve in the light of the financial crisis**

“At Danmarks Nationalbank, we had underestimated the need for a larger foreign exchange reserve. We had expected the government to be able to borrow additional foreign exchange in the international markets if needed. It proved impossible to raise foreign exchange in this way at acceptable prices. We had to acknowledge the truth of the banal doctrine that money is most difficult to come by when you need it the most. We’ve learned a lesson from that.”

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Quote from Governor Nils Bernstein’s speech (in Danish only) at Politiken’s conference *Lessons from the financial crisis*, 12 November 2010.

Other experience gained in 2008 also pointed to the need for a larger foreign exchange reserve:

- In May 2008, Danmarks Nationalbank and the other Scandinavian central banks, Norges Bank and Sveriges Riksbank, entered into bilateral currency swap facilities with the Icelandic central bank, Seðlabanki Íslands, to make euro available against Icelandic krona if needed for financial stability in Iceland. For each of the Scandinavian central banks, the facility covered a total amount of 500 million euro.<sup>11</sup> Furthermore, in December 2008, Danmarks Nationalbank and Sveriges Riksbank concluded an agreement with the Latvian central bank, Latvijas Banka, to make euro available against Latvian lats in order to support Latvia's macroeconomic and financial stability. For Danmarks Nationalbank, this facility covered a total amount of 125 million euro.<sup>12</sup>
- The financial crisis also generated a need to increase the lending capacity of the International Monetary Fund (IMF). This also resulted in a greater need to be able to draw on foreign exchange from member countries, including Denmark. If the IMF were to draw on Denmark, this would not in itself affect the size of Danmarks Nationalbank's foreign exchange reserve, as Danmarks Nationalbank would receive a claim on the IMF corresponding to the IMF's drawing on Danmarks Nationalbank. But drawings by the IMF would reduce the highly liquid share of Danmarks Nationalbank's foreign exchange reserve.<sup>13</sup>

The foreign exchange reserve more than doubled from the end of September 2008 to the end of September 2009. The increase was partly due to central government borrowing abroad, partly to inflows of foreign exchange and Danmarks Nationalbank's consequent intervention purchases of foreign exchange, see chart 4.5.<sup>14</sup> In connection with the European sovereign debt crisis in the following years, the foreign exchange

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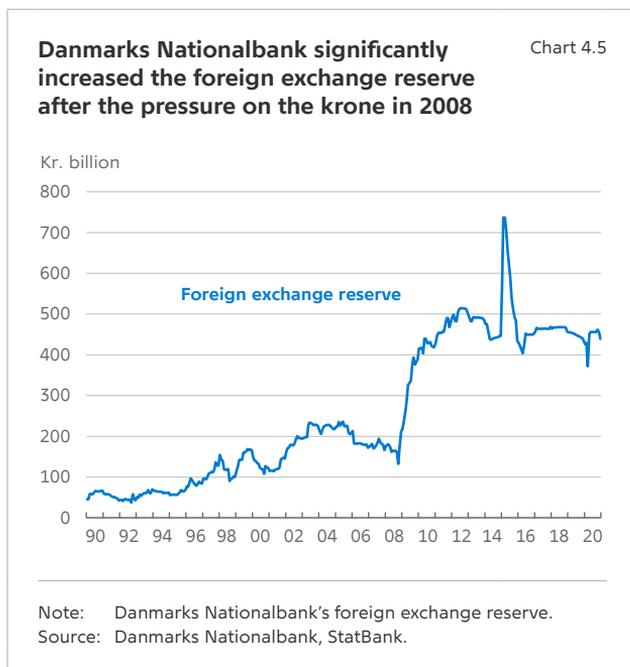
11 The Icelandic economy was hit hard by the financial crisis, and in early October 2008 the Icelandic government had to take over the country's three largest banks, which together made up about 85 per cent of the Icelandic banking sector. On 14 October 2008, Seðlabanki Íslands drew 200 million euro on the currency swap facility with Danmarks Nationalbank, see Danmarks Nationalbank's press release *Danmarks Nationalbank enters swap facility with Seðlabanki Íslands*, 16 May 2008; *Danmarks Nationalbank, Report and Accounts 2008*; *Danmarks Nationalbank Monetary Review 2nd quarter 2008*; *Danmarks Nationalbank Monetary Review 4th quarter 2008*; Jakob Ekholdt Christensen, The economic crisis in Ireland, Iceland and Latvia, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

12 By the end of 2008, Latvijas Banka had drawn 72.5 million euro on the currency swap facility with Danmarks Nationalbank, see Danmarks Nationalbank's press release *Danmarks Nationalbank enters into swap facility with Latvijas Banka*, 16 December 2008; *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Monetary Review 1st quarter 2009*; Jakob Ekholdt Christensen, The economic crisis in Ireland, Iceland and Latvia, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

13 See Thomas Krabbe Jensen and Søren Vester Sørensen, Danmarks Nationalbank's financial accounts with The International Monetary Fund, IMF, *Danmarks Nationalbank Monetary Review*, Vol. 48(4), December 2009.

14 See Anders Jørgensen, Paul Lassenius Kramp, Carina Moselund Jensen and Lars Risbjerg, The money and foreign exchange markets during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,2), June 2011.

reserve rose further due to massive inflows of foreign exchange into Denmark, given the prevailing fears of a break-up of the euro area.



### **Consultation of the European Affairs Committee of the Folketing in January 2009 on the costs of remaining outside the euro**

During the course of events in October 2008, Danmarks Nationalbank had to raise interest rates in the middle of a financial crisis, while the ECB cut interest rates in the euro area. This was a concrete visualisation of the economic costs of remaining outside the euro, and it sparked a new debate about Denmark and the euro.

On 12 November 2008, a debate was held in the Folketing (Danish parliament) on whether Denmark should join the euro and on the economic and other consequences for Denmark of remaining outside the euro. Here it was decided to call on the European Affairs Committee of the Folketing (Danish parliament) to hold a consultation on the euro. The consultation was held on 22 January 2009, and Governor Nils Bernstein, Danmarks Nationalbank, participated in an expert panel.<sup>15</sup>

<sup>15</sup> See *Minutes of parliamentary proceedings on Wednesday 12 November 2008*; Parliamentary press release *Consultation on the euro on Thursday 22 January 2009, 12:30-4:45 p.m.*, 16 January 2009; Governor Nils Bernstein's statement at the consultation of the European Affairs Committee of the Folketing (Danish parliament) on 22 January 2009.

### On the political costs for Denmark of remaining outside the euro

“Denmark’s status as a non-euro area member state excludes us from a number of decisions, even though they are highly relevant to us. This applies to interest-rate decisions, of course, which affect us directly owing to our fixed-exchange-rate policy. It also applies to e.g. the agreement with the Federal Reserve to provide dollar liquidity to euro area banks at an early stage of the financial crisis. It took some time before we were able to present a similar agreement for the Danish banks.

I could list a number of other examples. Recently the Governing Council has thus agreed on standard-setting recommendations for the structure and pricing of government guarantees and capital injections in the banking sector.

(...)

These examples show that not only interest-rate decisions, but also many other decisions made by the Governing Council have a direct impact on us – and yet we have no influence on these decisions, or even insight into the rationale behind them.”

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Quote from Governor Nils Bernstein’s statement at the euro consultation of the European Affairs Committee of the Folketing (Danish parliament), 22 January 2009.

In his statement, Nils Bernstein pointed out that, in Denmark’s Nationalbank’s view, Denmark’s adoption of the euro would be a natural extension of Denmark’s fixed exchange rate policy vis-à-vis the euro and should be expected to have positive effects on the Danish economy. Danish participation in the euro would result in slightly higher trade and lower transaction costs. Interest rates would normally differ only marginally from those under the fixed exchange rate policy, but in turbulent periods the spread could widen. And precisely during turbulent periods, such as autumn 2008, interest rate increases could be rather inconvenient on top of the other negative factors that hit the real economy.

### On the fixed exchange rate policy and the euro

“Denmark’s fixed exchange rate policy has stood the test of time. Because we all agree to defend it.

It has tied us closely to the euro. So closely that Denmark is, to all intents and purposes, a euro area member state.

However, **with** exchange fees. And **without** influence. But that is another story.”

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Quote from Governor Lars Rohde’s speech at Denmark’s Nationalbank’s 200th anniversary, 4 July 2018.

Nils Bernstein also touched on the political costs of remaining outside the euro, which had become very clear during the financial crisis. For example, early in the financial crisis, the ECB was able to conclude an agreement with the Federal Reserve to ensure dollar liquidity for banks in the euro area. It took some time before Danmarks Nationalbank was able to present a similar agreement for Danish banks. Denmark also had a great interest in influencing and being informed about the work in international forums, such as the Basel Committee, which were to discuss the regulatory follow-up to the financial crisis and in which the ECB was an important participant.

The consultation took place at a time when, for several years, opinion polls had shown that a majority of Danes had a positive attitude towards the euro.<sup>16</sup> This subsequently changed with the outbreak of the European sovereign debt crisis.<sup>17</sup>

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16 See the Danish article *Flertal for euro-ja – men SF'erne stadig imod*, [www.dr.dk](http://www.dr.dk), 21 January 2009.

17 See the Danish article *Tre ud af fem er euroskeptiske*, [www.dr.dk](http://www.dr.dk), 26 December 2011.



# The Danish krone and the European sovereign debt crisis

Most countries provided massive fiscal accommodation to reduce the negative impacts of the global financial crisis on output and employment. But several EU member states with macroeconomic imbalances did not have sufficient government budget scope to ease their fiscal policies to that extent. In these countries, the financial crisis evolved into an outright sovereign debt crisis, with the worst affected countries needing international financial assistance.

The Danish krone appreciated against the euro from mid-2011 to mid-2012 when the sovereign debt crisis peaked and foreign demand for Danish securities was strong. Some investors regarded Danish krone assets as a safe haven – instruments to hedge against the risk of a euro break-up. During that period, Danmarks Nationalbank bought foreign exchange worth about kr. 90 billion to counter the krone appreciation trend, and on 6 July 2012 the certificates of deposit (CD) rate was reduced to -0.20 per cent. For the first time in Danmarks Nationalbank's 200 year history, one of its interest rates turned negative. In a global context, this was also the first time a central bank cut its key policy rate into negative territory.

The transition to a negative CD rate caused the upward pressure on the Danish krone to abate. However, the reduced pressure was also the result of increased confidence in the management of the European sovereign debt crisis after the clear announcement by the European Central Bank (ECB) that it would do whatever it took to preserve the euro.

At the EU level, the sovereign debt crisis led to improved oversight of macroeconomic imbalances. Moreover, the Fiscal Compact was concluded, setting standards for responsible public finances. In Denmark, the Fiscal Compact was incorporated into the Budget Act adopted by a majority of the members of the Folketing (Danish Parliament) in spring 2012.

### **The financial crisis evolved into a sovereign debt crisis in EU member states with macroeconomic imbalances**

Most countries provided massive fiscal accommodation to reduce the negative impacts on output and employment caused by the global economic and financial crisis when it escalated in earnest in 2008. It quickly became clear to several EU member states that they did not have sufficient government budget scope to ease their fiscal policies to that extent. Moreover, government budgets were challenged by the transfer of considerable risk from the private to the public sector in many countries following the adoption of substantial bank rescue packages in autumn 2008. These packages included explicit and implicit government guarantees, entailing that large amounts of government funds could potentially be needed to recapitalise the banking sector. Fiscal accommodation and bank rescue packages increased the focus on government debt and budget balances in various countries, and in a number of EU member states with macroeconomic imbalances, the financial crisis evolved into an outright sovereign debt crisis.<sup>1</sup> The sovereign debt crisis reflected that several countries with high economic growth in the pre-crisis years had failed to consolidate public finances sufficiently.

In the euro area, Greece, Italy and Portugal were running large government budget deficits in the mid-2000s – despite the boom, see chart 5.1. Although countries such as Spain and Ireland were recording government budget surpluses in the years leading up to the 2008 financial crisis, both countries had underestimated the strength of the boom. As a result, the structural government budget balance – i.e. the actual budget balance adjusted for cyclical and temporary factors – was assessed as being better than it actually was. So, these countries were ill equipped to support their economies with accommodative fiscal policies when the financial crisis struck. Among other EU member states, Latvia and the UK were struggling with huge budget deficits after the financial crisis outbreak.

Several euro area member states, especially Greece, Portugal and Spain, had accumulated very large, unsustainable current account deficits before the crisis, financed by capital inflows from surplus countries such as Germany, the Netherlands, Finland and Austria, see chart 5.2. The current account deficits were caused by a sharp increase in domestic demand in the deficit countries, driven by far too accommodative fiscal policies and

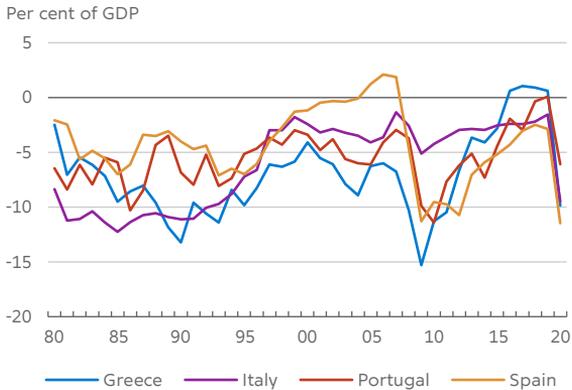
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1 See Ann-Louise Winther, Impact of fiscal policy during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009; Jakob Ekholdt Christensen and Rasmus Tommerup, Fiscal challenges in advanced countries, *Danmarks Nationalbank Monetary Review*, Vol. 49(2), June 2010; Niels Blomquist and Jakob Ekholdt Christensen, Economic imbalances in the euro area, *Danmarks Nationalbank Monetary Review*, Vol. 49(4), December 2010; Jakob Ekholdt Christensen, The economic crisis in Ireland, Iceland and Latvia, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011; Jens Bech Agerholm, Uffe Mikkelsen and Karoline Garm Nissen, Fiscal policy in the EU – what have we learned from the crisis?, *Danmarks Nationalbank Monetary Review*, Vol. 51(2,1), June 2012; Kim Abildgren and Sune Malthé-Thagaard, A comparison of the ERM crisis in the early 1990s with recent years' financial and sovereign debt crisis in Europe, *Danmarks Nationalbank Monetary Review*, Vol. 51(4,1), December 2012; Jacob Isaksen and Søren Vester Sørensen, Imbalances in the euro area, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,1), 2013.

favourable financing conditions. This trend, along with inflexible labour markets, resulted in pay increases that were out of sync with productivity growth, causing competitiveness to decline and, viewed in isolation, further boosting the current account deficits. Ultimately, it was called into question whether the deficit countries would be able to meet future public and private debt liabilities.

**Despite the boom, some EU member states were running large government budget deficits in the mid-2000s**

Chart 5.1



Note: Government budget balance (net lending).  
Source: IMF, World Economic Outlook Database.

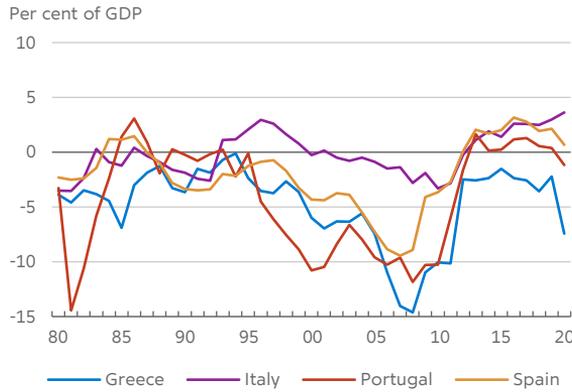
**On the importance of running government budget surpluses in good times**

“Since many countries had failed to take advantage of the favourable economic climate in the early years of this century to consolidate public finances, their position was weak when the crisis struck. Still, most countries eased fiscal policy in 2009 as part of concerted European efforts to offset the negative impact of the crisis on growth and employment. This caused further deterioration of public finances, and for several euro area member states it led to an outright sovereign debt crisis.( ...) In many countries, fiscal expansion during the boom immediately before the crisis has now made way for extensive consolidation. In other words, fiscal policy has amplified cyclical fluctuations instead of dampening them.”

Quote from Governor Lars Rohde’s speech at the European Affairs Committee consultation *The European Crisis and the Development of the European Union*, 26 February 2013.

**A number of euro area member states were running large current account deficits in the mid-2000s**

Chart 5.2

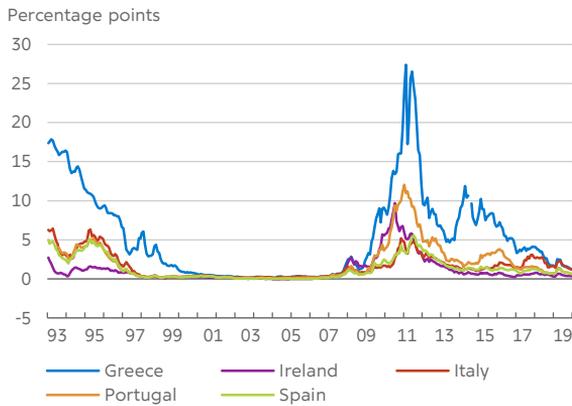


Note: Balance of the current account of the balance of payments.

Source: IMF, World Economic Outlook Database.

**Very low long-term government yield spreads to Germany in the mid-2000s**

Chart 5.3



Note: 10-year government bond yield spreads to Germany.

Source: DBnomics database and ECB.

Imbalances in some euro area member states should be seen in the context of developments in the pre-crisis years. The changeover to the euro in 1999 removed the intra-euro area exchange rate uncertainty, and yield spreads between euro area member states were largely eliminated. Subsequently, differences in the sustainability of the individual countries' public finances were not reflected in long-term government bond yields to any great extent in the pre-crisis years – not even in the countries with the most severe macroeconomic imbalances, which were hit the hardest by the sovereign debt crisis, see chart 5.3.<sup>2</sup> So, in principle, countries with macroeconomic imbalances had longer time to address the issues before the imbalances were reflected in risk premia on long-term yields. Nor was there any increase in short-term interest rates, which were now determined by monetary policy for the euro area as a whole. But the improved framework for correcting imbalances was not used, and the euro area systems for overseeing and preventing government budget deficits and other macroeconomic imbalances proved insufficient. This was part of the reason why the imbalances were allowed to accumulate to a substantial level.

### **The sovereign debt crisis sparked fears of a euro area break-up**

In autumn 2009, turmoil in European government bond markets escalated.<sup>3</sup> In October 2009, the incoming Greek government drastically revised Greece's budget deficit upwards. In the following months, this resulted in a gradual and significant widening of the Greek yield spread to Germany, and international credit rating agencies downgraded Greece's credit rating. Ratings of several other debt-ridden European countries were also downgraded in 2009 and early 2010.

In April 2010, Greece requested international financial assistance, and in early May Greece, the International Monetary Fund (IMF) and the euro area member states agreed on a debt relief package.<sup>4</sup> However, the announcement of the Greek debt relief package was not enough to calm the market turmoil. The government bond market crisis spread to a number of other European countries that saw their access to market-based funding dry up. In November 2010, Ireland had to request international financial assistance, and in the following years international loan programmes were also needed for Portugal and Cyprus, and financial assistance from euro area member states was required to recapitalise the Spanish banking sector. Moreover, further international assistance was

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2 See Kim Abildgren, David Altenhofen, Nicolaj Hamann Christensen, Jacob Wellendorph Ejsing, Signe Skovgaard Hansen, Jane Lee Lohff, Lars Risbjerg, Susanne Hougaard Thamsborg and Casper Ristorp Thomsen, Long-term yield spreads to Germany, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,1), March 2013.

3 See Søren Lejsgaard Autrup, Jacob Wellendorph Ejsing and Uffe Mikkelsen, The crisis in European sovereign debt markets, *Danmarks Nationalbank Monetary Review*, Vol. 49(4), December 2010. For a calendar of key events during the sovereign debt crisis, see Signe Skovgaard Hansen, Lars Risbjerg and Susanne Hougaard Thamsborg, Yield spreads and announcement of policy initiatives and credit ratings, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,2), March 2013.

4 See *Danmarks Nationalbank Monetary Review 2nd quarter 2010*.

needed for Greece, along with a write-down of the principal of private (but not public) creditors' share of the Greek government debt.<sup>5</sup>

During the sovereign debt crisis, there were indications that the high yield spreads of debt-ridden countries to Germany were partly attributable to fears of euro area break-up among some investors.<sup>6</sup> If a country were to leave the euro area to subsequently let its new currency depreciate against the euro, investors in that country's previously issued euro bonds would stand to suffer a loss if its euro bonds were forcibly converted into the new currency using the exchange rate at the time of its exit from the euro area. In the years 2010-11, these fears were reflected in a significant positive spread between yields on Italian government bonds issued under domestic law and yields on bonds issued under international law by ENEL, the partly government-owned Italian energy company. This yield spread was negative before the sovereign debt crisis. The change from a negative to a positive spread during the crisis reflected expectations that, in principle, a sovereign issuer could redenominate the currency of a bond subject to domestic law into another currency than initially agreed, while this could be considerably more difficult for bonds issued under international law.<sup>7</sup>

In May 2010, as part of the pan-European management of the sovereign debt crisis, the euro area member states created the European Financial Stability Facility, a temporary crisis resolution mechanism, which was later gradually replaced by the permanent facility the European Stability Mechanism. Also in May 2010, the European Central Bank (ECB) introduced the first in a number of programmes for the purchase of government bonds issued by euro area member states with a high yield spread to Germany.<sup>8</sup>

At the end of June 2012, an agreement was reached to set up a single supervisory authority, and in a speech held on 26 July 2012, Mario Draghi, President of the ECB, said that, within its mandate, the ECB was ready to

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5 See Uffe Mikkelsen and Søren Vester Sørensen, Write-down of Greek debt and new EU/IMF loan programme, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012; Anne Brolev Marcussen and Louise Funch Sørensen, The process towards an EU/IMF loan programme and a debt restructuring, *Danmarks Nationalbank Monetary Review*, Vol. 51(4,1), December 2012.

6 See Phoebus Athanassiou, Withdrawal and expulsion from the EU and EMU. Some reflections, *ECB Legal Working Paper Series*, No. 10, December 2009; Charles Proctor, The euro – fragmentation and the financial markets, *Capital Markets Law Journal*, Vol. 6(1), March 2011; Jens Nordvig, The Eurozone breakup debate: Uncertainty still reigns, *VoxEU*, 6 November 2012.

7 See Nicolaj Hamann Christensen and Jacob Wellendorph Ejning, Decomposing government yield spreads into credit and liquidity components, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,2), March 2013.

8 It was questioned whether the ECB's programme for the purchase of government bonds in secondary markets from 2012 (the Outright Monetary Transactions (OMT) programme) was compatible with the Treaty of European Union (TEU), including the monetary financing prohibition. In June 2015, following a request by the German Federal Constitutional Court, the Court of Justice of the European Union ruled that the ECB's OMT programme was compatible with the Treaty of European Union, see case no. C-62/14 of 16 June 2015.

do whatever it took to preserve the euro. In the financial markets, this speech was a turning point in market confidence in the management of the sovereign debt crisis, contributing to large reductions in the yield spreads of debt-ridden countries to Germany.

#### On “whatever it takes”

“When people talk about the fragility of the euro and the increasing fragility of the euro, and perhaps the crisis of the euro, very often non-euro area member states or leaders underestimate the amount of political capital that is being invested in the euro.

(...)

Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough.”

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Quote from speech by Mario Draghi, President of the ECB, at the Global Investment Conference in London, 26 July 2012.

#### **Pressure for a stronger krone led to negative monetary policy interest rates for the first time in Danmarks Nationalbank’s 200 year history**

In the 2nd half of 2011 and the 1st half of 2012, at the peak of the sovereign debt crisis, the Danish krone appreciated against the euro. This was remarkable compared with earlier periods of financial turmoil. Since the introduction of the fixed exchange rate policy in the early 1980s, the trend had typically been for the krone to depreciate against its anchor currency in case of turmoil in international financial markets.<sup>9</sup> Most recently, this had been the case during the 2008 financial crisis when the Danish krone, like other small currencies, came under pressure.

During the sovereign debt crisis, capital generally tended to flow extensively from euro area peripheral countries to core countries and highly rated non-euro area countries. This generated strong foreign demand for Danish government and mortgage bonds, and there were indications that some investors regarded Danish krone assets as a safe haven that could be used for hedging against the risk of a euro break-up. The mindset behind this demand was that – due to a decades-long tradition of a reliable fixed exchange rate against Germany – the Danish krone would appreciate in this scenario and be pegged to the strong part of the euro area with German participation.

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9 See Danmarks Nationalbank, *Danish Government Borrowing and Debt 2012*; Anders Jørgensen, Christoffer C. Larsen and Lars Risbjerg, Was the krone a safe haven during the sovereign debt crisis?, *Danmarks Nationalbank Monetary Review*, Vol. 52(2,1), June 2013; Nicolaj Hamann Christensen and Jacob Wellendorph Ejsing, Decomposing government yield spreads into credit and liquidity components, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,2), March 2013.

## On the Danish krone as a safe haven in 2011-12

“In the turbulent period in the wake of the financial crisis and the subsequent government debt crisis, Denmark became known as a “safe haven” among international investors. The Danish government has maintained its triple-A rating, at times capital inflows into Denmark have been sizeable, and both interest rates and the yield spread to Germany reached historically low levels. In fact, the yield spread to Germany was even negative for a while. Presumably no-one could have imagined that before the crisis. And if Denmark’s economic policy had not enjoyed a high degree of credibility, it would not have been possible.”

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Quote from Governor Lars Rohde’s speech at the Auditors’ Day 2013, 26 September 2013.

The pressure on the krone to appreciate during the sovereign debt crisis was also reflected in the krone/euro currency options market that saw increased interest in the purchase of options entitling the holder to buy kroner against euro at a predetermined exchange rate.

The strong demand pressure for Danish bonds caused interest rates to decline and the 10-year yield spread between Denmark and Germany to narrow, falling from about 0.2 to -0.2 percentage points in the 2nd half of 2011.<sup>10</sup> Due to the methodology used to calculate pension companies’ excess capital adequacy, the demand pressure challenged the Danish pension sector. The value of pension company liabilities was calculated based on the Danish Financial Supervisory Authority’s discount curve, and because of the significance of Danish interest rates to the discount curve, the decline in interest rates and the narrowing of the yield spread between Denmark and the euro area led to greater increases in pension company liabilities than in pension company assets. This reduced pension companies’ excess capital adequacy and incentivised them to sell euro bonds and buy Danish bonds. Viewed in isolation, the shift towards Danish bonds contributed to pushing Danish bond yields down even further, amplifying the pressure for appreciation of the krone. To prevent unintended and self-reinforcing market dynamics, with potential negative implications for pension savers, parts of the regulation of pension companies (including the discount curve) were adjusted at the end of 2011.

To counter the krone appreciation trend, Danmarks Nationalbank bought foreign exchange worth about kr. 90 billion during the period from August 2011 to June 2012. Moreover, Danmarks Nationalbank reduced its monetary policy interest rates on several occasions, both as a result of the ECB’s interest rate cuts and unilaterally to reduce the monetary policy interest

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<sup>10</sup> See Danmarks Nationalbank, *Danish Government Borrowing and Debt 2011*; Paul Lassenius Kramp, Jane Lee Lohff and Jens Pagh Maltbæk, Pension savings, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012.

rate spread between Denmark and the euro area. The spread between the key policy rates of Danmarks Nationalbank and the ECB turned negative in November 2011, reaching -0.55 percentage points in early June 2012.

On 6 July 2012, Danmarks Nationalbank reduced its CD rate to -0.20 per cent. The interest rate cut coincided with an ECB interest rate cut, entailing that the spread between Danish and euro area monetary policy interest rates remained unchanged. But for the first time in Danmarks Nationalbank's 200 year history, one of its interest rates turned negative. In a global context, this was also the first time a central bank cut its key policy rate into negative territory.<sup>11</sup>

The negative CD rate swept away any doubts about Danmarks Nationalbank's willingness to introduce negative monetary policy interest rates in its defence of the Danish krone, and the pressure for a krone appreciation abated following the transition to negative interest rates. However, another background factor was much stronger confidence in the ability to manage the European sovereign debt crisis following the statement by the President of the ECB in late July 2012 that, within its mandate, the ECB would do "whatever it took" to preserve the euro.

### **On the introduction of negative monetary policy interest rates in 2012**

"On 6 July 2012, Danmarks Nationalbank reduced the rate of interest on certificates of deposit to minus 0.2 per cent. (...) In other words, banks and mortgage banks must pay to hold liquidity at Danmarks Nationalbank; a situation that is unique in both a historical and an international context."

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Quote from Governor Lars Rohde's speech at the Auditors' Day 2013, 26 September 2013.

Some market rates had already turned negative before the CD rate entered negative territory. For instance, short-term Danish T-bill rates were negative at the end of 2011 following strong demand from foreign investors, and Danish money market interest rates and yields to maturity on Danish government bonds with a maturity of up to 3 years were also negative in the period leading up to Danmarks Nationalbank's interest rate reduction in July 2012.

In the months preceding the transition to a negative CD rate, Danmarks Nationalbank had been preparing its monetary policy counterparties for a potential situation of negative monetary policy interest rates if needed due to the fixed exchange rate policy. Already in the 1st half of February 2012, Danmarks Nationalbank posted a technical description of how to manage

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<sup>11</sup> See Anders Jørgensen and Lars Risbjerg, Negative interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 51(3,1), September 2012.

potentially negative monetary policy interest rates on its website, see box 5.1, and the financial sector was informed directly afterwards. Danmarks Nationalbank published this description to enable its counterparties to ensure that IT systems and business procedures were able to manage a situation of negative monetary policy interest rates. A description of Danmarks Nationalbank's instruments for managing a situation of negative monetary policy interest rates was also included in Danmarks Nationalbank's Monetary Review 2nd quarter 2012, published in mid-June 2012.<sup>12</sup>

**Technical description of the management of potentially negative monetary policy interest rates**

Box 5.1

"Technically, it is possible to obtain negative interest rates with the existing monetary-policy instruments. In exceptional circumstances it may be necessary for Danmarks Nationalbank to lower the rate of interest on certificates of deposit so that it becomes negative. Such a scenario would imply that the current-account rate will be higher than the rate of interest on certificates of deposit and the current-account limits will be revised upward. If the total current-account deposits exceed the overall limit, Danmarks Nationalbank will convert the current-account deposits into certificates of deposit."

Source: Danmarks Nationalbank's website, 10 February 2012.

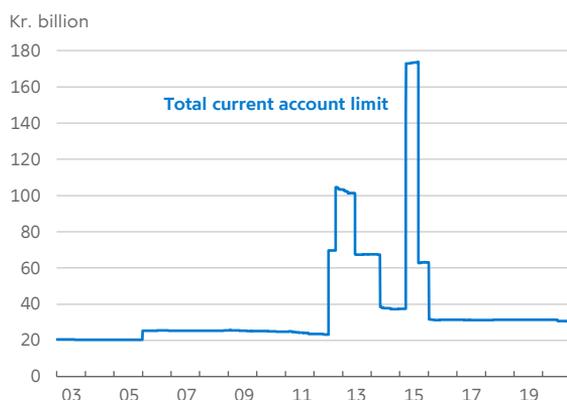
As a whole, monetary policy counterparties had a substantial need to place liquidity with Danmarks Nationalbank in mid-2012, entailing that the CD rate was a key determinant of short-term money market interest rates, and, by extension, the exchange rate of the krone. When the CD rate was lowered into negative territory in July 2012, the current account rate was maintained at 0 per cent. At the same time, the total current account limit was increased from kr. 23 billion to kr. 70 billion, see chart 5.4. The increase of the current account limit reduced the interest cost imposed on monetary policy counterparties as a result of the negative CD rate. The current account limits were to prevent the build-up of large current account deposits at Danmarks Nationalbank that could be used by counterparties for speculation in interest and exchange rate changes. However, in a situation of pressure for a krone appreciation, increasing the current account limits did not constitute a problem in relation to the fixed exchange rate policy as long as the certificate of deposit placement need was sufficient to ensure pass-through from the CD rate to money market interest rates. The current account limits were also temporarily significantly increased in connection with Danmarks Nationalbank's provision of 3-year loans to monetary policy counterparties in autumn 2012.<sup>13</sup>

12 See box 4, *Technical aspects of negative monetary-policy interest rates*, Danmarks Nationalbank Monetary Review 2nd quarter 2012.

13 See Danmarks Nationalbank, *Report and Accounts 2012*; Danmarks Nationalbank, *Report and Accounts 2013*.

### Current account limits were increased at the transition to negative monetary policy interest rates in July 2012

Figur 5.4



Source: Kim Abildgren, Nicolaj Albrechtsen, Mark Strøm Kristoffersen, Søren Truels Nielsen and Rasmus Tommerup, The short-term Danish interbank market before, during and after the financial crisis, *Danmarks Nationalbank Working Paper*, No. 99, November 2015; Danmarks Nationalbank's website.

In late April 2014, Danmarks Nationalbank raised the CD rate back into positive territory after close to two years of negative rates. This interest rate rise followed in the wake of a couple of months with a tendency for the krone to depreciate and foreign exchange intervention sales from the foreign exchange reserve. With the return to a positive CD rate, the aggregate limit for monetary policy counterparties' current account deposits with Danmarks Nationalbank was lowered, and minor adjustments were made to the principles governing the allocation of individual current account limits to monetary policy counterparties.<sup>14</sup>

But the CD rate had only a brief return back into positive territory. In early June 2014, the ECB lowered its deposit facility rate to -0.10 per cent, marking the first time an ECB interest rate turned negative. Danmarks Nationalbank maintained its monetary policy interest rates, but lowered its CD rate below zero again in early September 2014 following another ECB interest rate cut.<sup>15</sup>

### The sovereign debt crisis led to an EU Fiscal Compact, which was incorporated into the Danish Budget Act

The sovereign debt crisis revealed a need to strengthen general economic governance in the EU. Specifically, this resulted in initiatives for stronger

<sup>14</sup> See *Danmarks Nationalbank Monetary Review 2nd quarter 2014*.

<sup>15</sup> See *Danmarks Nationalbank Report and Accounts 2014*.

oversight of macroeconomic imbalances and the adoption of a fiscal compact.<sup>16</sup> Another initiative was the establishment of the banking union, see chapter 7.

### **On the importance of stronger oversight of macroeconomic imbalances**

“The euro area systems for monitoring and addressing government deficits and other macroeconomic imbalances proved to be completely inadequate. This was one of the reasons why the imbalances were allowed to develop – and to become much more serious than they had been ahead of the crisis in the early 1990s.”

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Quote from Governor Lars Rohde's speech at the European Affairs Committee consultation *The European Crisis and the Development of the European Union*, 26 February 2013.

Late 2011 saw the adoption of a new procedure for preventing and correcting macroeconomic imbalances in EU member states. Under the new procedure, an annual report had to be prepared to the European Council on the development of a number of internal and external economic imbalance indicators such as the current account, external debt, unit labour costs, public and private sector debt and house prices. A procedure could be launched to correct severe imbalances, obliging the member states in question to submit detailed plans for how to reduce their macroeconomic imbalances. Ultimately, sanctions could be imposed on euro area member states that failed to meet the Council's deadlines for reducing imbalances. Similarly to the Stability and Growth Pact<sup>17</sup>, the sanction provisions did not apply to non-euro area EU member states.

The strengthened cooperation also led to a number of measures to ensure that any fiscal challenges were addressed and that fiscal room for manoeuvre was created to facilitate fiscal accommodation when the economy was affected by cyclical downturns.

Firstly, in autumn 2011, operationalisation of the debt requirements of the Stability and Growth Pact was adopted. These requirements provided that countries with government debt exceeding 60 per cent of GDP had to

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16 See Thomas Pihl Gade and Jesper Ulriksen Thuesen, Strengthened economic governance in the EU, *Danmarks Nationalbank Monetary Review*, Vol. 49(4), December 2010; Jens Bech Agerholm, Uffe Mikkelsen and Karoline Garm Nissen, Fiscal policy in the EU – what have we learned from the crisis?, *Danmarks Nationalbank Monetary Review*, Vol. 51(2,1), June 2012; Kim Abildgren and Sune Malthé-Thagaard, A comparison of the ERM crisis in the early 1990s with recent years' financial and sovereign debt crisis in Europe, *Danmarks Nationalbank Monetary Review*, Vol. 51(4,1), December 2012.

17 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-Schultz Grafisk, 2010.

reduce the gap between the actual debt level and the 60 per cent of GDP by one-twentieth annually.

Secondly, in December 2011, it was decided to strengthen fiscal rules for euro area member states with a Fiscal Compact. Non-euro area EU member states could choose to adopt the Fiscal Compact. With the Fiscal Compact, member states committed to introducing a statutory fiscal rule, limiting the general government sector structural budget deficit to a maximum of 0.5 per cent of GDP (1 per cent of GDP for low-debt member states with sustainable public finances). Also, a mechanism would be introduced to ensure automatic correction of any excessive deficits.

### On whether Denmark should adopt the Fiscal Compact

“Being a small country with an open economy, we will, at any rate, have to observe the standards it sets for responsible budget policy. Irrespective of the fiscal compact, a Danish Budget Act is forthcoming that is to prevent overspending year after year. It is long overdue.

(...)

It is in our own interest to comply with the obligations we are now essentially taking on. That gives us greater freedom to determine our own policies. At the same time, we are signalling to the world that Denmark wishes to remain committed to stability-oriented economic policy.”

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Quote from Governor Nils Bernstein’s speech at the hearing on the fiscal compact conducted by the European Affairs Committee, 9 February 2012.

Denmark opted to adopt the Fiscal Compact, and the fiscal rule was incorporated into the Danish Budget Act adopted by a majority of the members of the Folketing (Danish parliament) in spring 2012. Under the Budget Act, expenditure cap provisions were imposed on the central government, municipalities and regions, along with the possibility of imposing economic sanctions on municipalities and regions for exceeding expenditure caps.<sup>18</sup>

In 2020, the European Commission published a review of the EU’s fiscal regulations. The review emphasised that, in general, EU member states had reduced their debts in the pre-corona years, but their progress in ensuring sustainable public finances varied greatly.<sup>19</sup>

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18 See Pernille Bomholdt Nielsen and Morten Hedegaard Rasmussen, Public expenditure management in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 51(2,1), June 2012; Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

19 Ministry of Finance, *Erfaringer med budgetloven 2014-2020 (in Danish only)*, April 2022; European Commission, *Economic governance review*, COM (2020) 55 final, 5 February 2020.



## The 2015 krone crisis and life with negative interest rates

In January 2015, massive amounts of foreign exchange flowed into Denmark, causing pressure for the Danish krone to appreciate. The foreign exchange inflows were driven by financial market expectations that the European Central Bank (ECB) would ease its monetary policy stance and by the Swiss central bank scrapping the limit on the Swiss franc's strength against the euro. This induced some investors to buy Danish kroner in the expectation that Denmark would abandon its fixed exchange rate policy, which would cause the krone to appreciate.

Danmarks Nationalbank bought foreign exchange worth kr. 275 billion in January and February to stabilise the exchange rate of the krone – a new record. Moreover, the certificate of deposit (CD) rate was reduced in stages to -0.75 per cent, an unprecedented low level. Also, the issuance of Danish government bonds was suspended, pushing down long-term interest rates. In late February, the foreign exchange inflows stopped, and in April 2015 Danmarks Nationalbank resumed foreign exchange sales.

In the years following the krone crisis, Danmarks Nationalbank's CD rate was negative, and it was still in negative territory at the end of 2020. Gradually, this passed through to other interest rates in the Danish economy, and companies, and later also households, were charged negative rates on bank deposits. Structurally low interest rates became the new normal – at least for a number of years.

In the years following the financial crisis, Danish money market turnover declined, creating the need for a new transaction-based reference rate, calculated using the principles and methodology applied to a corresponding new euro area reference rate. Danmarks Nationalbank became the owner and administrator of the new Danish rate, launched in 2022.

### **Strong krone pressure following expansion of ECB asset purchase programme and new Swiss foreign exchange policy**

January 2015 saw massive foreign exchange inflows to Denmark and pressure for the krone to appreciate against the euro.<sup>1</sup>

These inflows were driven by e.g. financial market expectations that the ECB would expand its asset purchase programme for government bonds to put downward pressure on euro area interest rates. As a result, in the latter part of 2014 and early 2015, large amounts of capital flowed to Switzerland, among other countries, which had been imposing a temporary limit on the Swiss franc's strength against the euro since 2011. These capital inflows put pressure on the Swiss franc to appreciate.

On 15 January 2015, the Swiss central bank announced that it was scrapping its temporary limit on the Swiss franc's strength against the euro. Already on the same day, this announcement resulted in increased foreign exchange inflows to Denmark, making the krone appreciate against the euro. The announcement of the new Swiss foreign exchange policy prompted some foreign investors to purchase Danish kroner in the expectation of realising a profit or avoiding a loss if Danmarks Nationalbank also abandoned the Danish fixed exchange rate policy, with a subsequent appreciation of the krone.

The ECB announced the expansion of its asset purchase programme on 22 January 2015, and measures were more extensive than anticipated by the market. This also contributed to increased demand for Danish kroner and pressure on the krone to appreciate against the euro.

Nearly two thirds of the increased demand for kroner in January and February came from domestic market participants. Danish insurance and pension companies accounted for much of the increased demand for kroner. Overall, these companies forward purchased kroner against foreign exchange (particularly euro) to hedge against some of the risk of a krone appreciation. And in January 2015 alone, the pension sector's overall hedging of euro exposures increased by five percentage points.<sup>2</sup> But the modus operandi of pension companies differed widely. While some companies increased their euro exposures, others reduced theirs, and overall only about 20 per cent of the pension sector's euro exposures were hedged.

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1 See *Danmarks Nationalbank Report and Accounts 2015*; *Danmarks Nationalbank Monetary Review 1st quarter 2015*; *Danmarks Nationalbank Monetary Review 2nd quarter 2015*; *Danmarks Nationalbank Danish Government Borrowing and Debt 2015*; *Danmarks Nationalbank Financial stability 1st half 2015*; *Danmarks Nationalbank, The Danish krone under pressure in January-February 2015*, *Danmarks Nationalbank Monetary Review 1st quarter 2015*.

2 See Jakob Roager Jensen, Anders Larsen and Martin Dencker Raffnsøe, The pension sector as a foreign exchange market participant, *Danmarks Nationalbank Monetary Review*, Vol. 55(4), December 2016.

## **On pension companies' positioning against Danish kroner in January and February 2015**

"However, nearly two thirds of the increased demand for kroner in January and February came from domestic market players, including insurance companies and pension funds. They have to some extent wished to insure themselves against losses in the event that the krone appreciated like the Swiss franc. This was done by way of hedging. You might say that the pension funds bought insurance policies of no value as abandoning the fixed exchange rate policy has never been on the agenda. Obviously it is entirely up to the pension funds and life insurance companies how they wish to place their funds. But nevertheless it is a shame if individual pension savers are forced to bear unnecessary costs."

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Quote from Governor Lars Rohde's speech at the Annual Meeting of the Danish Mortgage Banks' Federation, 25 March 2015.

## **Unprecedented interventions and even lower interest rates**

In January and February 2015, Danmarks Nationalbank purchased foreign exchange against kroner for kr. 275 billion to reduce the pressure on the krone. This was a new record, and in late February the foreign exchange reserve reached kr. 737 billion, up from kr. 447 billion at the end of 2014.

Moreover, from 20 January, Danmarks Nationalbank reduced the CD rate in stages, making it less attractive to place funds in Danish kroner. On 6 February, the CD rate reached a record low of -0.75 per cent. The current account rate was maintained at 0 per cent.

The CD rate reductions caused Danish short-term interest rates, in particular, to decrease. To further curb foreign exchange inflows, on 30 January, the Danish Ministry of Finance – on the recommendation of Danmarks Nationalbank – decided to temporarily suspend the issuance of Danish government bonds. The suspended issuance pushed down Danish government bond yields even further, making them less attractive. The impact constituted a parallel to the ECB's asset purchase programme, which reduced the effective market supply of government bonds in the euro area. The suspended issuance of Danish government bonds was an exceptional measure, but the balance on the central government's account with Danmarks Nationalbank was large enough for the central government to manage a prolonged period without raising loans.

In the latter part of February, the foreign exchange inflows stopped, and in March the monetary policy counterparties' total current account limit was increased considerably, allowing them to place more of their deposits with Danmarks Nationalbank at a zero rate (the current account rate) rather than a negative rate (the CD rate). Counterparty placement needs with Danmarks Nationalbank had increased sharply following Danmarks Nationalbank's massive foreign exchange purchases in January and February. The increase of the current account limit reduced the interest expense imposed on monetary policy counterparties by a negative CD

rate, and even after the increase counterparties' CD placement need was substantial. This placement need ensured the pass-through from the CD rate to money market interest rates.<sup>3</sup>

### **On no upper limit on the size of the foreign exchange reserve**

“In January-February, capital flows were larger than in previous episodes when the krone has been under pressure. While the interest rate typically is the most important instrument in a situation where the krone tends to weaken, intervention in the foreign exchange market potentially plays a larger role when capital is flowing into the country. In that situation there is no upper limit to the amount that Danmarks Nationalbank can make available in kroner.”

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Quote from Governor Lars Rohde's speech at the Annual Meeting of the Association of Danish Mortgage Banks, 1 October 2015.

In April, Danmarks Nationalbank resumed foreign exchange sales, and between April and August Danmarks Nationalbank sold foreign exchange worth kr. 191 billion.

On 26 August, Danmarks Nationalbank announced that extraordinary measures were no longer needed and that the Ministry of Finance, on the recommendation of Danmarks Nationalbank, had decided to resume the issuance of Danish government bonds starting on 1 October 2015.<sup>4</sup> Moreover, the current account limit was significantly reduced.<sup>5</sup>

Viewed in isolation, the 2015 pressure on the krone generated additional revenue of just over kr. 2 billion to Danmarks Nationalbank.<sup>6</sup> Kr. 0.8 billion of this amount was attributable to the subsequent sale at a profit of the foreign exchange Danmarks Nationalbank bought in January and February.

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3 See Danmarks Nationalbank, *Monetary Review 2nd quarter 2015*.

4 The 2015 suspension of issuance temporarily reduced liquidity in the government bond market. Therefore, Danmarks Nationalbank introduced several liquidity supporting measures under the central government debt policy such as swap auctions. Moreover the Danish government's primary dealer scheme was adjusted and more thoroughly reviewed in 2017, see *Danmarks Nationalbank Danish Government Borrowing and Debt 2015*; *Danmarks Nationalbank Danish Government Borrowing and Debt 2016*; *Danmarks Nationalbank Danish Government Borrowing and Debt 2017*; Johanne Dinesen Riishøj and Jonas Staghøj, Enhanced requirements and payments are to strengthen the Danish government securities market, *Danmarks Nationalbank Analysis*, No. 2, January 2017; Jens Bang-Andersen, New primary dealer model continues in 2018, *Danmarks Nationalbank Analysis*, No. 26, December 2017.

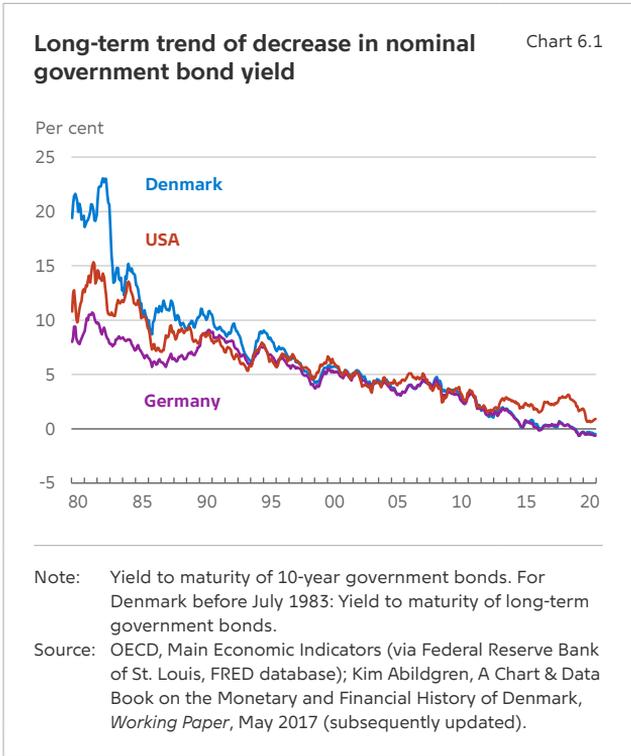
5 See Danmarks Nationalbank's press release *Resumption of government-bond issuance and reduction of the current-account limits*, 26 August 2015.

6 See Danmarks Nationalbank, The pressure on the krone gave Danmarks Nationalbank a profit of dkk 2 billion, *News from Danmarks Nationalbank*, 1st quarter, No. 1, 2016.

The remaining portion of the additional revenue was derived from the negative yield spread between Denmark and the euro area, entailing that the foreign exchange could be placed at higher interest rates than the interest on the increased krone deposits with Danmarks Nationalbank resulting from the foreign exchange interventions. So, speculation against the krone was loss-making for the market as a whole.

**A new world of negative nominal interest rates**

Many countries experienced a general fall in nominal interest rates in the wake of the financial crisis, see chart 6.1.



This fall was driven, in part, by the accommodative monetary policies pursued by central banks to stimulate demand during a period of spare capacity in the economy and inflation below the inflation targets of central banks. But analyses also suggested that the fall reflected a continuation of a more protracted trend towards lower natural real interest rates, already evidenced before the financial crisis.<sup>7</sup> The natural real interest rate is the (unobservable) real interest rate consistent with both low

<sup>7</sup> See Jesper Pedersen, The Danish natural real rate of interest and secular stagnation, *Danmarks Nationalbank Working Paper*, No. 94, March 2015; Jakob Adolfsen and Jesper Pedersen, The natural real interest rate in Denmark has declined, *Danmarks Nationalbank Analysis*, No. 13 June 2019; Governor Lars Rohde’s presentation (in Danish only) at Insurance & Pension Denmark’s member meeting, 11 January 2022.

and stable inflation and output equalling its potential. The structural fall in the natural real interest rate was the result e.g. of lower productivity growth, lower growth in the labour force due to the aging population, an increase in savings due to higher life expectancy and a higher propensity to save in emerging market economies such as China and a number of other countries, especially in Asia. Temporary factors also played a part, for instance increased demand for safe assets following the uncertainty caused by the financial crisis. The lower the natural real interest rate, the lower central bank monetary policy interest rates had to be to stimulate the economy. In several countries, monetary policy interest rates moved into negative territory.

A world of negative nominal interest rates was uncharted territory, raising a number of questions about the impact on the economy and the financial system. How did low and negative interest rates affect the behaviour of households and companies? What was their effect on bank business models? Did negative interest rates lead to increased risk-taking and a build-up of risks in the financial system? To what extent would the economy be stimulated by the lowering of monetary policy interest rates into negative territory? These were some of the focus issues of the work of both Danmarks Nationalbank and the Systemic Risk Council.

### **On negative monetary policy interest rates and the decline in the natural real interest rate**

“We are currently facing a situation of structurally low interest rates at the European level – a situation that is likely to persist for quite some time yet. This affects the entire financial sector, including banks and central banks. Under Danmarks Nationalbank’s regime, Danish banks are exempted from negative interest rates up to a certain amount. But I will emphasise that exempting Danish banks from structurally low interest rates is not Danmarks Nationalbank’s responsibility.”

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Quote from Governor Lars Rohde’s speech (in Danish only) at Finance Denmark’s Director Conference, 2 September 2019.

Before the introduction of negative monetary policy interest rates by Danmarks Nationalbank and other central banks, it was a widely held belief that nominal interest rates could not turn negative. The mindset was that banks, investors, companies and households would prefer holding cash rather than accepting negative interest rates on, for instance, bank deposits and securities placements.<sup>8</sup> But in practice, using bank deposits and securities as stores of value and bank deposits

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<sup>8</sup> See Niels Blomquist, Niels Arne Dam and Morten Spange, Monetary-policy strategies at the zero lower bound on interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 50(4,1), March 2011; Anders Jørgensen and Lars Risbjerg, Negative interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 51(3,1), September 2012.

for payments rather than cash has advantages. Transporting, storing, handling and insuring large cash holdings involve costs and risks, and in many payment situations electronic payment instruments relying on bank deposits are far more convenient than cash, especially for large-value payments. Banks, investors, companies and households may be willing to pay for these advantages by accepting some level of negative interest rates.

#### *Negative money market interest rates*

Danmarks Nationalbank's CD rate was well below zero for a number of years after the 2015 krone crisis, which gradually passed through to other interest rates in the Danish economy.<sup>9</sup> The pass-through to money market interest rates occurred instantly, which was key in the management of the exchange rate of the krone. The wide spread between Danmarks Nationalbank's CD rate and current account rate caused the day-to-day rate to fluctuate. These fluctuations were technical in nature: they were not the result of variations in liquidity supply and demand. This was a well-known phenomenon previously observed during periods of wide spreads between the two rates (and a positive CD rate).<sup>10</sup> After Danmarks Nationalbank's transition to daily open market operations in CDs in February 2017, the trajectory of the day-to-day rate became much more stable, see box 6.1.<sup>11</sup>

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9 See Carina Moselund Jensen and Morten Spange, Interest rate pass-through and the demand for cash at negative interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 54(2), June 2015; Søren Lejsgaard Autrup, Rasmus Kofoed Mandsberg and Lars Risbjerg, Pass-through from Danmarks Nationalbank's interest rates to the banks' interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 55(2), June 2016; *Danmarks Nationalbank Financial stability 2nd half 2016*; Jakob Feveile Adolfsen and Morten Spange, Positive pass-through from negative rates, *Danmarks Nationalbank Analysis*, No. 5, April 2020.

10 See Allan Bødskov Andersen, Volatility in the overnight money-market rate, *Danmarks Nationalbank Monetary Review*, Vol. 43(4), December 2004.

11 To further reduce fluctuations in money market interest rates, Danmarks Nationalbank changed its monetary policy instruments, effective from 19 March 2021, see Danmarks Nationalbank's press release *Technical adjustments of the monetary policy instruments*, 11 March 2021; Danmarks Nationalbank, Technical adjustment of the monetary policy instruments, *Danmarks Nationalbank Analysis*, No. 5, March 2021. The spread between the CD rate and the current account rate narrowed from -0.60 to 0.00 percentage points when both rates were changed to -0.50 per cent. Moreover, current account deposit limits were suspended, allowing monetary policy counterparties to place their entire deposits with Danmarks Nationalbank in a current account at the same rate as when placing funds in CDs. As a result, daily open market operations in CDs were no longer needed to adjust liquidity, so these operations ended on 30 April 2021. Also, the spread between the lending rate and the CD rate was narrowed from 0.65 to 0.15 percentage points by lowering the lending rate to -0.35 per cent. This reduced the potential for money market interest rate fluctuations due to changes in the level of monetary policy counterparties' total net position with Danmarks Nationalbank (that is: CDs and current account deposits less monetary policy loans). The changes of monetary policy instruments were technical only; the purpose was not to impact the level of money market interest rates or the exchange rate of the krone, and, overall, they did not significantly change monetary counterparty interest payments to Danmarks Nationalbank.

## **Transition to daily open market operations in 2017 reduced money market interest rate fluctuations**

Box 6.1

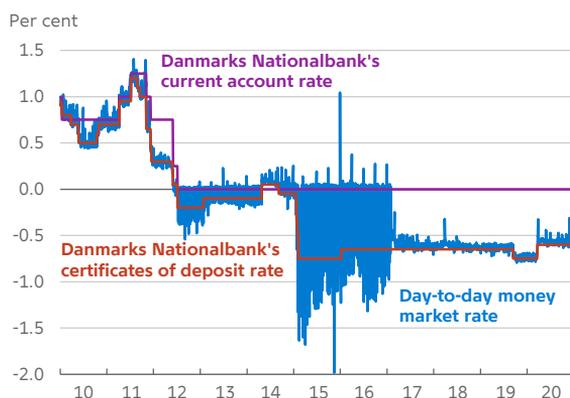
The structure of monetary policy instruments, with weekly open market operations and a spread between the CD rate and the current account rate, led to some technical volatility in the day-to-day money market rate that did not reflect fluctuations in liquidity supply and demand. This was true whether monetary policy interest rates were positive or negative.

In October 2007, both monetary policy interest rates were positive, and the current account rate (at 4.00 per cent p.a.) was slightly lower than the CD rate (at 4.25 per cent p.a.) to incentivise monetary policy counterparties to plan their liquidity needs and actively exchange liquidity on market terms via the money market rather than passively placing liquidity in current accounts at Danmarks Nationalbank. On the first four days of the week, the day-to-day money market rate tended to be close to the current account rate. The explanation was that, on these days, placement of funds in current accounts at Danmarks Nationalbank was the only opportunity for counterparties as a whole to earn interest on excess krone liquidity. But on the last business day of the week, when Danmarks Nationalbank was open for sale of certificates of deposit, the day-to-day money market rate would be somewhat higher than the CD rate, so over a 7-day period, arbitrage equilibrium existed between lending in the day-to-day money market and purchase of Danmarks Nationalbank's certificates of deposit. The arbitrage equilibrium exists because a bank lending liquidity to the money market on a day-to-day basis on the last business day of the week would have to consider that on the first four business days of the following week, liquidity could be expected only to be reinvested in the money market at a rate of interest close to the current account rate (or at the current account rate at Danmarks Nationalbank).

In October 2015, both rates were negative, and the current account rate (at 0.00 per cent p.a.) was higher than the CD rate (at -0.75 per cent p.a.). On the first four days of the week, the day-to-day money market rate still tended to be close to the current account rate. The explanation was that, on these days, placement of funds in current accounts at Danmarks Nationalbank was still the only opportunity for counterparties as a whole to place excess krone liquidity. But on days when Danmarks Nationalbank was open for sale of certificates of deposit, the day-to-day money market rate would be much lower than the CD rate, so over a 7-day period, arbitrage equilibrium existed between lending in the day-to-day money market and purchase of Danmarks Nationalbank's certificates of deposit at a negative rate of interest. The reason was that a bank lending liquidity in the money market on a day-to-day basis on the last business day of the week could consider that on the first four business days of the following week, liquidity could be expected to be reinvested at a rate of interest close to zero in the money market (or with Danmarks Nationalbank). Given the wide spread between the CD rate and the current account rate, volatility in the day-to-day money market interest rate was very high, see the chart in this box.

*Continues...*

### Substantial fluctuations in money market interest rates before 2017



Note: Danmarks Nationalbank's deposit rates and the day-to-day money market rate. Until and including 28 February 2017, the day-to-day rate was the tomorrow-next rate. After this date, pre-DEST (Denmark Short-Term Rate) is applied.

Source: Danmarks Nationalbank and Finance Denmark.

Effective from 1 February 2017 Danmarks Nationalbank introduced daily purchases and sales of certificates of deposit. This followed an extended period during which Danmarks Nationalbank had often needed to conduct extraordinary open market operations to support the smooth exchange of liquidity and avoid exceeding the total current account limit.

With the transition to daily open market operations, the day-to-day money market rate was much closer to the CD rate on all business days. But in connection with bank balance sheet and liquidity dates (at the end of the year, the quarter and the month), major money market interest rate fluctuations still occurred. The continued fluctuations were the result of banks' wish to present a balance sheet to, for instance, investors, authorities and credit rating agencies with the lowest possible risk and the largest possible amount of liquid assets. Consequently, banks were unwilling to provide uncollateralised money market loans with maturities spanning, in particular, the turn of the year without compensation in the form of higher interest rates.

Source: Kim Abildgren, Nicolaj Albrechtsen, Mark Strøm Kristoffersen, Søren Truels Nielsen and Rasmus Tommerup, The short-term Danish interbank market before, during and after the financial crisis, *Danmarks Nationalbank Working Paper*, No. 99, November 2015; Jonas Lundgaard Christensen, Palle Bach Mindested and Lars Risbjerg, Recent money market trends, *Danmarks Nationalbank Monetary Review*, Vol. 53(4), December 2014; Morten Fremmich Andresen, Mark Strøm Kristoffersen and Lars Risbjerg, The money market at pressure on the Danish krone and negative interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 54(4), December 2015; Danmarks Nationalbank, Stable krone and calm money market, *Danmarks Nationalbank Report (Monetary and financial trends)*, No. 2, March 2017.

### *Negative household and corporate rates*

In February 2015, short-term mortgage bond yields turned negative, and already in late February 2015 the Danish tax authorities (SKAT) issued guidelines describing the taxation and deductibility of negative interest, establishing that interest income due to negative interest rates was taxable for borrowers, while interest expenses due to negative interest rates were deductible for lenders.<sup>12</sup>

Banks did not start applying negative interest rates to retail customers on any specific date; both dates and amount limits for negative interest rates varied from bank to bank. Banks charged negative interest rates on corporate deposits already at the beginning of 2015, and two years later about half of corporate deposits were earning negative interest rates, see charts 6.2 and 6.3.

Banks were much more reluctant to pass on negative deposit rates to household customers than to corporate customers. The first household customers only started being charged negative interest rates on bank deposit in late 2019 and early 2020.<sup>13</sup> This difference was not rooted in financial regulation preventing banks from charging negative interest rates to household customers.<sup>14</sup> Rather, the difference reflected fear of negative media publicity and customer flight if a bank started applying negative interest rates to household customers when other banks did not. Also, it may have had an impact that deposits accounted for only part of a total customer exposure. Even for deposit-only customers, the value of a customer relationship could go beyond the immediate liquidity impact of the deposit because the deposit customer could later require other services. Finally, banks may have feared that negative interest rates would cause many customers to cash in their deposits, which could be difficult and costly for banks to handle. So, deposit rates could be impacted by a number of factors that were not directly related to the trajectory of monetary policy interest rates.

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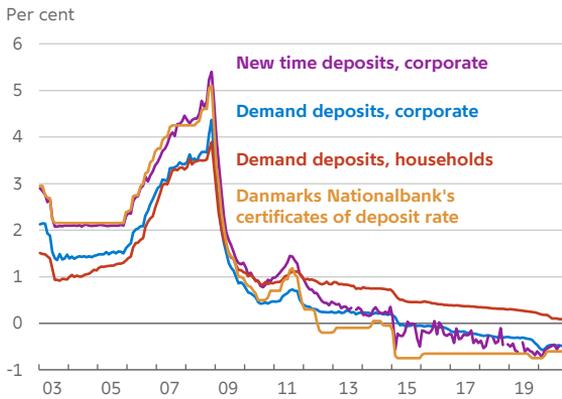
12 See *Danmarks Nationalbank Financial stability 1st half 2015*.

13 See Danmarks Nationalbank, *Stabilisation of financial markets after COVID-19 turmoil, Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 11, June 2020; Danmarks Nationalbank, *Accommodative financial conditions support the real economy, Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 6, March 2021; Rasmus Kofoed Mandsberg, Alexander Meldgaard Otte and Morten Spange, *The response of household customers to negative deposit rates, Danmarks Nationalbank Analysis*, No. 9, April 2021.

14 See The Danish Financial Supervisory Authority's memo on *Negative interest rates on deposit accounts*, 3 February 2020. An outstanding issue existed regarding negative interest rates on basic payment accounts, accounting, however, for just a modest portion of household customer accounts and deposits with banks, see the Danish Financial Supervisory Authority's press release *Comments on TV2's news stories on negative interest rates (in Danish only)*, 3 December 2021; Finance Denmark's news item *Basic payment accounts in relation to focus on negative interest rates (in Danish only)*, 15 December 2021; the Danish Financial Supervisory Authority's memo *Report on the process of negative interest rates (in Danish only)*, 13 January 2022; the Danish Financial Supervisory Authority's press release *The EU Commission's assessment of negative interest rates (in Danish only)*, 17 January 2022; letter from the European Commission to the Danish Financial Supervisory Authority on the subject *Interpretation of the Payment Accounts Directive (PAD) – Negative interest rates*, 13 January 2022.

### Corporate customers started being charged negative interest rates on bank deposits in 2015

Chart 6.2

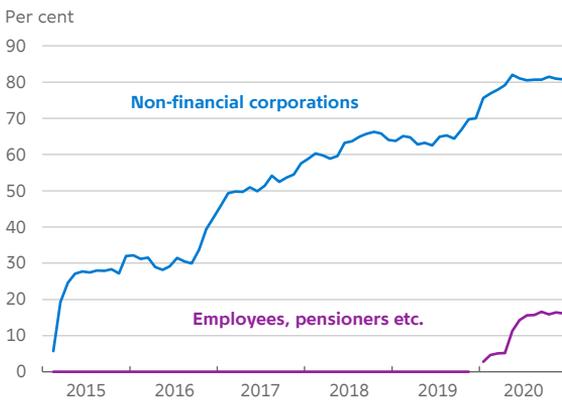


Note: Bank deposit rates and Danmarks Nationalbank's CD rate. *Corporate* is non-financial corporations. *Household* is households (including sole proprietorships). Household demand deposits are stated inclusive of deposits that are offset by the undrawn portion of the limit of, for instance, a mortgage-like bank loan, typically earning interest as loans.

Source: Danmarks Nationalbank.

### Half of all corporate bank deposits were subject to negative interest rates in 2017

Chart 6.3

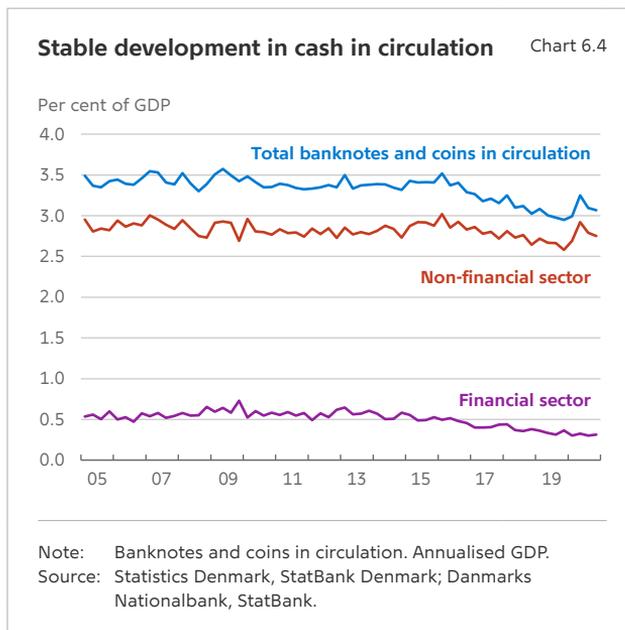


Note: Proportion of bank deposits subject to negative interest rates.

Source: Danmarks Nationalbank, StatBank.

### Cash in circulation in the context of negative interest rates

Demand for cash did not seem to grow either as a result of Denmark's Nationalbank's transition to a negative monetary policy interest rate for most of the period since mid-2012 or as a result of banks' application of negative interest rates to corporate customers from early 2015, see chart 6.4. Following the application of negative interest rates to household customers at the end of 2019 and the beginning of 2020, there were indications of some increase in demand for cash, but this period was also marked by the coronavirus outbreak. During the pandemic, many retailers encouraged customers to pay digitally, and there were periods of lockdowns of parts of society. This may have made it more difficult for households and small businesses to make cash payments, resulting in a temporary accumulation of cash among households and companies. With the decrease in cash payments during the pandemic, companies may, for reasons of cost, also have made less frequent night safe deposits or cash collections, which may, in turn, have contributed to increasing the need for cash in circulation.<sup>15</sup>



### Negative interest rates and bank earnings

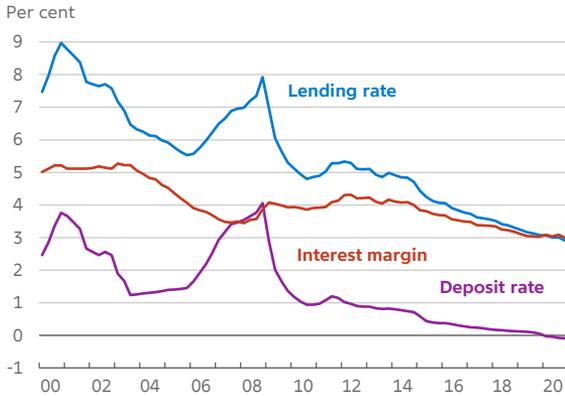
In the years after 2012, banks' net interest income decreased driven by a combination of low and negative interest rates and reluctance among banks to adjust deposit rates, in particular, downwards, see charts 6.5 and 6.6.<sup>16</sup> Conversely, banks' fee income grew (including intermediation

<sup>15</sup> See Jakob Mølgaard Heisel, The use of cash in society, *Danmarks Nationalbank Analysis*, No. 3, March 2022.

<sup>16</sup> See chapter 4 on Negative interest rates and their impact on credit institutions' earnings in *Danmarks Nationalbank Financial stability 1st half 2015*.

### Decline in banks' interest margins after 2012

Chart 6.5

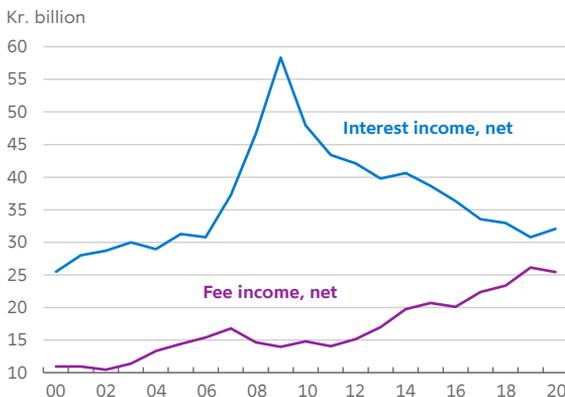


Note: Banks' average rates and interest margins. Weighted interest rates on outstanding transactions with non-financial corporations, general government, households and non-profit institutions serving households.

Source: Kim Abildgren, A Chart & Data Book on the Monetary and Financial History of Denmark, *Working Paper*, May 2017 (subsequently updated).

### Banks earned less interest income but more fee income during the 2010s

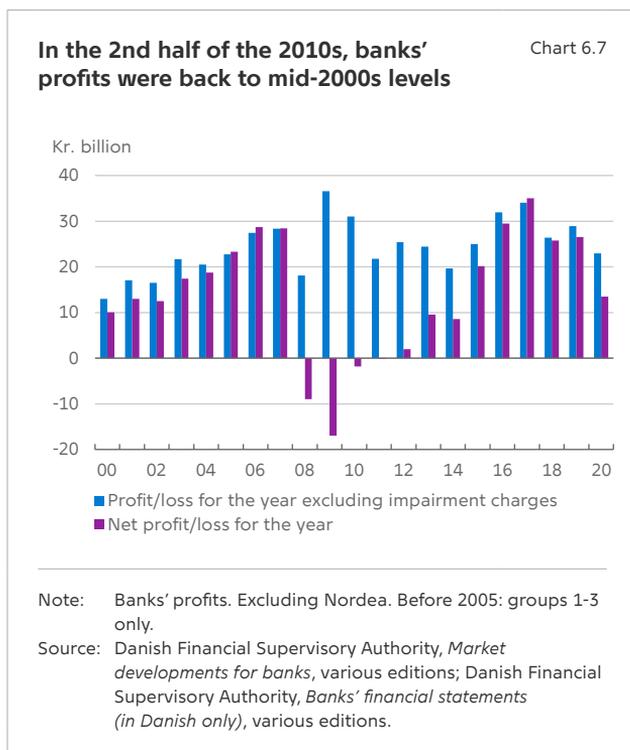
Chart 6.6



Note: Banks' interest and fee income. Excluding Nordea. Before 2005: groups 1-3 only. Fee income from payment systems, guarantee commission, loan fees, securities trading etc.

Source: Danish Financial Supervisory Authority, *Market developments for banks*, various editions; Danish Financial Supervisory Authority, *Banks' financial statements (in Danish only)*, various editions.

commission from e.g. mortgage credit institutions), and from 2015 banks' overall profits were back to pre-financial crisis levels, see chart 6.7. So, there were no indications that negative interest rates, in themselves, were a major challenge to bank earnings.



*Corporate behaviour during the period of low and negative interest rates*  
 Danmarks Nationalbank's analyses demonstrated that, in general, favourable financial conditions following the transition to negative monetary policy interest rates stimulated the economy.<sup>17</sup> The analyses also showed that companies responded to negative bank deposit rates not only by deleveraging and transferring deposits to banks that had not (yet) started applying negative deposit rates. Negative deposit rates also increased companies' risk appetite for investing in output and jobs in the hope of generating a positive return.<sup>18</sup>

The corporate sector's credit demand was more subdued after the financial crisis than before the crisis. Companies had a substantial positive savings

17 See Jakob Roager Jensen and Jesper Pedersen, Macro-financial linkages in a SVAR model with application to Denmark, *Danmarks Nationalbank Working Paper*, No. 134, January 2019.

18 See Kim Abildgren and Andreas Kuchler, Corporations deleverage and invest when charged negative interest rates on bank deposits, *Danmarks Nationalbank Analysis*, No. 24, November 2020.

surplus, and a number of companies wanted to consolidate their balance sheets to become more resilient to economic shocks and improve future financing opportunities. Moreover, historically, Danish companies had been able to cover much of their financing need at the start of an expansion by relying on accumulated earnings.<sup>19</sup>

Low corporate credit demand led to increased competition for corporate customers among banks. But there were no indications that low and negative interest rates induced banks to ease credit conditions for less creditworthy companies. Analyses showed that the least productive Danish companies had relatively easy access to credit compared with low-productivity companies in other countries. Still, there were no indications that low interest rates resulted in more highly leveraged and uncompetitive Danish companies and, compared with other countries, Denmark had few such zombie companies.<sup>20</sup>

### **New money market reference rate**

In the years following the financial crisis, money market turnover declined, especially for longer-term uncollateralised loans. The reason was greater focus on credit risks. But turnover in the day-to-day money market was also concentrated on collateralised loans. Activity contracted further in the years after the 2015 krone crisis when banks held large current account deposits at Danmarks Nationalbank following Danmarks Nationalbank's massive foreign exchange purchases. As a result, banks had less need to conduct money market transactions. This need may also have been reduced with Danmarks Nationalbank's transition to daily open market operations in February 2017.<sup>21</sup>

Turnover in the day-to-day money market changed to be dominated by overnight loans (O/N loans)<sup>22</sup> rather than tomorrow/next loans (T/N loans)<sup>23</sup>. This change reflected, for instance, that banks had less need to manage foreseen liquidity fluctuations two days ahead during periods of large current account balances at Danmarks Nationalbank. It may also have had an impact that the settlement of transactions in the

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19 See Christina Petersen and Lars Risbjerg, The financing of Danish corporations in a macroeconomic perspective (in Danish with an English abstract), *Danmarks Nationalbank Working Paper*, No. 62, July 2009; Kim Abildgren, Mark Niels Strøger Hansen, Mark Strøm Kristoffersen, Andreas Kuchler, Carina Moselund Jensen and Oxana Skakoun, Corporate capital structure, productivity and access to finance, *Danmarks Nationalbank Monetary Review*, Vol. 53(4), December 2014.

20 See Svend Greniman Andersen and Andreas Kuchler, Lending in a low interest rate environment, *Danmarks Nationalbank Monetary Review*, Vol. 55(2), June 2016; *Danmarks Nationalbank Report (Monetary and financial trends)*, No. 3, March 2018; Svend Greniman Andersen, Paul Lassenius Kramp and Andreas Kuchler, Low prevalence of zombie firms in Denmark, *Danmarks Nationalbank Analysis*, No. 29, December 2019.

21 See Morten Fremmich Andresen, Mark Strøm Kristoffersen and Lars Risbjerg, The money market at pressure on the Danish krone and negative interest rates, *Danmarks Nationalbank Monetary Review*, Vol. 54(4), December 2015.

22 Loans commencing on the day they are agreed.

23 Loans commencing after the day they are agreed.

Danish bond market changed from three to two value days in October 2014.

Since 1997, the Danish day-to-day money market reference rate had been a turnover-weighted T/N rate, calculated based on uncollateralised interbank lending in Danish kroner in the T/N segment and the average rate of these loans. Originally, this rate was calculated by Danmarks Nationalbank on behalf of the Danish Bankers Association,<sup>24</sup> but later NASDAQ OMX (2015) and the Danish Financial Benchmark Facility (2019) assumed responsibility for calculating the rate. Due to the decrease in turnover in the uncollateralised day-to-day market, T/N rates became largely dependent on quoted rates rather than being based on actual transactions.

In May 2019, Finance Denmark issued a consultation paper on a new Danish day-to-day reference rate (Denmark Short-Term Rate, DESTR), which was to be based entirely on transactions in uncollateralised O/N deposits with banks from banks and other financial institutions. New transaction-based reference rates were also in the pipeline internationally, and the new Danish reference rate would follow the principles and methodology of the new euro area reference rate (euro short-term rate, €STR). Danmarks Nationalbank performed the data analysis work in relation to the new Danish reference rate.<sup>25</sup>

In Danmarks Nationalbank's view, it was positive that a Danish reference rate was developed in line with international best practice and based on actual transactions rather than quoted prices, as underlying transactions increase confidence in a reference rate.<sup>26</sup> DESTR was launched in 2022, and Danmarks Nationalbank became the owner and administrator of the new reference rate in a model corresponding to that of similar reference rates in several other countries. The phasing out of the existing reference rate (the T/N rate) was planned by a working group established by Danmarks Nationalbank with broad participation from the private Danish banking sector, relevant industry associations, the Danish Financial Benchmark Facility and the Danish Financial Supervisory Authority.<sup>27</sup>

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24 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

25 See *Danmarks Nationalbank Report (Monetary and financial trends – September 2018)*, No. 6, 2018; *Danmarks Nationalbank Financial stability 2nd half 2019*; the announcement *Key Danish benchmark CIBOR set to get a new benchmark Administrator*, Finance Denmark, 15 May 2019; the announcement *Important new Danish rate to be launched (in Danish only)*, Finance Denmark, 9 July 2019.

26 See Danmarks Nationalbank's *Consultation response regarding potential candidates for a new risk-free reference rate for the Danish krone market*, 22 May 2019.

27 See Danmarks Nationalbank's press release *Danmarks Nationalbank becomes owner and administrator of new Danish reference rate*, 27 November 2020; Danmarks Nationalbank's press release *The reference rate DESTR will be launched on 1 April 2022*, 9 November 2021; box 1, *Danmarks Nationalbank takes over DESTR*, in *Accommodative financial conditions support the real economy, Danmarks Nationalbank Analysis, (Monetary and financial trends)*, No. 6, March 2021; box 4, *New transaction-based day-to-day reference rate, DESTR, to be launched on 1 April*, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 4, March 2022.

The work on reference rates for maturities longer than day-to-day was to be performed by a working group under the auspices of Finance Denmark.<sup>28</sup> This working group would analyse the phasing out of Cibur-based reference rates<sup>29</sup> and the T/N rate after the launch of DESTR.

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28 See *Public Consultation on the Transition from Tom/Next to DESTR*, 4 October 2021, by the Working Group on Short-Term Reference Rate; *Memo on the potential use of forward- and backward-looking reference rates in the Danish banking-, mortgage- and derivative market considering the introduction of DESTR*, 8 July 2021, by Finance Denmark's working groups on risk free rates.

29 Cibur (Copenhagen InterBank Offered Rate) was established in 1988 as the reference rate for krone liquidity loans on an uncollateralised basis to creditworthy banks. In 2011, the calculation of Cibur was transferred from Danmarks Nationalbank to NASDAQ OMX, and later, in 2019, from NASDAQ OMX to the Danish Financial Benchmark Facility, see Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; *Statement on Cibur (in Danish only)*, Danmarks Nationalbank, 30 March 2011.



# Regulatory follow-up on the financial crisis

The global financial crisis brought huge social costs. So, to make the financial sector more resilient and prevent future crises, it was necessary to review the sector's regulatory framework, both in Denmark and elsewhere. Most of the new financial regulation in Denmark originated in European and international measures.

Policymakers' focus on financial system risks was sharpened with the establishment of special institutions – in Denmark the Systemic Risk Council – designed to detect threats to financial stability.

Capital and liquidity requirements applicable to credit institutions were strengthened. Large banks and mortgage credit institutions were designated as systemically important financial institutions (SIFIs). They were subject to additional requirements because if they failed, it could have severe implications for the financial system and the economy as a whole. Also, new regimes for failing credit institutions were implemented to ensure that even complex financial groups could be resolved – without costs to taxpayers.

The new regulation also extended to home financing. Over a number of years, a range of measures were implemented, for instance to restrict access to deferred amortisation mortgage loans and/or adjustable rate mortgage loans for borrowers with low home equity and high loan-to-income ratios. Moreover, it was decided to change property taxation to bring housing taxation back in sync with house prices.

The financial crisis also brought focus on corporate governance and financial sector pay. Later the risks of climate change to financial stability also came into focus.

## **Need for new regulation in a number of areas in the wake of the financial crisis**

The financial crisis exposed weaknesses in financial sector regulation that had contributed to the accumulation of large financial imbalances in the pre-crisis period and, thereby, to its wide-ranging implications. In the wake of the crisis, extensive measures were implemented, both internationally and in Denmark, to make the financial system more resilient and reduce the risk of similar future crises with severe negative economic consequences.<sup>1</sup>

Special institutions were established – in Denmark the Systemic Risk Council – to detect threats to financial stability. Oversight was to focus not on the resilience of individual financial institutions, but on overall financial system resilience. The purpose was to prevent risks from growing large, with extensive negative implications for the financial system and the economy as a whole.

Some countries restructured their financial sector supervision, giving their central banks a larger role. Responsibility for financial supervision in Denmark was also reviewed – but without leading to changes.

Capital requirements for credit institutions were strengthened to make them better able to withstand losses. Here, particular focus was on ensuring that institutions built up extra capital buffers when times were good, with strong lending growth and accumulation of risks, to be able to withstand crises. Moreover, measures for the crisis management (recovery and resolution) of complex financial institutions were introduced.

Credit institution regulation was also strengthened in various other areas, for instance in terms of liquidity reserve requirements and accounting treatment of impairment charges.

### **On the need for post-financial crisis regulation**

“The crisis will affect the future structure and regulation of the financial sector. It is yet too early to draw detailed conclusions, the causes must be analysed first. However, there is no doubt that the capital-to-risk requirements imposed on the financial institutions will be tightened. New transparency requirements will be imposed on financial institutions, and liquidity management will, undoubtedly, also be tightened in the future. And these requirements will not be voluntary. The weaknesses in the system will not simply pass over. We need to do something about the underlying factors that have landed us in this pickle!”

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Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Bankers Association, 8 December 2008.

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1 See Borka Babic and Anne-Sofie Reng Rasmussen, Regulatory initiatives in the financial sector, *Danmarks Nationalbank Monetary Review*, Vol. 49(1), March 2010; *Danmarks Nationalbank Financial stability 1st half 2009*.

The purpose of enhanced capital requirements and a new framework for the recovery and resolution of failing credit institutions was not only to help reduce the severity of future financial crises. The purpose was also to avoid substantial government rescue operations of the financial sector – with taxpayers having to foot the bill for bank rescues ('bailouts').

The array of measures was also based on the expectation of social benefits because improved regulation, especially of banks, could contribute to fewer and less severe financial crises and so less fluctuation in output and unemployment. But tighter regulation could mean higher costs for the banking sector in a transitional period, affecting both banks' willingness to lend and the interest and costs payable by customers. However, analyses demonstrated that the benefits to society of post-crisis regulatory tightening clearly outweighed the costs.<sup>2</sup> That was also the assessment in the report published, in April 2018, by a broadly composed working group on financial regulation review. This working group was established by the government and included representatives from Finance Denmark, Insurance & Pension Denmark, Danmarks Nationalbank and the research community.<sup>3</sup>

### On regulation – a burden or an asset for banks?

"One sometimes hears the remark that regulation by the authorities is a special burden imposed on the banks.

(...)

However, it is thought-provoking that back in the days when the banks were not subject to any regulation – before the first Danish banking act in 1919 – capital adequacy was generally far higher than today. Around the mid-19th century capital and reserves were approximately 40 per cent of the balance-sheet total, and by around 1900 a good 20 per cent. In the 1920s this had fallen to around 12 per cent. Today, the banks' net capital is an average of approximately 6 per cent of the balance-sheet total.

A comparison of this nature should naturally not be taken too literally, although it may lead to the realisation that regulation should not be perceived as a burden, but perhaps a valuable asset!"

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Quote from Governor Bodil Nyboe Andersen's speech at the Annual Meeting of the Danish Bankers Association, 1 December 2004.

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- 2 See Anders Møller Christensen, Macroeconomic impacts of financial regulation, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011; Jakob Guldbæk Mikkelsen and Jesper Pedersen, A cost-benefit analysis of capital requirements for the Danish economy, *Danmarks Nationalbank Working Paper*, No. 123, December 2017.
  - 3 See the announcement *Working group recommends financial regulation simplification (in Danish only)*, Ministry of Industry, Business and Financial Affairs, 27 April 2018; Working Group on Financial Regulation Review, *Financial regulation review*, April 2018.

### **Establishment of council to oversee systemic financial risks**

The financial crisis clearly demonstrated that focus on regulation of individual financial institutions (microprudential regulation) and supervision of their health (microprudential supervision) was not sufficient. Stronger oversight of both the risks to the financial system as a whole (macroprudential oversight) and the possibilities of implementing measures to prevent or reduce such systemic risks (macroprudential regulation) was needed to ensure that they did not have severe negative impacts on the financial system and the real economy.

The European Systemic Risk Board (ESRB) was established in January 2011 as part of the new EU macroprudential framework.<sup>4</sup> The ESRB was to consist of representatives from all central banks and supervisory authorities in the EU. As an advisory body, it was charged with overseeing and assessing systemic risks in the EU. The European Central Bank (ECB) was to provide analytical, statistical, administrative and logistical support to the ESRB, also drawing on technical advice from national central banks and supervisory authorities. The ESRB was to hold at least four annual meetings and it could issue warnings and recommendations to the EU, EU member states, European and national supervisory authorities. If a recipient of a recommendation chose not to act on it, the recipient had to explain why (the principle of 'comply or explain').

But much macroprudential policy was pursued at national level rather than EU level. Therefore, in December 2011, the ESRB recommended that a well-defined institutional framework and division of responsibilities for macroprudential oversight and regulation should be established in all EU member states.<sup>5</sup> According to the recommendation, macroprudential institutions should be operationally independent, with access to all information relevant for the exercise of its tasks, including data from microprudential supervisors. The recommendation also stated that the national central banks should have a leading role in macroprudential policy because of their expertise and existing responsibilities in the area of financial stability. In compliance with the ESRB recommendation, Danmarks Nationalbank encouraged the government to establish a Danish macroprudential council (systemic risk council), chaired by Danmarks Nationalbank.<sup>6</sup>

The financial crisis prompted several countries to review the division of responsibilities between the central bank and other authorities in the supervision of individual financial institutions. Supervisory models varied across countries. In some countries, the central bank was the supervisory authority, in others the central bank had limited supervisory responsibilities and in others again the central bank was not involved in supervision at

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4 See Birgitte Bundgaard Madsen and Louise Caroline Mogensen, A new European supervisory architecture, *Danmarks Nationalbank Monetary Review*, Vol. 48(4), December 2009; *Danmarks Nationalbank Report and Accounts 2010*; *Danmarks Nationalbank Financial stability 2011*.

5 See *Danmarks Nationalbank Financial stability 2012*; *Danmarks Nationalbank Monetary Review 3rd quarter 2013, part 1*; ESRB, *Recommendation on the macro-prudential mandate of national authorities* (ESRB/2011/3), 22 December 2011.

6 See *Danmarks Nationalbank Monetary Review 1st quarter 2012, part 1*.

all. Following reviews, some countries gave their central banks more responsibility in financial supervision.

In Denmark, financial supervision had been organised as a single supervisory authority since 1990, with supervision of all financial institutions (banks, mortgage credit institutions, insurance and pension companies etc.) and market supervision carried out by one independent government authority, the Danish Financial Supervisory Authority, under the responsible minister. In light of the work on how to organise financial supervision in several countries, in December 2010, the Minister for Business and Growth set up a Committee on the Structure of Financial Supervision to assess the Danish structure relative to possible alternatives.<sup>7</sup> The Committee had representatives from Danmarks Nationalbank, the Danish Financial Supervisory Authority, the Ministry of Finance, the Ministry of Economic and Business Affairs and two external experts. In autumn 2011, the Minister for Business and Growth also asked the Committee to examine the need for establishing a macroprudential committee in Denmark.

Following a change of government, the first part of the Committee's work – the issue of responsibility for supervision – was put on hold. The new government assessed that it was not possible to find suitable alternative supervisory organisation to ensure also that the government would have sufficient insight into and knowledge about the financial sector.<sup>8</sup>

In June 2012, the Committee on the Structure of Financial Supervision in Denmark submitted its report with the second part of its work, recommending that a systemic risk council should be established. At the same time, the government announced that it would table a bill for the establishment of this council.<sup>9</sup> The Act on the Establishment of the Systemic Risk Council (the Council) was adopted by the Folketing (Danish parliament) in December 2012, and the Council was established by the Minister for Business and Growth in February 2013.<sup>10</sup>

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7 See *Danmarks Nationalbank Report and Accounts 2010*; Ministry of Economic and Business Affairs, *Terms of reference of the Committee on the Structure of Financial Supervision in Denmark (in Danish only)*, 24 November 2010; *Lecture Notes* by Lars Rohde and Thomas Sangill for Governor Lars Rohde's lecture on macroprudential policy in Denmark at the University of Copenhagen, 12 May 2020; the announcement *Danish Financial Supervisory Authority to remain as a government agency (in Danish only)*, Ministry of Industry, Business and Financial Affairs, 16 March 2012.

8 In its report (the Rangvid report), the expert committee established by the Minister for Business and Growth in 2012 to investigate the causes of the financial crises concluded that the responsibility for financial supervision had not had any bearing on the extent of the financial crisis, either in Denmark or elsewhere, see Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons*, Schultz, September 2013.

9 See the announcement *Government to establish a systemic risk council (in Danish only)*, Ministry of Business and Growth, 21 June 2012; Ministry of Business and Growth, *Recommendations of the Committee on the Structure of Financial Supervision in Denmark (in Danish only)*, 21 June 2012; Ministry of Business and Growth, *Report on the establishment of a systemic risk council in Denmark (in Danish only)*, June 2012.

10 See *Danmarks Nationalbank Report and Accounts 2012*; *Danmarks Nationalbank Financial stability 2013*; press release *Annette Vilhelmsen establishes Systemic Risk Council (in Danish only)*, Ministry of Business and Growth, 21 February 2013.

The Council was to consist of one representative from each of the economic ministries (when the Council was established, these were the Ministry of Business and Growth, the Ministry of Finance and the Ministry of Economic Affairs and the Interior), two representatives from the Danish Financial Supervisory Authority, two from Danmarks Nationalbank and three independent experts. The Chairman of the Board of Governors of Danmarks Nationalbank would chair the Council, and Danmarks Nationalbank would provide secretarial services to the Council. The Danish Financial Supervisory Authority and the economic ministries would be part of the secretariat.

Under the Act, the Council was tasked with overseeing and identifying systemic financial risks in Denmark and issuing observations, warnings and recommendations to prevent or reduce the accumulation of such risks. Observations, warnings and recommendations should generally be published, and warnings and recommendations could be addressed to the Danish Financial Supervisory Authority or – if they involved legislation – to the government. If a warning or recommendation was not complied with, the recipient was required to explain why under the principle of comply-or-explain. The economic ministries and the Danish Financial Supervisory Authority did not have voting rights in relation to the Council's observations, warnings and recommendations addressed to the government but only the right to voice an opinion.

The Council was also tasked with overseeing and identifying systemic financial risks in the Faroe Islands and Greenland. If the Council discussed Faroese and Greenlandic issues, representatives from the relevant Faroese and Greenlandic authorities could be invited to sit in as observers.

The Act gave the Council access to relevant information from public authorities, including Danmarks Nationalbank. The Council should serve in an advisory role only, so the Act establishing the Council did not lead to changes in the existing division of responsibilities between Danish financial authorities.

The explanatory notes for the Bill establishing the Council explicitly stated that the Council was not to address general economic policy developments (such as fiscal, tax and monetary policies).<sup>11</sup> Nor should the Council, according to the explanatory notes, take a position on recovery and resolution measures in the form of bank rescue packages or specific failing banks.<sup>12</sup>

The Council held its first meeting in April 2013<sup>13</sup>, and, under its rules of procedure, it was to hold at least four annual meetings.

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11 See the memo *Legal basis of the Systemic Risk Council (in Danish only)*, the Systemic Risk Council, 20 April 2020; *Lecture Notes* by Lars Rohde and Thomas Sangill for Governor Lars Rohde's lecture on macroprudential policy in Denmark at the University of Copenhagen, 12 May 2020.

12 See the memo *Legal basis of the Systemic Risk Council (in Danish only)*, the Systemic Risk Council, 20 April 2020.

13 See the press release *Meeting of the Systemic Risk Council*, Systemic Risk Council, 8 April 2013.

## On the first meeting of the Systemic Risk Council

“The first meeting of the Systemic Risk Council was held yesterday. The Council discussed the current situation and risks to financial stability in Denmark.

I am pleased that the Council is now in operation. An important lesson from the financial crisis has been that it is necessary to focus on systemic risk. The Council is to contribute to preventing and addressing future systemic financial risks, thereby shielding the real economy and the financial system against a new financial crisis. Obviously we cannot avoid normal cyclical fluctuations. The Council will regularly monitor risk developments and issue observations, warnings and recommendations to the relevant authorities.

We have a considerable task ahead of us and there are many important issues that I look forward to discussing – and learning more about. I have taken on the task of chairman with a great degree of humility.”

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Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Danish Mortgage Banks’ Federation, 9 April 2013.

To avoid unnecessary confusion about whether the Chairman of the Board of Governors of Danmarks Nationalbank commented on financial stability issues in his capacity as Governor or as Chairman of the Council, a special communications practice was developed under which the Council communicated with the media only through press releases and other publications.<sup>14</sup>

In a report from 2014, the European Systemic Risk Board (ESRB) assessed that the institutional framework of the Council was largely compliant with the ESRB recommendation of December 2011.<sup>15</sup> However, in connection with its review of the Danish financial sector in 2020, the International Monetary Fund (IMF) recommended strengthening the institutional framework for the Council’s work.<sup>16</sup> In its review, the IMF took note of the consensus requirement. According to the explanatory notes for the Bill establishing the Council, the Council should strive for consensus<sup>17</sup> in its recommendations.

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14 See *Lecture Notes* by Lars Rohde and Thomas Sangill for Governor Lars Rohde’s lecture on macroprudential policy in Denmark at the University of Copenhagen, 12 May 2020.

15 See *ESRB Recommendation on the macro-prudential mandate of national authorities (ESRB/2011/3). Follow-up Report – Overall assessment*, June 2014.

16 See IMF, Denmark: Financial Sector Assessment Program – Technical Note – Systemic Risk Oversight and Macroprudential Policy Framework, *IMF Country Report*, No. 253, August 2020; Svend E. Hougaard Jensen and Thomas Sangill, *The Systemic Risk Council: An assessment of strengths and weaknesses* (in Danish only), *Finans/Invest*, No. 6, 2021.

17 See the memo *Legal basis of the Systemic Risk Council (in Danish only)*, the Systemic Risk Council, 20 April 2020.

According to the IMF, this requirement – combined with the Council’s status as an advisory body with no direct control over macroprudential instruments – involved a risk of acting too late or not acting at all in macroprudential policy-making. Therefore, the IMF suggested that the Council should be given powers to issue recommendations without the need to strive for consensus. The IMF also stated that – if the inaction bias became a problem – the Council could be given hard powers over macroprudential instruments by setting certain capital requirements. The IMF’s recommendations to the Danish authorities on the institutional framework, macroprudential instruments and ongoing oversight of systemic risks were subsequently discussed at Council meetings<sup>18</sup>, but by the end of 2020 the IMF’s recommendations had not yet resulted in any changes.

### **Additional requirements on systemically important financial institutions**

The financial crisis brought into focus the future handling of systemically important financial institutions (SIFIs). SIFIs were financial institutions so large and complex that their failure could cause significant disruption to the financial system and the economy as a whole. Consequently, the Financial Stability Board<sup>19</sup> and the Basel Committee<sup>20</sup> subsequently worked to develop recommendations for rules on especially intensive supervision and additional capital and liquidity requirements, among other things, for SIFIs. These were to ensure that large credit institutions were especially resilient and did not assume excessive risks in the expectation that they would be bailed out by the government because they were too big to fail.

As part of the political agreement on Bank Rescue Package 4 from August 2011, an expert group was to be established to consider the criteria for designation of SIFIs in Denmark, additional requirements to be imposed on them and how to resolve them if they became distressed.<sup>21</sup> Consequently, the Committee on Systemically Important Financial institutions in Denmark (the SIFI Committee) was established in January 2012. Its members were the Ministry of Business and Growth, the Ministry of Finance, the Danish Financial Supervisory Authority, Danmarks Nationalbank and four external experts.<sup>22</sup>

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18 See Systemic Risk Council press releases of 29 September 2020 and 15 December 2020.

19 The Financial Stability Board (FSB) was established in 2009 as an international committee hosted by the Bank for International Settlements (BIS) to ensure effective implementation of regulation and supervision of the financial sector. The FSB comprised representatives from 24 countries and a range of international organisations, including the European Commission, see the report *Systemically important financial institutions in Denmark: Identification, requirements and crisis management*, Committee on Systemically Important Financial institutions in Denmark, 11 March 2013.

20 The Basel Committee on Banking Supervision (BCBS) was established in 1974 to strengthen the stability of the international financial system. The Committee’s secretariat was located at the BIS. It comprised representatives from the central banks and financial supervisory authorities of a number of countries, see Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

21 See Danmarks Nationalbank, *Report and Accounts 2011*; Danmarks Nationalbank, *Monetary Review 3rd quarter 2011 - part 1*.

22 See the press release *SIFI Committee established (in Danish only)*, Ministry of Business and Growth, 12 January 2012.

## On systemically important financial institutions (SIFIs)

“The largest credit institutions are those that we call systemically important financial institutions, or – in financial lingo – SIFIs. These institutions are important to society as a whole and to financial stability. For everyone’s sake it is essential that these private-sector enterprises do not suddenly find themselves in dire straits so that the government must take over. In future these large institutions must therefore be required to have extra strong defences. For example, they must have extra capital, the option to convert loan capital into subordinate capital as well as recovery plans, and they may be subject to additional supervision. The aim is to ensure that they do not end up in a situation where they become distressed.”

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Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Mortgage Banks’ Federation, 29 March 2012.

The SIFI Committee submitted its report in March 2013.<sup>23</sup> The Committee recommended that a credit group should generally be identified as a SIFI if either its ratio of total assets to GDP or its ratio of lending or deposits to the sector’s total lending or deposits was above a fixed threshold. The Committee also recommended that the Danish Financial Supervisory Authority should be responsible for designating SIFIs on the recommendation of the Systemic Risk Council. In addition, the Committee issued a number of recommendations on the Danish implementation of the new enhanced international requirements for SIFIs in terms of capital and liquidity, corporate governance, supervision and recovery and resolution plans.

Danmarks Nationalbank supported the SIFI Committee’s proposals, and in June 2013 the Systemic Risk Council recommended that the government should put forward legislative proposals to implement the SIFI Committee’s recommendations.<sup>24</sup>

The proposals of the SIFI Committee were generally supported by the government, and its recommendations were largely complied with in the political agreement on Bank Rescue Package 6 in October 2013 and implemented in subsequent legislation.<sup>25</sup> Still, the Systemic Risk Council was not assigned the role in the identification of SIFIs proposed by the SIFI

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23 See the press release *SIFI Committee recommends additional requirements for the largest Danish banks*, Ministry of Business and Growth, 14 March 2013; the report *Systemically important financial institutions in Denmark: Identification, requirements and crisis management*, Committee on Systemically Important Financial institutions in Denmark, 11 March 2013; *Danmarks Nationalbank Monetary Review 1st quarter 2013, part 1; Danmarks Nationalbank Financial stability 2013*.

24 See The Systemic Risk Council, *Recommendation on phasing-in of capital requirements legislation in Denmark*, 24 June 2013.

25 See *Danmarks Nationalbank Financial stability 2013, 2nd half*; the press release *Meeting of the Systemic Risk Council*, Systemic Risk Council, 27 March 2014.

Committee. The Danish Financial Supervisory Authority was to be singularly responsible for designating SIFIs based on legislative criteria.

In June 2014, the Danish Financial Supervisory Authority designated six banking and mortgage credit groups as SIFIs in Denmark: Danske Bank, Nykredit Realkredit, Jyske Bank, Nordea Bank Danmark<sup>26</sup>, Sydbank and DLR Kredit.<sup>27</sup> By the end of 2020, Spar Nord Bank had also been designated as a SIFI in 2019.<sup>28</sup>

In the Faroe Islands, three institutions (BankNordik, Eik Banki<sup>29</sup> and Norðoya Sparikassi<sup>30</sup>) were designated as SIFIs in November 2015<sup>31</sup>, while Grønlandsbanken was designated as a Greenlandic SIFI in April 2017.<sup>32</sup>

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26 In January 2017, Nordea Bank Danmark was converted from a subsidiary into a branch of Nordea AB. Following the conversion, Nordea Bank Danmark was no longer subject to independent capital and liquidity requirements, but was to be covered by the capital and liquidity of Nordea AB. Also, the primary responsibility for supervising the activities of Nordea Bank Danmark passed from the Danish to Swedish supervisory authorities. As a result, Nordea Bank Danmark was no longer a SIFI in Denmark. However, Nordea Kredit Realkreditaktieselskab remained a subsidiary in Denmark and so continued to be under Danish supervision. In January 2017, Nordea Kredit Realkreditaktieselskab was designated as a SIFI in Denmark. In October 2018, Nordea Bank AB redomiciled its headquarters from Sweden to Finland, a member of the EU banking union, and Nordea Bank AB's banking activities in Denmark, Finland, Norway and Sweden became subject to direct supervision by the ECB. Nordea Kredit Realkreditaktieselskab remained a Danish subsidiary, see *Danmarks Nationalbank Financial stability 2016, 2nd half*, the press release *Designation of Nordea Kredit Realkreditaktieselskab as a SIFI in Denmark (in Danish only)*, Danish Financial Supervisory Authority, 3 January 2017; Danmarks Nationalbank, *Lengthy period of increasing risk appetite in parts of the banking sector, Danmarks Nationalbank Analysis (Financial stability)*, No. 6, May 2018.

27 See the press release *Six institutions designated as systemically important (SIFIs) (in Danish only)*, Danish Financial Supervisory Authority, 24 June 2014.

28 Following an adjustment of the deposit threshold, see the press release *Designation of Spar Nord Bank A/S as a SIFI in Denmark (in Danish only)*, Danish Financial Supervisory Authority, 3 January 2019. In 2021, Arbejdernes Landsbank was designated as a SIFI following the acquisition of the majority stake in Vestjysk Bank, see the press release *Annual designation of SIFI institutions (in Danish only)*, Danish Financial Supervisory Authority, 25 June 2021. A new model for designation of SIFIs in Denmark was implemented in 2021, based on a model recommended by the European Banking Authority and used in a number of European countries, see Danmarks Nationalbank's *Consultation response concerning the bill to amend the Danish Financial Business Act, the Investment Associations etc. Act (in Danish only)*, 18 August 2021; the press release *Annual designation of SIFI institutions (in Danish only)*, Danish Financial Supervisory Authority, 24 June 2022.

29 Changed its name to Betri Banki in March 2017.

30 In 2020, the government decided to adjust the model for designation of SIFIs in the Faroe Islands, introducing a lower limit on total assets. As a result, Norðoya Sparikassi was no longer classified as a SIFI from the designation of SIFIs in 2021, see the announcement *Government adjusts model for designation of SIFIs in the Faroe Islands (in Danish only)*, Ministry of Industry, Business and Financial Affairs, 4 June 2020; the press release *Annual designation of SIFI institutions (in Danish only)*, Danish Financial Supervisory Authority, 25 June 2021.

31 See the press release *Three institutions designated as systemically important (SIFIs) in the Faroe Islands (in Danish only)*, Danish Financial Supervisory Authority, 1 December 2015; the memo *Designation of systemically important financial institutions (SIFIs) in the Faroe Islands (in Danish only)*, Danish Financial Supervisory Authority, 30 November 2015.

32 See the press release *Grønlandsbanken designated as a systemically important financial institution (SIFI) in Greenland (in Danish only)*, Danish Financial Supervisory Authority, 28 April 2017.

## On the recommendations of the SIFI Committee

“In my opinion, this is a carefully considered proposal.

Denmark has an efficient and credible resolution scheme for distressed banks, which means that the taxpayers will not end up footing the bill.

There is though barely an alternative to a government rescue plan if one of the largest financial institutions becomes distressed. The Committee’s report is addressing this issue.

The Committee has emphasised the need to ensure the defences around systemically important financial institutions to prevent them from becoming distressed. The proposal comprises additional requirements for capital adequacy, liquidity and supervision as well as requirements for the preparation of recovery and resolution plans.”

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Statement by Governor Lars Rohde on the publication of a report from the Committee on Systemically Important Financial Institutions in Denmark, 14 March 2013.

## Higher credit institution capital requirements

With the revisions of the EU Capital Requirements Directive, implemented in all EU member states (including Denmark) following the financial crisis, bank capital requirements were substantially tightened. The EU requirements reflected the tightening agreed by a broad circle of countries under the aegis of the Basel Committee, published in December 2010 (Basel III capital adequacy standards).<sup>33</sup>

The new capital adequacy rules took effect in the EU in early 2014<sup>34</sup>. Following a gradual phasing-in period, the rules imposed significantly higher requirements on Danish banks than before the financial crisis, see chart 7.1. The higher capital buffer requirement was to make banks better able to withstand economic crises with loan losses. Like previous EU capital adequacy rules, the new requirements also applied to mortgage credit institutions.

Under the new rules, banks were still required to hold total capital (Tier 1 and Tier 2 capital) equivalent to at least 8 per cent of risk-weighted assets (exposures), just as before the crisis. But going forward, own funds should be better at absorbing losses. A substantially higher amount of Common Equity Tier 1 capital was required in the form of common equity (share capital and reserves) for going concern loss absorption, while the amount

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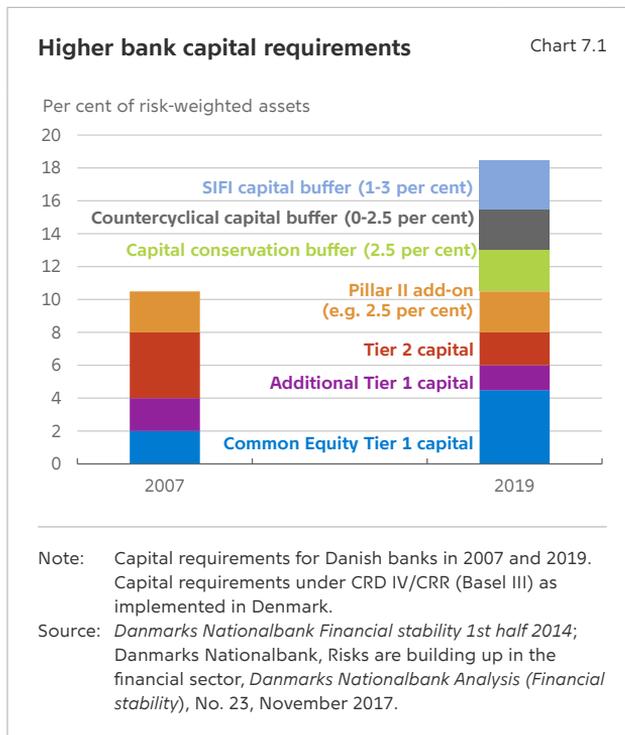
33 See Borka Babic, Status on Basel III – liquidity and capital, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011.

34 Directive (Capital Requirement Directive IV (CRD IV)) and regulation (Capital Requirement Regulation (CRR)), see *Danmarks Nationalbank Financial stability 2011*; *Danmarks Nationalbank Financial stability 2013*; *Danmarks Nationalbank Financial stability 2013 2nd half*; *Danmarks Nationalbank Financial stability 1st half 2014*.

of other types of capital (Additional Tier 1 capital<sup>35</sup> and Tier 2 capital<sup>36</sup>) was to be reduced.

An individual Pillar II add-on requirement<sup>37</sup> also applied both before and after the crisis. Together with the minimum total capital requirement for banks, the Pillar II add-on was to reflect the risks assumed by each bank.

The minimum total capital requirement for banks and the Pillar II add-on were hard capital requirements. Therefore, a bank would be placed under receivership for resolution or restructuring if it was no longer in compliance with the capital requirement.



35 Debt instrument that was converted into Common Equity Tier 1 capital if the Common Equity Tier 1 capital ratio fell below a predetermined trigger level and was therefore able to absorb losses in going concern situations equally to common equity. CRD IV/CRR increased the previous requirements for Additional Tier 1 capital to make it better able to absorb losses.

36 Debt instrument that was normally not loss absorbing in going concern situations, but was subordinated to other debt instruments (loans) in connection with resolution or failure. CRD IV/CRR also tightened the previous requirements for Tier 2 capital, for instance in terms of maturity, see *Danmarks Nationalbank Financial stability 1st half 2014*.

37 From Pillar 2 of the Basel II accord, see Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

After the financial crisis, all banks were required to build up two capital buffers: a capital conservation buffer of 2.5 per cent and a countercyclical capital buffer (CCyB) of up to 2.5 per cent. SIFIs were also required to maintain an additional institution-specific capital buffer of 1-3 per cent, depending on the SIFI's systemic importance.<sup>38</sup> The capital buffers were to be composed of Common Equity Tier 1 capital. They were soft requirements that were to act as a buffer and absorb losses during an economic downturn or an unexpected shock, so that the bank could continue lending to the economy. Breach of capital buffer requirements would not result in the resolution or restructuring of a bank, but if the buffers fell below required levels restrictions would be imposed on dividend payments, share buybacks and bonus payments.<sup>39</sup>

The idea behind the countercyclical capital buffer was for banks to build additional capital buffers when systemic risks were building up, for instance during periods of optimism, growing asset prices and accommodative credit standards as seen in the pre-financial crisis period. In times of crisis, the buffer could be reduced or released to provide room for handling impairment charges and continuing lending to creditworthy customers. That would reduce the risk of credit crunches in which creditworthy customers would be denied loans.<sup>40</sup>

When the new capital requirements were implemented into Danish law, it was established that the Minister for Business and Growth would decide on changes to the countercyclical capital buffer rate. In its consultation response to the bill, Danmarks Nationalbank had argued that, similarly to most other European countries, this responsibility should be vested in the Danish Financial Supervisory Authority or the Systemic Risk Council.<sup>41</sup> The reason for this wish was that tightening of the capital requirement could be expected to have to be initiated at times when the general public might find it difficult to see the need for such tightening. If the responsibility was not vested in an independent authority, increases of the buffer rate could be implemented 'too little, too late'. The decision-making power ended up being vested in the Minister for Business and Growth, but the Systemic Risk Council could make recommendations to the Minister about activating and

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38 The implementation of CRD V in Denmark on 1 January 2021 also provided the possibility of activating a systemic risk buffer (in addition to the other capital buffers) to cover systemic risks in the financial systems that were not addressed by other macroprudential instruments, see the press release *Meeting of the Systemic Risk Council*, Systemic Risk Council, 23 March 2021.

39 See Christian Sinding Bentzen and Ianna Georgieva Yordanova, Can capital buffers actually help banks in times of crisis?, *Danmarks Nationalbank Analysis*, No. 25, November 2020.

40 See Mads Peter Pilkjær Harmsen, Basel III: Macroprudential regulation by means of countercyclical capital buffers, *Danmarks Nationalbank Monetary Review*, Vol. 49(4), December 2010.

41 See *Consultation response concerning amendment of the Danish Financial Business Act, Securities Trading, etc. Act, Mortgage-Credit Loans and Mortgage-Credit Bonds, etc. Act, Act on Alternative Investment Fund Managers, etc. and various other acts*, Danmarks Nationalbank, 11 September 2013; *Danmarks Nationalbank Monetary Review 3rd quarter 2013, part 1*.

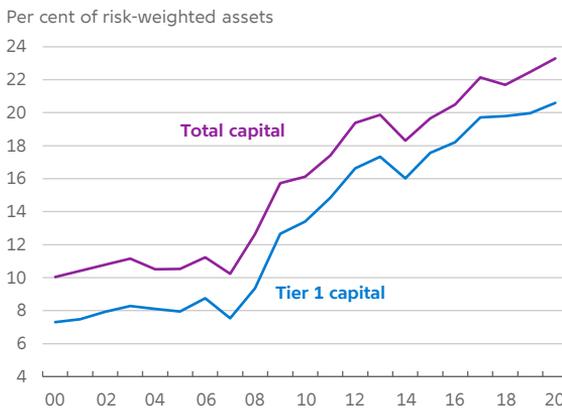
### On the release of the countercyclical capital buffer in connection with the coronavirus pandemic

“When times are back to normal and the buffer has to be built up again, experience is now gained for the build-up phase as well as the release of the buffer, and the financial sector will know that the buffer will be released in a crisis situation. Thus, contrary to the first build-up where the banks continuously argued against the buffer, they may hopefully see the benefit of having a buffer in place that can be released in a crisis.”

Quote from *Lecture Notes* by Lars Rohde and Thomas Sangill for Governor Lars Rohde’s lecture on macroprudential policy in Denmark at the University of Copenhagen, 12 May 2020.

#### Credit institutions were better capitalised after 2007

Chart 7.2



Note: Credit institution solvency. Prior to 2017: Banks at group level. Since 2017: Excluding Nordea.

Source: Danish Financial Supervisory Authority, *Market developments for banks*, various editions; Danish Financial Supervisory Authority, *Market developments for credit institutions*, various editions.

setting the buffer rate, and during the period 2017-19 the Council made an active effort to build up the countercyclical capital buffer.<sup>42</sup> When the coronavirus pandemic started in Denmark, the buffer had been built up to 1 per cent and was released by the Minister for Industry, Business and

<sup>42</sup> See recommendations from the Systemic Risk Council of 20 December 2017, 25 September 2018, 26 March 2019 and 1 October 2019.

Financial Affairs in March 2020.<sup>43</sup> The buffer was released to discourage banks and mortgage credit institutions from being too cautious in their lending due to insufficient capital.

Because of the tightening of capital adequacy rules, Danish credit institutions were considerably better capitalised and more resilient to withstand losses, see chart 7.2. Solvency ratios rose, particularly during the years immediately before the new rules took effect. The explanation was that already before the new regulation was implemented, the financial markets expected the banking sector to have stronger capital buffers after the financial crisis outbreak. This prompted credit institutions to respond by increasing their solvency ratios already before they were required by law to do so.<sup>44</sup>

To some extent, the increase in the post-crisis solvency ratios of credit institutions was due to capital increases, but also reflected a fall in calculated risks on their credit exposures.<sup>45</sup> The volume of bank loans was reduced, but this decline was more than offset by a rise in mortgage lending during the same period. In other words, there were no indications of credit shortages, see chart 7.3. The switch from bank credit to mortgage credit reflected the need for large impairment charges on bank loans during the financial crisis, while impairment charges on mortgage loans were low. Due to low impairment charges on mortgage loans, it was possible to meet the need for mortgage credit during a period when it was necessary to reduce the volume of bank loans.<sup>46</sup>

When bank capital requirements were tightened in the wake of the financial crisis, it was debated to what extent this would increase bank funding costs. Subsequent implications for bank lending rates and negative economic spillover effects were also debated. Both the SIFI Committee<sup>47</sup> and Danmarks Nationalbank<sup>48</sup> pointed out that return requirements for both equity and

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43 Also, planned increases of the buffer were cancelled, see the announcement *COVID-19: Danish government is prepared to provide more assistance to Danish workplaces (in Danish only)*, Ministry of Industry, Business and Financial Affairs, 12 March 2020, with fact sheets; Danmarks Nationalbank, *Banks should keep their powder dry, Danmarks Nationalbank Analysis (Financial stability)*, No. 28, December 2020.

44 In relation to chart 7.2, it should be noted that the Basel II capital adequacy rules took effect from and including 2007, with transitional arrangements until 2010. For most Danish credit institutions, the transition to the Basel II capital adequacy rules meant reduced capital requirements due to exposures with retail customers and small and medium-sized enterprises (SMEs) that were given lower risk weights with the new rules. Viewed in isolation, this contributed to the substantial increase in capital ratios in 2008 and 2009, see *Danmarks Nationalbank Financial stability 2008*; *Danmarks Nationalbank Financial stability 1st half 2009*.

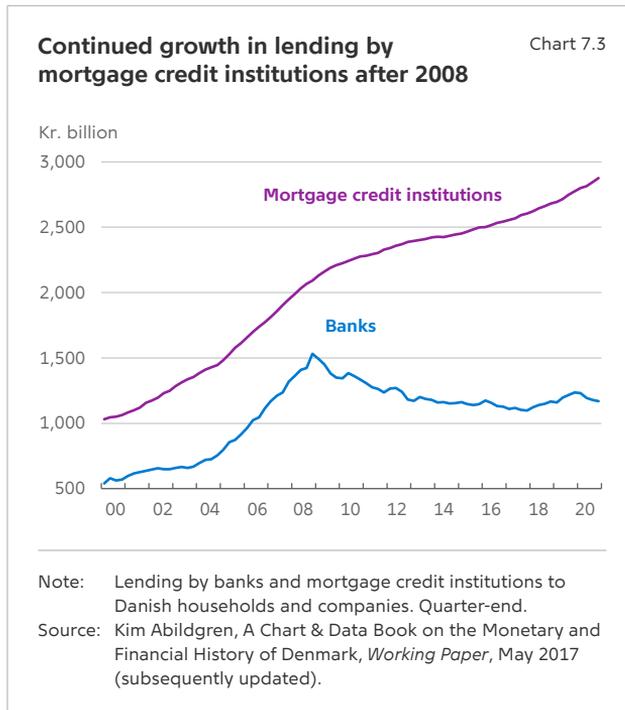
45 See *Danmarks Nationalbank Financial stability 1st half 2016*.

46 See Kim Abildgren and Andreas Kuchler, *Banks, credit and business cycles, Danmarks Nationalbank Monetary Review*, Vol. 52(2,2), June 2013.

47 See the report *Systemically important financial institutions in Denmark: Identification, requirements and crisis management*, Committee on Systemically Important Financial institutions in Denmark, 11 March 2013.

48 See Danmarks Nationalbank, *Financial stability 2013*.

debt were lower for better capitalised banks than for poorly capitalised banks. The reason was that a well-capitalised bank was more resilient to adverse shocks and so more secure than a poorly capitalised bank. A study conducted by Danmarks Nationalbank also found that higher capital requirements would result in just a modest increase in bank lending rates, with a limited negative impact on economic growth – which would be more than outweighed by the benefit of a lower risk of financial crises with a better capitalised banking sector.<sup>49</sup>



### On the costs for banks of holding more equity

“It is an evident misunderstanding that rising funding costs are an argument against holding more equity. The stronger a bank’s capitalisation is, the lower the market requirements will be in terms of return on both equity and debt.”

Statement by Governor Lars Rohde in the press release *Financial stability 2013*, 12 June 2013.

49 See Jakob Guldbæk Mikkelsen, Banks’ capital accumulation does not hurt GDP growth, *Danmarks Nationalbank Analysis*, No. 9, June 2017.

The interaction between the new capital adequacy rules and other regulation involved certain challenges. In some cases, the practical use of capital buffers as loss absorbers in an economic downturn could be limited by leverage requirements<sup>50</sup> and minimum requirements for own funds and eligible liabilities (MREL). Danmarks Nationalbank believed it was necessary to take this aspect into account in future regulatory amendments.<sup>51</sup>

### **Recovery and resolution of credit institutions without costs to taxpayers**

Bank Rescue Package 3 from 2010 introduced a Danish model for orderly resolution of small and medium-sized failing banks – without costs to taxpayers.

The EU Bank Recovery and Resolution Directive (BRRD) from 2014<sup>52</sup> introduced a European framework for the resolution and recovery of complex credit institutions. The BRRD was to ensure the continuity of critical functions of credit institutions through orderly resolution or restructuring, thereby limiting the impact on the economy and the financial system and ensuring, to the maximum extent possible, that investors and creditors rather than the public purse would bear the costs (bail-in rather than bail-out).

The BRRD was implemented into Danish law in June 2015 and replaced the Bank Rescue Package 3 resolution scheme. The new rules contained requirements for credit institutions to prepare recovery and resolution plans and requirements for institutions to have sufficient liabilities to absorb losses in a resolution. Also, a sector-financed Resolution Fund should be established to absorb losses if necessary to safeguard the economy and financial stability. The Resolution Fund could be used only if owners and creditors had borne a large portion of losses.

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50 In a revision of the EU Capital Requirement Regulation (Capital Requirement Regulation 2 (CRR 2)), a minimum leverage ratio requirement for credit institutions was introduced in EU legislation (the requirement was a minimum Tier 1 leverage ratio of 3 per cent of non-risk weighted assets). The CRR 2 was adopted in May 2019 with effect from July 2021, see *Danmarks Nationalbank Financial stability, 1st half 2019*.

51 See Lars Rohde, *Bank capital buffers aren't working*, feature article in the Financial Times, 9 December 2020; Christian Sinding Bentzen and Ianna Georgieva Yordanova, *Can capital buffers actually help banks in times of crisis?*, *Danmarks Nationalbank Analysis*, No. 25, November 2020.

52 Directive 2014/59/EU of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms etc. (Bank Recovery and Resolution Directive – BRRD); *Danmarks Nationalbank Financial stability 1st half 2014*; *Danmarks Nationalbank Financial stability 2nd half 2014*; *Danmarks Nationalbank Financial stability 2nd half 2015*; *Danmarks Nationalbank Report and Accounts 2015*.

## On the EU Bank Recovery and Resolution Directive

“In the period leading up to the financial crisis, everyone expected the government to step in if a large and complex credit institution – a SIFI – became distressed. The owners of the institution reaped the profit in good times, but expected taxpayers to foot the bill if things went wrong. This provided an incentive to take higher and irresponsible risks, which increased the risk of a financial crisis.

When the financial crisis erupted, the government provided a guarantee of 2½ times GDP to buoy up the financial sector. It is obvious that the government assumed an almost unlimited risk on behalf of the taxpayers. Fortunately all went well. If things had gone wrong, they would have gone very wrong.

(...)

So since the financial crisis it has been important to ensure that we never again find ourselves in a situation where society is compelled to come to the rescue of the credit institutions. That is why the European Recovery and Resolution Directive was introduced in 2014. The new rules are to ensure that the economy and financial stability can be protected if a SIFI needs to be resolved. This makes it impossible for the owners and creditors of the institutions to take society as a hostage so that the government must rescue them. They themselves will have to face up to the consequences of unsound decisions and risky actions.”

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Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Association of Danish Mortgage Banks, 5 October 2016.

Effective from 1 July 2019, in addition to the capital requirement, Danish SIFI banks were to meet a minimum requirement for own funds and eligible liabilities (MREL) under which their loss absorption amount was to be equal to their minimum capital requirement<sup>53</sup>. These liabilities could be written down or converted to equity if the institution was failing. In addition to the capital requirement, an MREL was imposed on non-systemic banks at the level of 3.5-11 per cent of risk-weighted assets.<sup>54</sup> As part of the preparatory work, Danmarks Nationalbank had found it important to ensure transparency for creditors in terms of the resolution of small and medium-sized banks and ensure that small and medium-

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53 That is, the minimum total capital requirement and the Pillar II add-on plus the combined capital buffer requirement. Certain transitional provisions related to MREL, see the memo *Fact-sheet on the minimum requirements for own funds and eligible liabilities (MREL) for systemically important banks (in Danish only)*, Danish Financial Supervisory Authority, 23 March 2018; Danmarks Nationalbank, *Capital requirements for banks – myths and facts, Danmarks Nationalbank Analysis*, No. 8, June 2018.

54 When Denmark was hit by the coronavirus pandemic in 2020, the Danish Financial Supervisory Authority extended the MREL phasing-in period for small and medium-sized banks. Also, the phasing-in of technical accommodation for SIFIs was accelerated, see the press release *Phase-in of minimum requirements for own funds and eligible liabilities (MREL) in light of the COVID-19 crisis*, Danish Financial Supervisory Authority, 1 May 2020.

sized banks could be resolved without the use of government funds. But, in Danmarks Nationalbank's assessment, a simpler, less burdensome model for small and medium-sized banks could have been chosen because financial stability considerations did not have to be taken into account in the resolution of non-systemically important banks. Danmarks Nationalbank found the critical factor to be that depositors were covered by the deposit guarantee scheme and could access their funds immediately if their bank failed.<sup>55</sup>

At Denmark's request, the BRRD allowed exemption of mortgage credit institutions from MREL under certain conditions, and that option was exercised at the Danish implementation of the BRRD. Instead, mortgage credit institutions were required to hold a debt buffer consisting of loss-absorbing liabilities<sup>56</sup> of 2 per cent of their unweighted lending (in addition to their capital requirements). Moreover, in May 2018, an amendment to Danish legislation was adopted, applying to SIFIs that were or included a mortgage credit institution. The debt buffer and own funds of systemically important mortgage credit institutions should amount to at least 8 per cent of total liabilities and own funds. The debt buffer of mortgage credit institutions that were part of a systemically important group should be set at a level ensuring that the group's debt buffer, own funds and eligible liabilities amounted to at least 8 per cent of the group's total liabilities and own funds.

In connection with the Danish implementation of the BRRD, Danmarks Nationalbank had expressed concerns about the special Danish model for resolution of mortgage credit institutions.<sup>57</sup> These concerns revolved around the fact that the debt buffer requirement and the 8 per cent minimum requirement were not risk sensitive. So, the requirement could be too low in periods of crisis with declining house prices when mortgage

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55 See Danmarks Nationalbank's consultation response to the Danish Financial Supervisory Authority's Discussion Paper on main principles for resolution of small and medium-sized banks and determination of minimum requirements for own funds and eligible liabilities (MREL), 27 February 2017.

56 In the form of Common Equity Tier 1 capital, Additional Tier 1 capital, Tier 2 capital and/or senior unsecured debt, see *Danmarks Nationalbank Financial stability 2nd half 2015*.

57 See Governor Lars Rohde's speech at the Annual Meeting of the Danish Mortgage Banks' Federation on 25 March 2015; Governor Lars Rohde's speech at the Annual Meeting of the Association of Danish Mortgage Banks on 5 October 2016; Danmarks Nationalbank, Optimism in the banking sector provides breeding ground for increased risk-taking, *Danmarks Nationalbank Analysis (Financial stability)*, No. 11, June 2017; Danmarks Nationalbank, Risks are building up in the financial sector, *Danmarks Nationalbank Analysis (Financial stability)*, No. 23, November 2017; Danmarks Nationalbank, Low price for protecting the mortgage credit sector against crises, *Danmarks Nationalbank News*, No. 2, January 2017; Asbjørn Klein and Jacob Malte Svanborg, Too-big-to-fail can be solved inexpensively, *Danmarks Nationalbank Analysis*, No. 1, January 2017; Danmarks Nationalbank, Resolution strategy for SIFI groups, *Danmarks Nationalbank Analysis*, No. 21, November 2017; Asbjørn Klein and Christine Sif Larsen, Danmarks Nationalbank, MREL for mortgage banks reduces funding needs in times of crisis, *Danmarks Nationalbank Analysis*, No. 11, August 2018; MREL for mortgage credit institutions: necessary and inexpensive, *Danmarks Nationalbank Analysis*, No. 23, December 2018; *Consultation response concerning the bill to amend the Danish Financial Business Act, Anti-Money Laundering Act, Act on Alternative Investment Fund Managers, etc. and various other acts (part III)*, Danmarks Nationalbank, 19 February 2018.

credit institutions' risks typically grew. Therefore, Danmarks Nationalbank recommended subjecting SIFI mortgage credit institutions to the same international risk-based standards for own funds and eligible liabilities as SIFI banks. Danmarks Nationalbank's proposal was not complied with.<sup>58</sup>

### On resolution of mortgage credit institutions

"They [eds.: mortgage credit institutions] are exempt from the MREL. As a result, we cannot be sure that there are sufficient funds to resolve failing mortgage credit institutions. And we cannot use the Resolution Fund for loss absorption in the mortgage credit institutions, should this be necessary. We need to do away with this exemption in order to ensure credible resolution of mortgage credit institutions. At the same time, I would like to emphasise that mortgage bonds should not absorb losses. Instead, as I have already said a couple of times, there must be sufficient MREL funds."

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Quote from Governor Lars Rohde's speech at the Anniversary Conference on Banking & Supervision, 3 October 2019.

As part of the implementation of the BRRD in Denmark, all banks and mortgage credit institutions were required to draw up and maintain a recovery plan providing for measures to be taken to restore the institution's capital or liquidity in the event of a crisis. The recovery plan had to be approved by the institution's Board of Directors and submitted to the Danish Financial Supervisory Authority for assessment. Recovery plans for small institutions could be relatively simple, while requirements for SIFI recovery plans were rather extensive. In connection with the implementation, Danmarks Nationalbank made it clear that in their recovery planning, institutions could not simply rely on Danmarks Nationalbank as the lender of last resort to automatically and unconditionally provide emergency liquidity assistance (ELA) as part of the recovery and resolution process.<sup>59</sup>

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58 In connection with the implementation of the revised Bank Recovery and Resolution Directive (BRRD2) into Danish legislation in 2020, Danmarks Nationalbank repeated its recommendations to repeal the special Danish regulation of mortgage credit institutions, see *Consultation response concerning the bill to amend the Danish Financial Business Act etc.*, Danmarks Nationalbank, 17 August 2020. The BRRD2 MREL changes, effective from December 2020, are described in Danmarks Nationalbank, *Banks should keep their powder dry*, *Danmarks Nationalbank Analysis (Financial stability)*, No. 28, December 2020; Christine Sif Larsen and Anne Dyrberg Rommer, *Crisis management of credit institutions – what is new?*, *Danmarks Nationalbank Analysis*, No. 4, March 2021. The implementation of the BRRD2 also increased the likelihood that unsecured creditors, for instance large non-financial corporations with deposits exceeding the deposit guarantee limit, would have deposits written down or converted to equity in case of resolution of a bank.

59 See Governor Lars Rohde's speech at the Annual Meeting of the Danish Bankers Association, 7 December 2015.

## **On Danmarks Nationalbank as the lender of last resort under new recovery and resolution regime**

“Danmarks Nationalbank is still the lender of last resort, as we have always been. This applies in connection with liquidity problems in the sector in general, but also if a single solvent bank has an urgent need for emergency liquidity assistance – ELA. The role of lender of last resort is an element of Danmarks Nationalbank’s task of contributing to financial stability. But the banks’ liquidity management should obviously not be based on access to emergency liquidity assistance from Danmarks Nationalbank if they come under pressure. (...)

Under the new recovery and resolution regime, the Financial Stability Company, as the resolution authority, is given a number of resolution tools to prevent a resolution from causing financial instability. This means that there is a genuine alternative to granting ELA. We therefore expect the new recovery and resolution regime to limit the number of situations where ELA is relevant.”

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Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Danish Bankers Association, 7 December 2015.

Finally, as part of the new recovery and resolution framework, the resolution authorities (the Danish Financial Supervisory Authority and *Finansiel Stabilitet* (independent public company owned by the Danish State)) had to draw up recovery plans for institutions, and Danmarks Nationalbank had to be consulted on SIFI recovery plans.

### **Enhanced requirements for credit institutions’ liquidity and funding**

In 2009, the Basel Committee put forward proposals for international standards for credit institutions’ liquidity and funding structure. After a number of years, these proposals formed part of EU regulation and so of Danish legislation. Previously, requirements for credit institutions’ liquidity and funding had not been subject to pan-European rules.<sup>60</sup> The new requirements – Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) – were designed to make institutions better able to honour their payment obligations in both domestic and foreign currencies during periods of financial turmoil without liquidity assistance from the authorities.

The LCR requirement stipulated that credit institutions were required at any time to hold a stock of unencumbered, high-quality liquid assets that enabled the institutions to handle net cash outflows in a 30-day scenario with severe liquidity stress in financial markets. The volume of liquid assets

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60 See *Danmarks Nationalbank Financial stability 2006; Danmarks Nationalbank Stress tests, 2nd half 2010; Danmarks Nationalbank Financial stability 2011; Danmarks Nationalbank Financial stability 2013; Danmarks Nationalbank Financial stability 2nd half 2014; Danmarks Nationalbank Financial stability 1st half 2015; Danmarks Nationalbank Financial stability 1st half 2016; Danmarks Nationalbank Financial stability 2nd half 2016.*

each institution was required to hold depended on its business model and the liquidity risks it faced. Institutions were required to comply with the LCR for all currencies as a whole, but should ensure some consistency between the currency denomination of liquid assets and net cash outflows. If an institution was not able to comply with the LCR, it was required to submit a report to the Danish Financial Supervisory Authority, explaining the reason for non-compliance and providing a plan for return to compliance. Ultimately, it could lead to closure of the institution if it was not able to comply with the LCR within a deadline stipulated by the Danish Financial Supervisory Authority.<sup>61</sup>

The LCR was to be gradually phased in from 60 per cent on 1 October 2015, increasing to 100 per cent by 1 January 2018. However, SIFIs were required to comply with an LCR of 100 per cent starting on 1 October 2015. Institutions could comply with the LCR by holding cash, central bank deposits, government bonds etc. and covered bonds, including Danish mortgage bonds, within various limits. In light of the key role of liquid Danish mortgage bonds in Danish credit institutions' liquidity management, in the design of the international LCR framework, Danish emphasis had been placed on ensuring that mortgage bonds could make up a substantial portion of the pool of assets eligible for institutions' LCR compliance.<sup>62</sup>

The NSFR required credit institutions to have stable sources of funding in the medium and long term.<sup>63</sup> This would reduce institutions' refinancing risk in situations of financial market turmoil when, for instance, bond issuance could be difficult. The minimum acceptable amount of stable funding of each institution depended on its business model and the funding risks it faced. Also, each institution should ensure some consistency between the currency denomination of the stable funding and the assets to be funded. The procedures for non-compliance with the NSFR were similar to those for non-compliance with the LCR.

#### *Special focus on refinancing risk in the mortgage credit sector*

In a Danish context, increased awareness of credit institutions' liquidity management led to special focus on the mortgage credit sector's

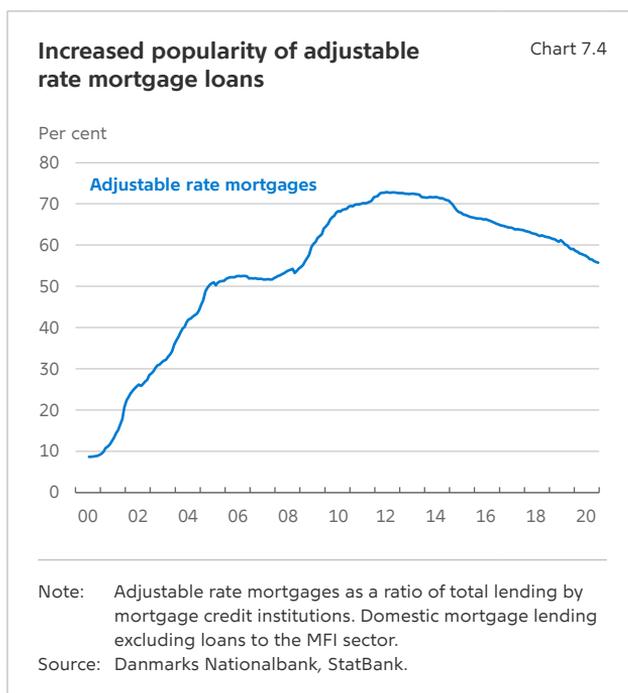
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61 See the memo *Penalties for non-compliance with LCR requirements etc. (in Danish only)*, Danish Financial Supervisory Authority, 28 April 2016.

62 See *Letter to Commissioner Barnier* from Danmarks Nationalbank and the Danish Financial Supervisory Authority of 7 April 2010 with the *memorandum – Danish mortgage credit and international regulation*; *Letter to The Basel Committee on Banking Supervision* from Danmarks Nationalbank and Danish Financial Supervisory Authority of 7 April 2010 with the *memorandum – Danish mortgage credit and international regulation*; consultation response to the Basel Committee on Banking Supervision from Danmarks Nationalbank and the Danish Financial Supervisory Authority of 23 August 2010 with the memorandum on *Danish covered bonds and the Liquidity Coverage Ratio (LCR)*; Birgitte Vølund Buchholst, Jacob Gyntelberg and Thomas Sangjill, *Liquidity of Danish government and covered bonds – before, during and after the financial crisis – preliminary findings, Danmarks Nationalbank Working Paper, No. 70*, September 2010.

63 The NSFR provisions were implemented in EU legislation with a revision of the EU Capital Requirement Regulation (Capital Requirement Regulation 2 (CRR 2)) in May 2019 with effect from mid-2021.

refinancing risks. The reason was the popularity of adjustable rate mortgage loans where 30-year loans were financed by the issuance of, for instance, 1-, 3- or 5-year bonds, see chart 7.4.



A large share of adjustable rate mortgages was funded by short-term bonds. In addition, refinancing was highly concentrated in the final months of the year. In 2009, following discussions between Danmarks Nationalbank, the Association of Danish Mortgage Banks and the Danish Mortgage Banks' Federation, it was agreed that Danish mortgage credit institutions would implement measures to ensure a more even distribution of refinancing activities for adjustable rate mortgages. This would reduce the refinancing risk and also eliminate some of the operational risk arising when very large payments needed to be settled within a short space of time.<sup>64</sup>

But more even distribution of refinancing activities for adjustable rate mortgages did not alter the inherent refinancing risk associated with providing long-term mortgage loans funded by short-term bonds. Situations could arise in which it would not be possible to issue securities in certain markets – not even at much higher interest rates. And, other

<sup>64</sup> See the press release *Spreading of refinancing in December (in Danish only)*, Danish Mortgage Banks' Federation, 12 October 2009; the press release *Spreading of refinancing in December (in Danish only)*, Association of Danish Mortgage Banks, 12 October 2009; *Danmarks Nationalbank Financial stability 2010*.

things being equal, if the refinancing was successfully completed, resulting in large interest rate rises for borrowers, this would increase the credit risks of mortgage credit institutions because borrowers would be affected by higher interest rates. Therefore, Danmarks Nationalbank recommended that this inherent risk in the structure of adjustable rate mortgages should be addressed.<sup>65</sup>

In autumn 2013, a working group was established with representatives from the Ministry of Business and Growth, the Ministry of Finance, Danmarks Nationalbank, the Ministry of Economic Affairs and the Interior and the Danish Financial Supervisory Authority. In March 2014, as a result of the working group's work, the Folketing (Danish parliament) adopted an act on contingent maturity extension for mortgage bonds in case of failed refinancing or excessive interest rate rises.<sup>66</sup> Under the new rules, all mortgage bonds with maturities shorter than the underlying loans would be extended if refinancing failed or if interest rates rose by more than 5 percentage points compared with the yield to maturity of the corresponding short-term bonds the previous year. If the extension was triggered, the maturity of outstanding short-term bonds would be extended by one year, with a nominal interest rate equal to the yield to maturity of corresponding bonds the previous year, plus 5 percentage points. If it was subsequently not possible to refinance the bonds, the maturity would be further extended. However, the probability that interest rates would rise by 5 percentage points over one year was generally seen as very low, and credit rating agencies welcomed the legislative amendment.

### **On compulsory maturity extension of mortgage bonds**

"The immense popularity of mortgage-credit loans that have not been prefinanced has led to a potential refinancing risk for the mortgage banks. Unlike in the old days, mortgage banks have a continuous need for refinancing in the market, and they might experience a situation resembling a 'run' on a bank. It is very unlikely that this will happen, but the consequences could be enormous. Danmarks Nationalbank has pointed out this risk. (...) In Danmarks Nationalbank's opinion compulsory, contingent maturity extension provides a solution to this problem."

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Statement by Governor Lars Rohde in the press release *Financial stability 2nd half 2013*, 11 December 2013.

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65 See *Danmarks Nationalbank Financial stability 2011*.

66 See *Danmarks Nationalbank Financial stability 2nd half 2013*; *Danmarks Nationalbank Financial stability 1st half 2014*; Danmarks Nationalbank, Maturity extension of mortgage bonds, *Monetary Review 1st quarter 2014*; the press release *Future-proofing of Danish mortgage credit (in Danish only)*, Ministry of Business and Growth, 6 November 2013; the press release *Solution to the mortgage banks' refinancing problem*, Danmarks Nationalbank, 6 November 2013.

### **New rules on timely impairment charges in banks' financial statements**

New international accounting standards (IAS 39) were introduced shortly before the financial crisis – in 2005. The new standards marked a departure from a long-standing principle that banks should recognise impairment charges on loans (losses and provisions) according to a prudence concept based on a probable risk of loss, see chapter 1. Going forward, impairment charges could not be recognised until objective evidence of impairment existed. An event must have occurred that resulted in an identifiable loss, for instance that the borrower failed to make the payments agreed in the loan document.<sup>67</sup>

After the financial crisis, bank impairment charges under the new rules were criticised for being 'too little, too late'. This issue was addressed with the transition to the revised International Financial Reporting Standards (IFRS 9) in January 2018. Under IFRS 9, impairment charges were to be based on a more forward-looking approach, with impairment charges being recognised for both incurred and expected losses. Impairment charges now had to be recognised before there was objective evidence of impairment.<sup>68</sup> So, the concept of prudence was reintroduced to financial reporting.<sup>69</sup>

### **Supervisory diamonds and LTVs for highly leveraged homeowners**

Several of the banks that were discontinued during the financial crisis differed from the banking sector as a whole on a number of key parameters. They were characterised by particularly strong lending growth, many large exposures, large customer funding deficits and substantial exposure to the real estate sector compared with the banking sector as a whole. In 2010, this experience prompted the Danish Financial Supervisory Authority to introduce a supervisory diamond as part of its banking supervision. The Supervisory Diamond included a number of benchmarks to indicate banking activities that should generally be regarded as having a higher risk profile. These benchmarks involved lending growth, concentration on commercial property exposure, sum of large exposures, excess liquidity coverage and funding ratio (loans/deposits).<sup>70</sup>

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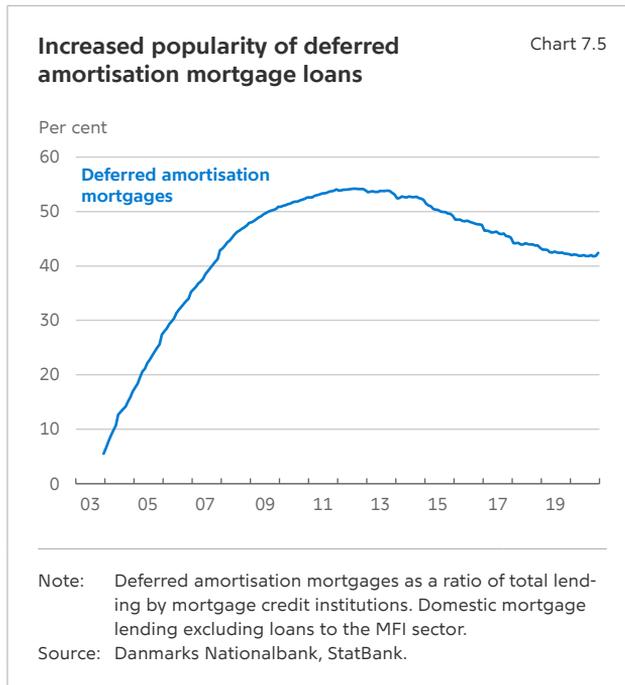
67 See Borka Babic, Credit Institutions and procyclicality, *Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009; Kim Abildgren and Jannick Damgaard, Models for banks' loan impairment charges in stress tests of the financial system, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,2), March 2012; Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

68 See *Danmarks Nationalbank Financial stability 2nd half 2014*; Danmarks Nationalbank, Largest banks close to buffer requirements in stress test, *Danmarks Nationalbank Analysis (Stress test)*, No. 10, June 2017; Danmarks Nationalbank, Risks are building up in the financial sector, *Danmarks Nationalbank Analysis (Financial stability)*, No. 23, November 2017; Danmarks Nationalbank, Prospects of lower earnings and higher capital requirements for banks, *Danmarks Nationalbank Analysis (Financial stability)*, No. 11, May 2019; Danmarks Nationalbank, Credit institutions are facing hard times, *Danmarks Nationalbank Analysis (Financial stability)*, No. 8, May 2020.

69 Certain IFRS 9 transitional arrangements were postponed due to the coronavirus pandemic, see Danmarks Nationalbank, Banks should keep their powder dry, *Danmarks Nationalbank Analysis (Financial stability)*, No. 28, December 2020.

70 See the memo *Danish FSA introduces the 'Supervisory Diamond' for banks*, Danish Financial Supervisory Authority, 25 June 2010.

In 2014, to follow up on a recommendation made in the Rangvid Committee report, the Danish Financial Supervisory Authority also introduced a supervisory diamond for mortgage credit institutions with benchmarks for mortgage credit activities with a higher risk profile.<sup>71</sup> The Supervisory Diamond for mortgage credit institutions e.g. determined limits for the share of deferred amortisation mortgage loans ('interest only lending') due to the growing popularity of deferred amortisation mortgages, see chart 7.5.



Danmarks Nationalbank welcomed the Supervisory Diamond for mortgage credit institutions, but recommended supplementing it with a reduction in the limit for deferred amortisation mortgages for each borrower to underpin the high security of Danish mortgage bonds – also during periods of declining house prices.<sup>72</sup> The Systemic Risk Council shared this view<sup>73</sup> and over a number of years, Danish authorities implemented a range of measures to restrict the possibility of deferred amortisation

71 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; the memo *More robust property financing (in Danish only)*, Danish Financial Supervisory Authority, 11 September 2014.

72 See Governor Lars Rohde's speech at the Annual Meeting of the Association of Danish Mortgage Banks, 2 October 2014; *Danmarks Nationalbank Report and Accounts 2014*; *Danmarks Nationalbank Financial stability 2nd half 2014*.

73 See *Recommendation on restriction of deferred amortisation on mortgage loans*, The Systemic Risk Council, 30 September 2014.

mortgage loans and/or adjustable rate mortgage loans for borrowers with low home equity and high loan-to-income ratios.<sup>74</sup>

### **On limitation of the option of raising deferred amortisation mortgages**

“It is essential to design the mortgage credit system in such a way that bonds remain secure and the system is still robust in periods when house prices fall. The level of interest rates has a strong impact on house prices. If interest rates remain at the current very low level for a long period, prices may rise substantially, but if interest rates go up, house prices could fall sharply. The widespread use of variable rate loans means that many homeowners have no protection of their home equity if interest rates rise. That requires a certain degree of financial resilience. So it is important for homeowners to build up home equity over time, thereby moving away from the maximum LTV ratio.

To supplement the Supervisory Diamond, Danmarks Nationalbank therefore recommends introducing legislation to reduce the maximum limit for deferred amortisation loans as a ratio of the value of the home at the time of mortgaging. This may cause house prices to rise a little more slowly for a while, but the effect will be limited. The reduction should apply to deferred amortisation loans underlying covered bonds, covered mortgage bonds or mortgage bonds issued by banks and mortgage banks. In this way, borrowers will automatically build up a certain distance to the maximum LTV ratio over time. That will further underscore the mortgage credit system’s high degree of security – even if house prices are plummeting.”

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Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Association of Danish Mortgage Banks, 2 October 2014.

### **Decision on a return to stabilising housing taxes**

In its September 2013 report on the causes of the financial crisis, the Rangvid Committee recommended changing property taxation to bring it back in sync with house prices.<sup>75</sup>

Danmarks Nationalbank supported the Rangvid Committee’s recommendation. Danmarks Nationalbank’s analyses demonstrated that the nominal freeze on property value tax contributed to the unsustainable housing bubble in the pre-crisis years and the subsequent sharp downturn

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74 See the overview in Christian Sinding Bentzen, Graeme Stuart Cokayne, Eddie Edin Gerba and Rasmus Pank Roulund, Stricter lending requirements have made homeowners more robust, *Danmarks Nationalbank Analysis*, No. 1, January 2020.

75 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

in the housing market.<sup>76</sup> The freeze caused the ratio of property value taxes to property value to decrease in the years of soaring house prices until 2007 and to increase in the subsequent years of falling house prices. The freeze also resulted in substantial regional differences in effective tax rates: metropolitan areas that recorded the highest price rises experienced the lowest effective tax rates.

Restoration of the link between property value tax and house prices would ensure that house prices increases would automatically trigger higher property taxes, while taxes would automatically decrease when house prices fell. This would provide for more stable macroeconomic developments and enhance financial stability.<sup>77</sup>

### On an appropriate housing tax structure

“An important factor behind the large fluctuations in house prices seen since the mid-2000s is the structure of housing taxes. If the property value tax in nominal terms is frozen, as it is now, the effective taxation rate declines when prices go up, and vice versa. Combined with deferred-amortisation loans, this has contributed to stronger fluctuations in house prices.

(...)

As regards property value tax, the solution is, in principle, simple. Freeze the rate of taxation, not the amount in kroner. With the current outlook for the housing market, this will not lead to higher taxes right now. But more appropriate housing taxes will help dampen fluctuations in the market – fluctuations that are detrimental to society and impede the implementation of economic policy.”

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Quote from Governor Nils Bernstein’s speech at the Annual Meeting of the Danish Mortgage Banks’ Federation, 29 March 2012.

In early May 2017, the Danish government and a broad majority of the parties of the Folketing (Danish parliament) reached agreement that, from 2021, housing taxes would return to tracking house prices.<sup>78</sup> But, as a

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76 See Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen and Susanne Hougaard Thamsborg, The housing bubble that burst: Can house prices be explained? And can their fluctuations be dampened?, *Danmarks Nationalbank Monetary Review*, Vol. 50(1,1), March 2011; Simon Juul Hviid, Tina Saaby Hvolbøl, Asbjørn Klein, Paul Lassenius Kramp and Erik Haller Pedersen, House price bubbles and the advantages of stabilising housing taxation, *Danmarks Nationalbank Monetary Review*, Vol. 55(3), September 2016.

77 See *Danmarks Nationalbank Financial stability 2013*; *Danmarks Nationalbank Financial stability 1st half 2014*.

78 Homeowners incurring higher housing taxes as a result of the housing taxation agreement would be granted a special tax rebate until they sold their homes to ensure that they did not end up paying higher housing taxes, see Simon Juul Hviid and Paul Lassenius Kramp, Housing taxation agreement stabilises house prices, *Danmarks Nationalbank Analysis*, No. 14, September 2017; Simon Juul Hviid and Sune Malthe-Thagaard, The impact of the housing taxation agreement on house prices, *Danmarks Nationalbank Analysis*, No. 6, March 2019.

result of IT problems with the implementation of a new property and land valuation system in the tax administration, the introduction of the new housing taxes was delayed. In May 2020, it was announced that the new housing tax rules would take effect only from 2024.<sup>79</sup>

### **Focus on corporate governance and employee earnings**

The financial crisis brought corporate governance in the financial sector into focus, both in Denmark and at EU level, following corporate governance failures in a large number of banks.<sup>80</sup>

In 2010, the fit and proper provisions of the Danish Financial Business Act were strengthened. As a result, financial stability considerations were included in the Danish Financial Supervisory Authority's assessment of whether members of executive and supervisory boards had the necessary skills and qualifications to carry out their work. The objective of strengthening the provisions was to ensure that the management of a financial company would not take on risks it could not control. Danmarks Nationalbank welcomed this amendment. Danmarks Nationalbank especially emphasised that board members should have the necessary credit expertise.<sup>81</sup> In 2014, the fit and provision provisions were further strengthened.

Employee earnings levels in the financial sector were another focus area.<sup>82</sup> A range of measures were implemented to reduce the risk that remuneration would provide incentives for excessive risk taking in financial companies.

At a more general level, Danmarks Nationalbank's analyses showed that employee earnings levels in the financial sector were relatively high.<sup>83</sup> There could be many – and reasonable – explanations for the relatively high levels. According to Danmarks Nationalbank, most of the additional employee earnings in the financial sector reflected the educational composition of employees, the complexity of job functions, geography etc. Other factors could also provide for the relatively high employee earnings

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79 See the press release *New housing agreement ensures housing tax security (in Danish only)*, Ministry of Taxation, 15 May 2020.

80 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013.

81 See the *Consultation response regarding the Danish Financial Business Act, etc. (in Danish only)*, from Danmarks Nationalbank to the Danish Financial Supervisory Authority, 7 January 2010.

82 See Ministry of Business and Growth, *The financial crisis in Denmark – causes, consequences and lessons (in Danish only)*, Schultz, September 2013; *Danmarks Nationalbank Financial stability 1st half 2009*; Borka Babic, *Credit institutions and procyclicality, Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009.

83 See Kim Abildgren, Nicolai Møller Andersen, Mark Strøm Kristoffersen and Andreas Kuchler, *Productivity and cost-efficiency in the Danish financial sector, Danmarks Nationalbank Monetary Review*, Vol. 52(4,1), December 2013. See also Kraka Advisory, *Analysis of the financial sector pay premium (in Danish only)*, July 2021.

in the financial sector, for instance high productivity or high earnings capacity due to efficient utilisation of highly educated, specialised labour. On the other hand, the ownership structure of the financial sector or the absence of strong potential foreign competition in financial services could dampen the pressure for efficient cost control and equalisation of additional earnings over time.

Danmarks Nationalbank noted that, since 1988, the Danish financial sector had been subject to a special payroll tax. Other things being equal, such payroll tax should contribute to relatively lower earnings in the financial sector than in other industries because, viewed in isolation, payroll tax provided an incentive for the financial sector to replace labour by, for instance, capital (for instance through automation of labour-intensive processes). In Danmarks Nationalbank's view, an important financial sector management task was to ensure a balance between employee earnings levels and their productivity and value for the company.<sup>84</sup>

### On financial sector employee earnings

"Payroll costs make up the most significant item on a bank's operating budget. Raw earnings levels show that, since the early 1980s, average earnings in the financial sector have tended to be higher than in the rest of the economy.

(...)

So it is an important financial sector management task regularly to focus on ensuring a balance between employee earnings levels and productivity and value for the company."

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Quote from Governor Lars Rohde's speech at the Annual Meeting of the Association of Local Banks, Savings Banks and Cooperative Banks in Denmark, 8 May 2014.

Financial sector employee earnings were back in focus in October 2020 when the government and a majority of the parties of the Folketing (Danish parliament) agreed on a new early retirement scheme. A special tax on the financial sector – in the form of a special corporate tax on financial sector profits – was included as part of the agreement. Danmarks Nationalbank pointed out that the additional taxation should not be used or accepted as a reason for relaxing regulatory requirements on banks.<sup>85</sup>

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84 See Governor Lars Rohde's speech at the Annual Meeting of the Association of Local Banks, Savings Banks and Cooperative Banks in Denmark, 8 May 2014.

85 See Danmarks Nationalbank, Banks should keep their powder dry, *Danmarks Nationalbank Analysis (Financial stability)*, No. 28, December 2020; press release *Agreement on right to early retirement (in Danish only)*, Ministry of Finance, 11 October 2020 (with *Agreement on new right to early retirement (in Danish only)*, 10 October 2020).

### **On a special tax on financial institutions to finance right to early retirement**

“The Danish government is planning to impose a special tax on financial institutions. In Danmarks Nationalbank’s assessment, the nature and scale of the proposed tax will not challenge financial stability. But it is essential that the burden on the banking sector is not used or accepted as a reason for relaxing capital requirements, the minimum requirement for own funds and eligible liabilities (MREL) or, for instance, anti-money laundering efforts.”

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Quote from *Danmarks Nationalbank’s comments on the Economic Council’s Autumn 2020 Report*, 20 October 2020.

### **Danish participation in the banking union?**

The financial crisis and the subsequent sovereign debt crisis in a number of European countries brought into focus the negative spiral of weak banks and weak public finances. These countries did not have sufficient government budget scope to pay for the costs of the financial crisis without creating an upward pressure on government borrowing costs, which in turn spilled over to banks’ funding costs. This amplified the problems of the banking sector and the real economic implications of the crisis.

In late June 2012, as part of the resolution of the European sovereign debt crisis, euro area leaders agreed to create a banking union with a single supervisory mechanism. The banking union would also include a framework for the recovery and resolution of credit institutions.<sup>86</sup>

In October 2013, the Single Supervisory Mechanism (SSM) was adopted by EU ministers of economics and finance, and in November 2014 the European Central Bank (ECB) assumed its new role as single supervisory authority.<sup>87</sup> The ECB would now make supervisory decisions regarding the largest credit institutions in banking union participant member states and be responsible for direct supervision with the assistance of national supervisory authorities. National supervisory authorities would be responsible for supervisory decision-making as well as the practical exercise of supervision of other credit institutions within the framework, guidelines and instructions issued for the single supervision.

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86 See Signe Skovgaard Hansen, Lars Risbjerg and Susanne Hougaard Thamsborg, Yield spreads and announcement of policy initiatives and credit ratings, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,2), March 2013; *Danmarks Nationalbank Monetary Review 3rd quarter 2012, part 1*. A proposal for a single deposit guarantee scheme to be part of the banking union was a more sensitive political issue, and by the end of 2020 negotiations for this scheme had not yet come to a successful conclusion.

87 See *Danmarks Nationalbank Monetary Review 4th quarter 2013, part 1*.

The framework for the Single Resolution Mechanism (SRM) was finally adopted in July 2014, and it took full effect in January 2016. The new Single Resolution Board (SRB) was based in Brussels. The SRB would be responsible for the resolution of the largest failing credit institutions and cross-border groups with the assistance of national resolution authorities. Moreover, a Single Resolution Fund was created. The amount of its funds was built up over time, with contributions from the banking sector raised at national level by the participant member states.

Participation in the banking union was mandatory for euro area member states, while non-euro area EU member states could opt to join. If Denmark opted to join, Danish authorities – the Danish Financial Supervisory Authority and *Finansiel Stabilitet* – would become part of the Single Supervisory Mechanism and the Single Resolution Mechanism.

In February 2014, the government established a working group under the auspices of the Ministry of Business and Growth with representatives from the relevant ministries, the Danish Financial Supervisory Authority and Danmarks Nationalbank. The working group was tasked to assess whether participation in the banking union would be in Denmark's best interests. The working group submitted its report in April 2015.<sup>88</sup> Based on this report, the government and a majority of the parties of the Folketing (Danish parliament) found that participation in the banking union would generally be an advantage for Denmark. A final decision on Danish participation would be made when the functioning of the banking union and certain aspects of importance to Danish participation had been clarified.

In July 2017, the government established a working group under the auspices of the Ministry of Industry, Business and Financial Affairs with representatives from the relevant ministries, authorities and Danmarks Nationalbank. The working group was tasked to draw up a new report on Danish participation in the banking union.<sup>89</sup> The working group's report was published in December 2019. The report found that many aspects spoke in favour of Danish participation in the banking union and that unclarified issues raised in the 2015 report had been clarified or made more specific.<sup>90</sup> When the report was published, the government announced that work on

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88 See the announcement *Report on possible Danish participation in the banking union (in Danish only)*, Ministry of Business and Growth, 30 April 2015; *Report on possible Danish participation in the banking union (in Danish only)*, April 2015, Working Group on possible Danish Participation in the Banking Union; the press release *No constitutional requirement for a referendum on Danish participation in the banking union (in Danish only)*, Ministry of Justice, 30 April 2015; *memo on whether Danish participation in the banking union requires use of the procedure under section 20 of the constitution (in Danish only)*, Ministry of Justice, 29 April 2015.

89 See the press release *The Danish government launches review on Danish participation in EU Banking Union*, Ministry of Industry, Business and Financial Affairs, 4 July 2017.

90 See *Report on possible Danish participation in the banking union – experience since 2015 (in Danish only)*, December 2019, Working Group on possible Danish Participation in the Banking Union.

new elements of the banking union was still ongoing and that more clarity was needed in various areas before it could make a decision on Danish participation.<sup>91</sup>

Throughout the years, Danmarks Nationalbank recommended Danish participation in the banking union for the following reasons:<sup>92</sup>

The banking union was an important step in the strengthening of the single market for financial services, which Denmark had already joined. According to Danmarks Nationalbank, Danish participation would strengthen cross-border price and product competition to the benefit of households and companies.

The largest Danish banks engaged in substantial cross-border activities<sup>93</sup>. In Danmarks Nationalbank's view, this required close and binding international supervisory cooperation. In any case, the banking union would have a huge impact on Denmark. Even if Denmark opted out of the banking union, the largest Danish banks would be subject to supervision by the ECB in relation to considerable parts of their euro area activities.<sup>94</sup> Membership of the banking union would give Denmark more of a say in how the European supervision of banks was performed.

In Danmarks Nationalbank's assessment, with its resources and expert experience, the Single Supervision Mechanism would strengthen the supervision of the largest Danish credit institutions. Also, the Single Supervision Mechanism would become the new standard and would be seen as a stamp of quality among credit rating agencies and investors.

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91 See the announcement *Report from the Working Group on possible Danish Participation in the Banking Union*, Ministry of Industry, Business and Financial Affairs, 19 December 2019.

92 See *Danmarks Nationalbank Monetary Review 1st quarter 2013, part 1*; *Danmarks Nationalbank Financial stability 2013*; *Danmarks Nationalbank Financial stability 2013 2nd half*; Governor Lars Rohde's speech at the Annual Meeting of the Danish Bankers Association, 2 December 2013; *Danmarks Nationalbank Financial stability 2014 1st half*; *Financial stability 2014, 2nd half*; *Danmarks Nationalbank Monetary Review 4th quarter 2014*; Danmarks Nationalbank, Danish participation in the banking union, *Danmarks Nationalbank Monetary Review*, Vol. 53(4), December 2014; Governor Lars Rohde's speech at the Annual Meeting of the Danish Bankers Association on 1 December 2014; *Danmarks Nationalbank's statement on the banking union (in Danish only)*, 30 April 2015; *Danmarks Nationalbank Financial stability 2015, 1st half*; Governor Per Callesen, *Danes will not have to pay extra bill from joining the banking union (in Danish only)*, Altinget, 20 November 2018; Governor Lars Rohde's speech at the Annual Meeting of Finance Denmark, 3 December 2018; Governor Lars Rohde's speech at the Annual Meeting of Finance Denmark, 2 December 2019; Danmarks Nationalbank, *Knowledge about the banking union (in Danish only)*, [www.nationalbanken.dk](http://www.nationalbanken.dk), December 2019; Governor Per Callesen and Karsten Bilotft, *Let's debate the banking union (in Danish only)*, Børsen, 17 January 2020.

93 In 2013: Danske Bank and Nordea. In January 2017, Nordea Bank Danmark was converted from a subsidiary into a branch of Nordea AB. Following the conversion, Nordea Bank Danmark was no longer subject to independent capital and liquidity requirements, but was to be covered by the capital and liquidity of Nordea AB. Also, the primary responsibility for supervising the activities of Nordea Bank Danmark passed from the Danish to Swedish supervisory authorities.

94 Following the redomiciliation of Nordea's headquarters to Finland in 2018, Nordea's Danish banking activities became subject to direct supervision by the ECB.

Therefore, participation in the banking union would ensure better funding terms for Danish credit institutions than credit institutions based in EU member states that did not participate in the banking union.

Danmarks Nationalbank also stressed that the banking union's Single Resolution Mechanism was essentially based on the continuation of the systemically important functions of failing institutions without use of government funds or transfers between banking union member states. The principle was that losses should primarily be borne by the owners and investors of a failing bank. Transfers from banks and taxpayers in one member state to bail out banks in another member state would be effected only in very extreme loss scenarios.<sup>95</sup>

Finally, participation in the banking union through the ECB would give Denmark a voice and influence in the Basel Committee and the Financial Stability Board, which were key bodies in the design of financial regulation to which Danish credit institutions were subject through EU legislation.

### **On Danish participation in the banking union**

"Danish participation in this cooperation will boost the competences of the authority which is to scrutinise the largest Danish credit institutions. The single supervisory authority in Frankfurt can attract experts from all over Europe. And it is currently building up considerable experience via its supervision of a number of very large banks.

It is of paramount importance to financial stability that our supervisory authority has the competences to match the large banks. And it is equally important that we have a resolution authority with the necessary insight and resources to resolve the largest Danish banks.

It is considerably easier to build up and maintain such supervisory powers if you have many "customers". The quality of the resolution also increases if you gradually accumulate experience in resolving large banks.

The strengthened banking cooperation is a further development of the single market for financial services, which Denmark is part of. It strengthens the overall European supervisory powers and creates a more level playing field for credit institutions in Europe. We ought to be able to agree on opting in."

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Quote from Governor Lars Rohde's speech at the Anniversary Conference on Banking & Supervision, 3 October 2019.

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<sup>95</sup> See also Niels Bartholdy, The banking union is not centred round joint liability, *Danmarks Nationalbank Analysis*, No. 19, November 2018.

## Climate change and financial stability

In December 2015, some 200 countries signed the Paris Climate Accord and pledged to reduce greenhouse gas emissions (not least carbon emissions) to the atmosphere to reduce man-made climate change and keep the derived rise in global temperature to well below 2 °C relative to pre-industrial levels. Efforts should be made to limit the rise in temperature to 1.5 °C.

In December 2017, as follow-up to the Paris Climate Accord, a group of central banks and supervisory authorities established the Network for Greening the Financial System (NGFS). The objective of the NGFS was to exchange experience and contribute to the development of climate-related risk management in the financial sector. Danmarks Nationalbank joined the NGFS in April 2019<sup>96</sup>, and Danish Financial Supervisory Authority joined the network in June 2020<sup>97</sup>.

### On central banks and climate change

“Climate change is global and transcends borders so it is natural that we work together internationally. It is not the task of central banks to provide solutions to climate challenges, but given our objective of ensuring financial stability in Denmark, we also have to consider the climate-related risks that may affect the financial system and the economy overall (...).”

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Statement by Governor Lars Rohde in the press release *Danmarks Nationalbank joins the Network for Greening the Financial System*, 9 April 2019.

In December 2019, Danmarks Nationalbank published its first analysis of the impact of climate change on financial stability.<sup>98</sup> This analysis focused on risks that could, for instance, impact credit institution customers and result in loan and investment losses. These risks covered several areas. Some risks were related to physical climate change impacts, for instance if more extreme weather conditions resulted in more frequent droughts and floods, which could, in turn, affect agricultural revenue and the value of properties in low-lying coastal areas. Other risks related to a transition to a more carbon-neutral economy<sup>99</sup>, for instance if earnings in some sectors

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96 See the press release *Danmarks Nationalbank joins the Network for Greening the Financial System*, 9 April 2019.

97 See the Danish Financial Supervisory Authority's press release *The Danish Financial Supervisory Authority joins international network for sustainable finance (in Danish only)*, 17 June 2020.

98 See Danmarks Nationalbank, *Climate change can have a spillover effect on financial stability*, *Danmarks Nationalbank Analysis*, No. 26, December 2019.

99 In which emissions of other greenhouse gases such as methane are also converted into carbon equivalents.

were particularly impacted by climate policy measures or changes in consumer preferences in response to climate change.

Danmarks Nationalbank called on financial institutions to include climate-related risks in their risk management and pricing and on authorities to include these risks in their work. In November 2020, Danmarks Nationalbank published its first climate stress test of Danish credit institutions.<sup>100</sup>

Danmarks Nationalbank also found it important that financial regulation should reflect actual risks. Accordingly, artificial green 'discounts' on capital requirements should not be granted to credit institutions to accelerate the green transition. On the other hand, capital requirements for carbon-intensive assets should be tightened if these proved to be linked to greater risks.<sup>101</sup>

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100 See Olivia Helmersen, Søren Korsgaard and Rasmus Pank Roulund, A gradual green transition supports financial stability, *Danmarks Nationalbank Analysis*, No. 21, November 2020.

101 See Governor Lars Rohde's speech at the Annual Meeting of Finance Denmark, 2 December 2019.





# The Danish economy after the financial crisis

Denmark's general government debt was low before the financial crisis, providing good starting point for supporting the economy when the crisis hit. Danmarks Nationalbank considered fiscal easing in the years 2009-10 to be justified, but after 2010 Danmarks Nationalbank recommended consolidation of public finances. This recommendation was based on the expectation that the spare capacity in the economy would be exhausted within a few years. Moreover, the sovereign debt crisis in Europe prompted international investors to pay much more attention to whether individual countries were pursuing responsible fiscal policies, and several countries experienced strong increases in long-term interest rates over a short period of time.

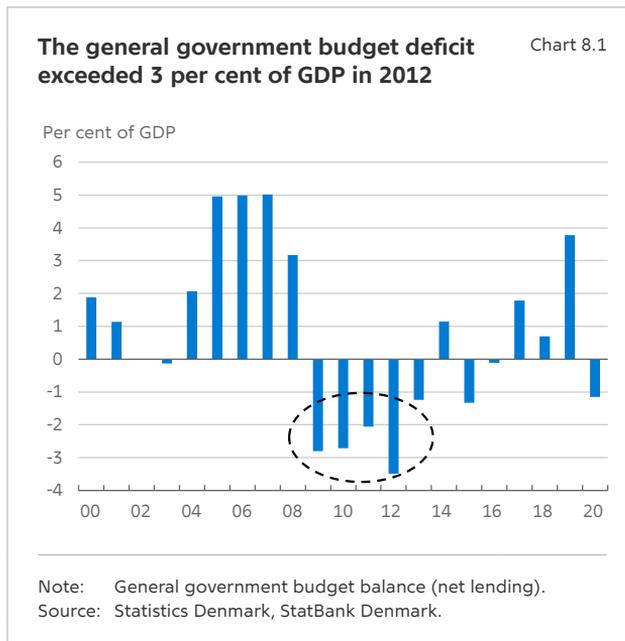
Actual growth in the years 2012-14 was considerably lower than expected in Danmarks Nationalbank's projections (and other institutions' forecasts). A principal reason was lower-than-expected export market growth as the European sovereign debt crisis evolved. At the end of 2014, there was still spare capacity in the Danish economy, but after that the output gap closed within a few years. In 2016, real GDP growth in Denmark since 2009 was revised upwards markedly in connection with revisions of the national accounts. The considerable upward revision emphasised that economic performance could not be assessed on the basis of GDP growth data alone.

The upswing in the Danish economy after the financial crisis lasted for more than a decade. And it was a balanced upswing without overheating of the economy. Labour market pressures were eased through reforms that boosted the labour supply, and the risk of local house price bubbles was averted through adjustments to lending rules, among other things. Inflation was low during the upswing, and large current account surpluses turned foreign debt into net foreign assets. This contributed to low government borrowing rates.

The balanced boom, low public debt and strong net foreign assets gave Denmark a good starting point for tackling the downturn when the coronavirus pandemic hit the economy in 2020.

### Fiscal policy amid financial crisis and sovereign debt crisis

Denmark's general government debt was low before the outbreak of the financial crisis, providing a good starting point for supporting economic activity during the severe economic downturn. Denmark was among the EU member states that actively eased fiscal policy the most in the years 2009-10.<sup>1</sup> In addition, there was automatic fiscal accommodation in the form of greater public expenditure for transfer incomes and less tax revenue as a result of increased unemployment and lower output. Denmark was close to the Maastricht Treaty limit for a general government budget deficit of 3 per cent of GDP in the years following the financial crisis, and in one year the limit was exceeded, see chart 8.1. This led to an EU recommendation to reduce the deficit below 3 per cent of GDP.<sup>2</sup>



Danmarks Nationalbank considered fiscal easing to be justified in 2009 and 2010. But after that, the recommendation was for consolidation of public finances, given the renewed signs of economic recovery.<sup>3</sup>

1 See Ann-Louise Winther, Impact of fiscal policy during the crisis, *Danmarks Nationalbank Monetary Review*, Vol. 48(3), September 2009.

2 See *Danmarks Nationalbank Monetary Review 2nd quarter 2012, part 1*; Pernille Bomholdt Nielsen and Morten Hedegaard Rasmussen, Public expenditure management in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 51(2,1), June 2012.

3 See *Danmarks Nationalbank Monetary Review 3rd quarter 2009*; *Danmarks Nationalbank Monetary Review 1st quarter 2011, part 1*.

In Danmarks Nationalbank's quarterly projections from 2011 and 2012, the spare capacity in the economy was initially estimated to correspond to a negative output gap<sup>4</sup> of around 2 per cent of potential GDP. Given Danmarks Nationalbank's expectations of economic growth in the coming years, the gap would be largely closed by the end of the projection period.<sup>5</sup> In terms of stabilisation policy, Danmarks Nationalbank – like the International Monetary Fund (IMF)<sup>6</sup> – therefore did not consider it necessary to ease fiscal policy further.

### On fiscal policy during and after the financial crisis

“It made good sense to ease fiscal policy during the strong economic downturn in 2009 and 2010. But now the economy is recovering, while the government budget has deteriorated sharply. So now it is time for consolidation.”

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Statement by Governor Nils Bernstein on the publication of Danmarks Nationalbank's *Monetary Review 1st quarter 2011*, press release, 16 March 2011.

Danmarks Nationalbank assessed that easing fiscal policy to take account of the cyclical situation would entail greater risks than benefits.<sup>7</sup> One reason was that the aggravated sovereign debt crisis in Europe, where several countries experienced considerable increases in long-term government bond yields over a short period of time, underlined the importance of maintaining confidence in fiscal policy. The sovereign debt crisis made international investors much more aware of whether individual countries were pursuing responsible fiscal policies. This was the background for Danmarks Nationalbank's calls for maintaining the tight fiscal policy as planned.<sup>8</sup> In fact, the consolidation of public finances could turn out to be timely given the cyclical

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4 Calculated as the difference between actual and potential real GDP, see Asger Lau Andersen and Morten Hedegaard Rasmussen, Potential output in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 50(3,1), September 2011.

5 See *Danmarks Nationalbank Monetary Review 1st quarter 2011, part 1; Danmarks Nationalbank Monetary Review 2nd quarter 2011, part 1; Danmarks Nationalbank Monetary Review 3rd quarter 2011, part 1; Danmarks Nationalbank Monetary Review 4th quarter 2011, part 1; Danmarks Nationalbank Monetary Review 1st quarter 2012, part 1; Danmarks Nationalbank Monetary Review 2nd quarter 2012, part 1; Danmarks Nationalbank Monetary Review 3rd quarter 2012, part 1; Danmarks Nationalbank Monetary Review 4th quarter 2012, part 1.*

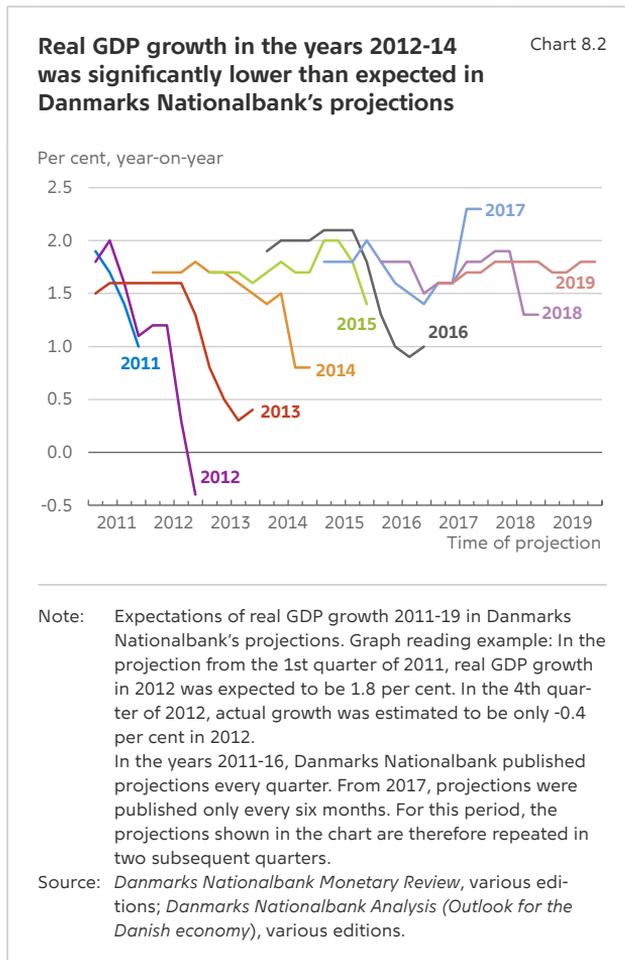
6 See the press release *The IMF Article IV consultation on the Danish economy* from Danmarks Nationalbank, 1 November 2010.

7 See *Danmarks Nationalbank Monetary Review 3rd quarter 2011, part 1.*

8 See speech by Governor Nils Bernstein at the Annual Meeting of the Association of Danish Mortgage Banks, 30 March 2011; *Danmarks Nationalbank, Monetary Review 4th quarter 2011, part 1.*

situation with prospects of economic growth and significant consumption potential stemming from a low consumption ratio.<sup>9</sup>

Actual growth in the years 2012-14 was significantly lower than expected in Danmarks Nationalbank's projections (and other institutions' forecasts), see chart 8.2.<sup>10</sup> A principal reason was lower-than-expected growth in Denmark's export markets as the European debt crisis evolved, see chart 8.3. At the end of 2014, there was still spare capacity in the Danish economy, but afterwards growth picked up and the output gap closed within a few years.<sup>11</sup>



9 See *Danmarks Nationalbank Monetary Review 1st quarter 2012, part 1*.

10 For a comparison of Danmarks Nationalbank's projections and other forecasts for 2012, see Kirstine Eibye Brandt and Niels Arne Dam, *Danmarks Nationalbank's projections for the Danish economy 2008-12*, *Danmarks Nationalbank Monetary Review*, Vol. 52(4.1), December 2013.

11 See *Danmarks Nationalbank Monetary Review 4th quarter 2014*; Danmarks Nationalbank, *Prospects for moderate recession over the next year*, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 18, September 2020.

## Export market growth in 2012-14 was significantly lower than assumed in Danmarks Nationalbank's projections

Chart 8.3



Note: Assumption of export market growth 2011-19 in Danmarks Nationalbank's projections. Graph reading example: In the projection from the 1st quarter of 2011, it was assumed that real export market growth in 2012 would be 6.5 per cent. In the 4th quarter of 2012, actual growth was estimated to be only 1.9 per cent in 2012. In the years 2011-16, Danmarks Nationalbank published projections every quarter. From 2017, projections were published only every six months. For this period, the projections shown in the chart are therefore repeated in two subsequent quarters.

Source: *Danmarks Nationalbank Monetary Review*, various editions; *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, various editions.

## On fiscal policy in the light of the European debt crisis

"In view of the intensified sovereign debt crisis in Europe, with more and more countries facing higher interest rates, it is important to maintain market confidence in Denmark's fiscal policy. I therefore welcome the new government's plans of observing the EU's recommendation to bring the government budget deficit below 3 per cent of GDP in 2013 and to improve the structural balance by 1.5 per cent of GDP over the years 2011-13."

Statement by Governor Nils Bernstein on the publication of Danmarks Nationalbank's *Monetary Review 4th quarter 2011*, press release, 15 December 2011.

Extraordinary revisions of the annual national accounts in 2016 resulted in a considerable upward revision of real GDP growth in the Danish economy since 2009. The upward revision was motivated by e.g. revision of the balance of payments statistics with regard to trade in goods not crossing the Danish border. The revisions of the national accounts did not significantly alter Danmarks Nationalbank's assessment of the economic performance during the first half of the 2010s, as the assessment of the economic situation and capacity pressures in the Danish economy had placed emphasis on a wide range of indicators, including indicators for developments in the labour market and in the various parts of the business sector. But the revision stressed that assessments of Denmark's economic performance could not be based on real GDP growth data alone.<sup>12</sup>

### **A protracted and balanced upswing**

The upswing in the Danish economy from the trough in 2009 was protracted and balanced without overheating of the economy. The upswing lasted for more than a decade right up to 2020 when Denmark and the rest of the world were hit by the coronavirus pandemic. Only about 20 per cent of all upswings in OECD countries since 1970 had lasted longer.<sup>13</sup>

During the upswing, Danmarks Nationalbank's analyses of the Danish economy focused on identifying possible imbalances that could build up during a boom, as experience had shown, and could lead to a sharp slowdown followed by a prolonged period of low or negative economic growth. The focus was not least on the risk of labour and housing market imbalances.

Structural unemployment had been continuously reduced through labour market reforms since the mid-1990s, and even in the years immediately following the outbreak of the financial crisis in 2008, unemployment was at a relatively low level viewed in a longer perspective, see chart 8.4.

Labour market capacity pressures gradually increased in the second half of the upswing with signs of labour shortages in parts of the labour market, particularly in construction. However, capacity pressures built up at a slower pace than during the boom in the first half of the 2000s, and towards the end of the upswing there were signs that labour market pressures were easing.

The labour market developed in a more balanced way during the upswing in the 2010s because it was possible to increase the labour supply with the retirement agreement from May 2011<sup>14</sup>, which after a few years resulted

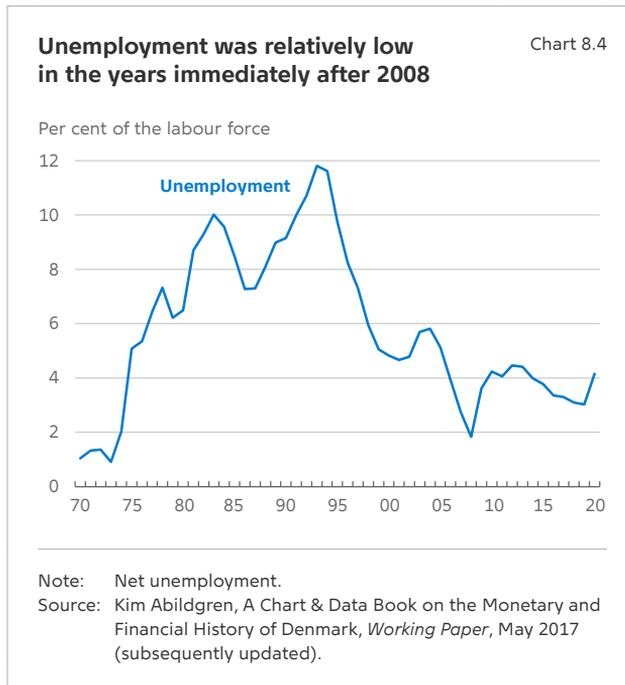
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12 See box 6 The revision of the national accounts provides a clearer picture of the upswing, *Danmarks Nationalbank Monetary Review 4th quarter 2016*; Grane Haker Høegh and Sune Malthe-Thagaard, Higher growth figures confirmed the upswing, *Danmarks Nationalbank Analysis*, No. 4, March 2017.

13 See Paul Lassenius Kramp and Jesper Pedersen, Expansions do not end because of old age, *Danmarks Nationalbank Analysis*, No. 10, June 2020.

14 See *Danmarks Nationalbank Monetary Review 2nd quarter 2011, part 1*.

in fewer people on early retirement and also entailed a gradual increase in the state pension age from 2019. Furthermore, with some limitations, it was possible to recruit labour from other countries in line with the increase in demand for labour.<sup>15</sup>



In relation to the housing market, as described in chapter 7, Danmarks Nationalbank called for a change in housing taxation to restore its function as an automatic stabiliser for the housing market and the economy as a whole. Moreover, Danmarks Nationalbank had special focus on the risk of regional and local house price bubbles during the upswing, as prices rose sharply in the large cities – especially in parts of Copenhagen.<sup>16</sup>

15 See Tina Saaby Hvolbøl, Rasmus Mose Jensen and Erik Haller Pedersen, Risks associated with the current upswing in the Danish economy, *Danmarks Nationalbank Monetary Review*, Vol. 54(2), June 2015; Troels Kromand Danielsen and Casper Winther Jørgensen, Spare capacity in the labour market, *Danmarks Nationalbank Monetary Review*, Vol. 54(3), September 2015; Andreas Kuchler and Svend Greniman Andersen, Once again labour shortage in construction, *Danmarks Nationalbank Analysis*, No. 15, September 2017; Christian Ellermann-Aarslev, The labour market is slowly tightening, *Danmarks Nationalbank Analysis*, No. 13, September 2018; Danmarks Nationalbank, Slightly lower growth in the coming years, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 20, September 2019.

16 See Niels Arne Dam, Tina Saaby Hvolbøl and Morten Hedegaard Rasmussen, A multi-speed housing market, *Danmarks Nationalbank Monetary Review*, Vol. 53(3), September 2014; Jacob Isaksen and Erik Haller Pedersen, Recent housing market trends, *Danmarks Nationalbank Monetary Review*, Vol. 54(3), September 2015.

## On labour supply and early retirement reform

“It is a well-known fact that the demographic development points to a shrinking workforce and a rising number of persons outside the labour market. This is a serious challenge for future prosperity and public services. An obvious and undoubtedly effective instrument for offsetting the decline in the labour force and strengthening public finances would be to phase out the early retirement scheme.”

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Statement by Governor Nils Bernstein on the publication of Danmarks Nationalbank's *Monetary Review 1st quarter 2011*, press release, 16 March 2011.

Nationally, house price developments reflected underlying fundamental factors, in particular rising incomes and the low level of interest rates, and Danmarks Nationalbank did not see signs of a nationwide house price bubble. Regional and local variations in house price developments stemmed from such factors as differences in demographics, incomes and the shortage of building plots. But in the mid-2010s, Danmarks Nationalbank's statistical tests showed indications that the Copenhagen housing market was close to a speculative house price bubble, with price increases driven by expectations of future increases.<sup>17</sup> Model calculations also indicated a risk that price increases in Copenhagen could, with some delay, spill over into house price increases in other parts of the country. Furthermore, Danmarks Nationalbank's analyses showed that many new housing loans in Copenhagen and Aarhus were granted to borrowers whose loans amounted to more than four times the household's annual income, bringing the homeowner indebtedness close to the level prior to the financial crisis.<sup>18</sup> However, towards the end of the upswing price increases in the Copenhagen housing market were dampened by several factors: the measures to restrict access to deferred amortisation housing loans and/or adjustable rate loans for borrowers with low home equity and high loan-to-income ratios, an increased housing supply via new construction and possibly also the agreement on the future housing tax from 2017.<sup>19</sup>

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- 17 See Danmarks Nationalbank, No housing price bubble at the national level, but it's getting close in Copenhagen, *Danmarks Nationalbank News*, No. 3, September 2016; Simon Juul Hviid, Tina Saaby Hvolbøl, Asbjørn Klein, Paul Lassenius Kramp and Erik Haller Pedersen, House price bubbles and the advantages of stabilising housing taxation, *Danmarks Nationalbank Monetary Review*, Vol. 55(3), September 2016.
- 18 See Danmarks Nationalbank, Higher indebtedness of homeowners in major cities, *Danmarks Nationalbank News*, No. 4, December 2016; Danmarks Nationalbank, Risk of price falls for owner-occupied flats in Copenhagen, *Danmarks Nationalbank News*, No. 4, December 2016; Simon Juul Hviid, Tina Saaby Hvolbøl and Erik Haller Pedersen, Regional aspects of the housing market, *Danmarks Nationalbank Monetary Review*, Vol. 55(4), December 2016.
- 19 See Danmarks Nationalbank, The Danish economy is heading deeper into the boom, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 7, March 2019; Danmarks Nationalbank, Slightly lower growth in the coming years, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 20, September 2019.

## On the concern about house price developments in Copenhagen

“Prices of owner-occupied flats in Copenhagen are high relative to incomes and interest rates and there is a risk that price developments are being driven by self-fulfilling expectations (...). This makes the Copenhagen housing market vulnerable to sudden interest rate rises. Hence, there is a considerable risk that if the real price increases seen in recent years continue, they will be followed by falls of the same size (...).”

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Statement by Governor Lars Rohde on the publication of Danmarks Nationalbank's *Monetary Review 4th quarter 2016*, press release, 7 December 2016.

From the mid-2010s, Danmarks Nationalbank, in its fiscal policy recommendations, emphasised the need to bring public finances from a stimulative to a neutral level by balancing the structural budget balance over a number of years. The cyclical recovery in the second half of the 2010s was supported by low interest rates, and given limited spare resources in the economy, expansionary fiscal measures were not needed, considering the cyclical momentum.<sup>20</sup>

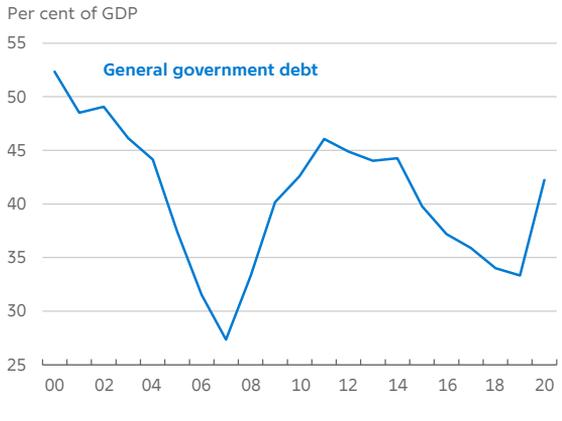
The boom left Denmark with an economy with no substantial imbalances and with low unemployment and public debt, see charts 8.5 and 8.6. This provided a good starting point for economic policy when the Danish and international economies were hit by the coronavirus pandemic in 2020.

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20 See *Danmarks Nationalbank Monetary Review 1st quarter 2015*; *Danmarks Nationalbank Monetary Review 2nd quarter 2015*; *Danmarks Nationalbank Monetary Review 3rd quarter 2015*; *Danmarks Nationalbank Monetary Review 4th quarter 2015*; *Danmarks Nationalbank Monetary Review 1st quarter 2016*; *Danmarks Nationalbank Monetary Review 2nd quarter 2016*; *Danmarks Nationalbank Monetary Review 3rd quarter 2016*; *Danmarks Nationalbank Monetary Review 4th quarter 2016*; Danmarks Nationalbank, Balanced recovery in the Danish economy, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 5, March 2017; Danmarks Nationalbank, Solid upswing with increased labour market pressure, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 16, September 2017; Danmarks Nationalbank, Moderate boom in the coming years, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 3, March 2018; Danmarks Nationalbank, Boom with no signs of imbalances, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 15, September 2018; Danmarks Nationalbank, The Danish economy is heading deeper into the boom, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 7, March 2019; Danmarks Nationalbank, Slightly lower growth in the coming years, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 20, September 2019.

### Low general government debt at the start of 2020

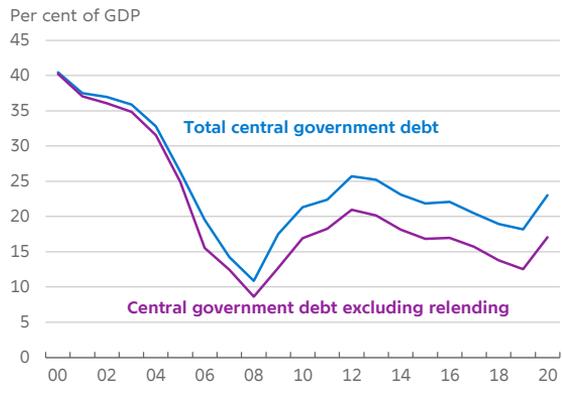
Chart 8.5



Note: General government debt. EMU debt.  
Source: Statistics Denmark, StatBank Denmark.

### Low central government debt at the start of 2020

Chart 8.6

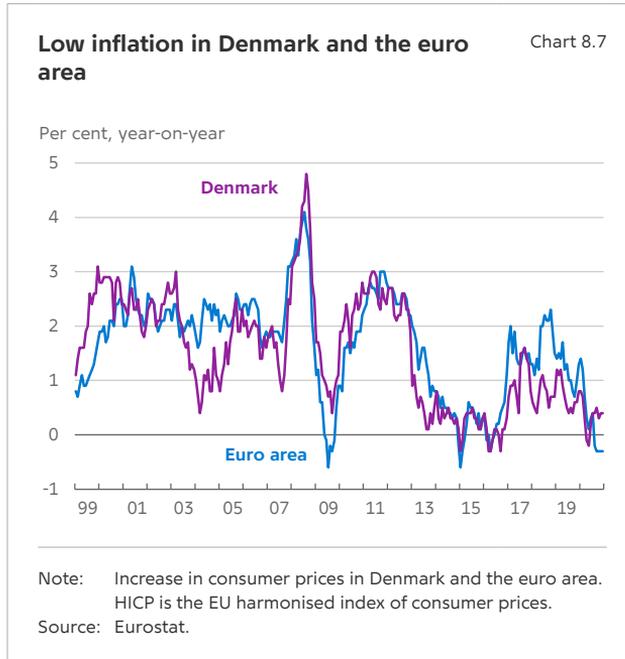


Note: Total central government debt is calculated as domestic and foreign government debt less the value of the central government's deposit at Danmarks Nationalbank, assets in government funds, the central government's portfolio bonds to finance social housing and the central government's receipt of collateral in connection with interest rate and currency swaps. Government funds include the Social Pension Fund (2000-2020), the Financing Fund (2005-2007), the Danish National Advanced Technology Foundation (2005-2013), the Fund for Prevention and Retention (2007-2020) and Innovation Fund Denmark (2014-2020).

Source: Danmarks Nationalbank, *Danish Government Borrowing and Debt*, various editions; Statistics Denmark, StatBank Denmark.

### Low inflation – but no deflation

The consistent fixed exchange rate policy vis-à-vis the euro was clearly reflected in inflationary developments in Denmark, mirroring developments in inflation in the euro area, see chart 8.7. For the euro area, the European Central Bank (ECB) aimed to keep annual inflation below but close to 2 per cent in the medium term, and for the period 2005-20 inflation averaged around 1.5 per cent per year in both Denmark and the euro area.



### On fixed exchange rate policy and price stability

“The date 12 January 2017 marks the 30th anniversary of the Danish central rate. Looking back, Denmark’s fixed exchange rate policy has turned out to be very resilient, even through economic and financial crises along the way. In brief, the objective of Denmark’s monetary policy is to ensure price stability, which the fixed exchange rate policy has helped to deliver. This means that the krone’s stable value plays an important role in the financial decisions of Danish households and in firms’ planning for the future.”

Quote from Danmarks Nationalbank, Denmark’s fixed exchange rate policy: 30th anniversary of unchanged central rate, *Danmarks Nationalbank News*, No. 1, January 2017.

For much of the 2010s, inflation in the euro area as well as in many other countries was below central bank targets, despite accommodative monetary policies with low or negative interest rates, exceptional lending facilities, bond purchases etc. But the risk of sustained falls in the general price level (deflation) was avoided. The short periods of slightly negative annual growth rates in the consumer price index were attributable to fluctuations in food and energy prices, in particular. There was also no evidence of deflation expectations among households, professional investors or long-term inflation expectations derived from the prices of financial products such as inflation-indexed bonds and swaps.<sup>21</sup>

Wage increases were also low in the 2010s, but exceeded price increases for most of the period, entailing growth in the purchasing power of wages (real wages), see chart 8.8. The trend towards lower nominal wage increases was also seen in a number of Denmark's export markets. Denmark's Nationalbank's analyses showed that the low nominal wage increases in Denmark were partly due to weak price developments. In addition, labour market structures were more flexible as a result of a lower average replacement ratio for unemployment benefits and a marked increase in the use of foreign labour. This contributed to dampening wage increases in periods of increased capacity pressure in the economy. Global value chains and more trade with low-wage countries such as China also contributed to dampening wage inflation in Denmark.<sup>22</sup>

The very direct correlation between unemployment rates and wage inflation, as experienced in the second half of the 1970s and 1980s, was less clear.<sup>23</sup> This had been the case throughout the period since the mid-1990s, when the labour market had become more flexible and inflation expectations low and stable. The considerable drop in structural unemployment<sup>24</sup> had made the actual unemployment rate a poor indicator of wage pressures in the Danish economy. There was now a better correlation between wage inflation and the unemployment gap measured as the difference between actual and structural unemployment.

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21 See Ester Hansen, Morten Hedegaard Rasmussen and Jonas Staghøj, Price formation in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 52(3,1), September 2013; Anne Ulstrup Mortensen and Jonas Staghøj, Falling oil and consumer prices, *Danmarks Nationalbank Monetary Review*, Vol. 54(1), March 2015; Kim Abildgren and Andreas Kuchler, Revisiting the inflation perception conundrum, *Danmarks Nationalbank Working Paper*, No. 144, November 2019; Jakob Feveile Adolfsen, Mikkel Bess and Jesper Pedersen, Real interest rates are affected by inflation expectations, *Danmarks Nationalbank Analysis*, No. 19, October 2020.

22 See Peter Beck Nellemann and Karoline Garm Nissen, Global value chains, *Danmarks Nationalbank Monetary Review*, Vol. 55(1), March 2016; Mark Strøm Kristoffersen, Geographic job mobility and wage flexibility, *Danmarks Nationalbank Monetary Review*, Vol. 55(3), September 2016; Mark Strøm Kristoffersen, Why is nominal wage growth so low?, *Danmarks Nationalbank Analysis*, No. 10, July 2018.

23 Often referred to as a flatter Phillips curve.

24 That is, the level of unemployment compatible with stable price and wage developments.

### Wage increases exceeded price increases throughout most of the 2010s Chart 8.8



Note: Increase in consumer prices and hourly wages. Hourly wages in manufacturing.

Source: Kim Abildgren, A Chart & Data Book on the Monetary and Financial History of Denmark, *Working Paper*, May 2017 (subsequently updated).

### From foreign debt to net foreign assets

Except for one year, Denmark had posted a current account surplus every year since 1990, and in the second half of the 2000s Denmark went from being a debtor to a creditor nation, see chart 8.9.<sup>25</sup> The large current account surplus in the 2010s came into focus in both the IMF's balance of payments surveillance<sup>26</sup> and the EU's macroeconomic imbalance<sup>27</sup> surveillance.

Viewed in a longer perspective, the transition from chronic current account deficits to decades of surpluses reflected fundamental changes in savings behaviour in both the public and private sectors. There was focus on sustainable public finances and savings for a future with an ageing population, including through contributions to occupational pension schemes. In addition, the propensity to save was strengthened by a reduction of the tax value of interest deductibility from a very high level.

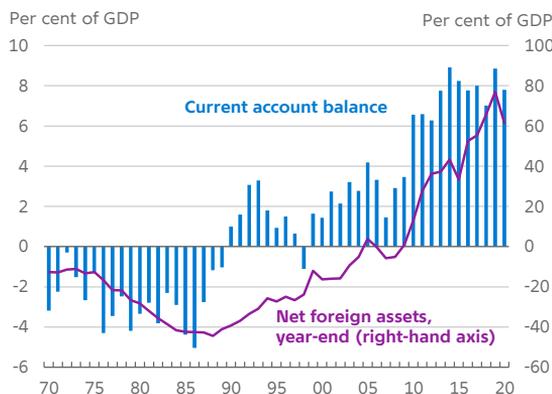
<sup>25</sup> See Jannick Damgaard, From debtor to creditor country – an analysis of investment income, *Danmarks Nationalbank Monetary Review*, Vol. 46(1), March 2007.

<sup>26</sup> See box 1 in Deanie Marie Haugaard Jensen, Rasmus Mose Jensen, Casper Winther Nguyen Jørgensen and Paul Lassenius Kramp, The krone rate has modest impact on the current account, *Danmarks Nationalbank Analysis*, No. 2, January 2019.

<sup>27</sup> See Kim Abildgren and Sune Malthe-Thagaard, A comparison of the ERM crisis in the early 1990s with recent years' financial and sovereign debt crisis in Europe, *Danmarks Nationalbank Monetary Review*, Vol. 51(4,1), December 2012.

### Denmark went from being a debtor to a creditor nation in the late 2000s

Chart 8.9



Note: Current account and net foreign assets.

Source: Kim Abildgren, A Chart & Data Book on the Monetary and Financial History of Denmark, *Working Paper*, May 2017 (subsequently updated).

The reversal from foreign debt to net foreign assets contributed to the growing current account surplus in the years after 2010, when interest expenses were replaced by investment income. Danmarks Nationalbank's analyses showed that the very large surpluses in the 2010s were partly affected by the consolidation of both companies and households after the financial crisis.<sup>28</sup>

The large current account surplus left plenty of room for imports during the upswing in the Danish economy in the 2010s. The substantial net foreign assets also gave Denmark a favourable starting point for tackling the downturn when the coronavirus pandemic hit the Danish and international economy in 2020. The substantial net foreign assets strengthened Denmark's creditworthiness and thus contributed to low government borrowing rates.<sup>29</sup>

28 See Danmarks Nationalbank, Saving for retirement contributes to large current account surpluses, *Danmarks Nationalbank News*, No. 4, December 2015; Søren Lejsgaard Autrup, Paul Lassenius Kramp, Erik Haller Pedersen and Morten Spange, Balance of payments, net foreign assets and foreign exchange reserve, *Danmarks Nationalbank Monetary Review*, Vol. 54(4), December 2015; *Danmarks Nationalbank's comment on the Economic Council's discussion paper, autumn 2017*, 10 October 2017; Danmarks Nationalbank, Denmark's large surplus is temporary, *Danmarks Nationalbank News*, No. 10, November 2017; Casper Winther Nguyen Jørgensen, Paul Lassenius Kramp and Anne Ulstrup Mortensen, Extraordinarily high current account surplus is temporary, *Danmarks Nationalbank Analysis*, No. 20, November 2017.

29 See Kim Abildgren and Casper Ristorp Thomsen, Macroeconomic determinants of the development in long-term yield spreads to Germany, *Danmarks Nationalbank Monetary Review*, Vol. 52(1,2), March 2013; Danmarks Nationalbank, From foreign debt to large wealth in ten years, *Danmarks Nationalbank Statistics (Denmark's international investment position)*, September 2018; Danmarks Nationalbank, Danish and international economy hit by pandemic, *Danmarks Nationalbank Analysis*, No. 4, April 2020.

### On the large current account surplus

“At 8-9 per cent of GDP, the current account surplus is very large. So there is room to let imports cover part of the growth in demand and for a slightly higher rate of wage increase, which will ease the pressure on the labour market. The large current account surplus is presumably to some extent of a temporary nature and attributable to households exercising restraint and continuing to consolidate.”

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Quote from *Danmarks Nationalbank's comments on the Economic Council's discussion paper, autumn 2017*, 10 October 2017.

### The productivity problem that disappeared

In the early 2010s, analyses – based on key figures from the national accounts – showed weaker growth in labour productivity in Denmark than in other OECD countries since the mid-1990s. This was remarkable in light of Denmark's favourable position in relation to other advanced economies measured by some of the parameters normally considered important for productivity performance. The costs and legal obstacles to hiring and firing were below the OECD average, and Denmark was also among the industrialised countries with the highest spending on education and research. Danmarks Nationalbank therefore found it difficult to simply point to a single factor that could explain the poor development in Danish productivity.<sup>30</sup>

### On the Danish productivity conundrum

“Nevertheless, it is difficult to point to a single factor behind Denmark's poor productivity performance. In several areas traditionally seen to be conducive to productivity, Denmark is in fact well positioned in an international context.”

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Quote from box 3, *Productivity development in Denmark*, in Danmarks Nationalbank, *Monetary Review 1st quarter 2010*.

In 2012, the government set up a productivity commission to identify the causes of weak productivity growth in Denmark and make recommendations for measures to enhance productivity.<sup>31</sup> In its consultation response to

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30 See box 3, *Productivity development in Denmark*, in Danmarks Nationalbank, *Monetary Review 1st quarter 2010*; Asger Lau Andersen and Morten Spange, *Productivity Development in Denmark*, *Danmarks Nationalbank Monetary Review*, Vol. 51(1,1), March 2012.

31 See the announcement *The government establishes productivity commission (in Danish only)* from the Ministry of Business and Growth, 20 March 2012.

this commission<sup>32</sup> Danmarks Nationalbank pointed out that productivity growth was not the only source of economic welfare. The weak productivity performance since the mid-1990s had coincided with a marked improvement in the terms of trade, an increase in the number of hours worked per person employed and rising interest and investment income from abroad. But Danmarks Nationalbank also stressed that it was unlikely that improvements in the terms of trade and increased income from abroad could fully compensate for continued weak productivity performance in future. Higher productivity growth was therefore crucial for the future development of Danish economic welfare. Danmarks Nationalbank also emphasised that the services sector accounted for much of the slowdown in productivity growth since the mid-1990s. It was therefore obvious to have a special focus on how productivity performance in the service industries – including the financial sector – could be improved, for example by looking at the competitive environment.

Real GDP growth since 2009 was revised upwards significantly following extraordinary revisions of the Danish national accounts in 2016. At the same time, the number of hours worked was revised downwards. As a result, productivity had increased substantially more than previously assumed, and Danish productivity growth no longer appeared to be remarkably low in an international comparison.

### **Brexit and protectionism**

The outcome of the UK referendum on 23 June 2016 was a majority in favour of Brexit. The increased uncertainty in the European financial markets prior to and after the referendum caused demand for kroner to rise, and Danmarks Nationalbank intervened by buying around kr. 50 billion worth of foreign exchange in May and June to stabilise the krone. However, demand for kroner declined considerably in the days after the referendum, as did the need for intervention.<sup>33</sup>

#### **On the Brexit referendum and the Danish krone**

“There are no reasons why the British decision to leave the EU should affect the exchange rate of the Danish krone against the euro. Danmarks Nationalbank will do what is necessary to keep the exchange rate stable should a pressure on the krone arise. We have the tools we need.”

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Statement by Governor Lars Rohde following the result of the British referendum, 24 June 2016.

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32 See the memo *Proposal to the Productivity Commission (in Danish only)*, 7 September 2012, published on the Productivity Commission’s website (*in Danish only*), 22 October 2012. The Productivity Commission’s final report, *Prosperity and welfare are key*, was published in March 2014.

33 See *Danmarks Nationalbank Report and Accounts 2016; Danmarks Nationalbank Monetary Review 3rd quarter 2016*.

The EU and the UK subsequently spent several years negotiating the terms of the UK's withdrawal from the EU. This was a factor of uncertainty in the international economic situation, but it had no particular effect in itself on the krone exchange rate.

The UK left the EU on 31 January 2020. The withdrawal agreement included a time-limited transition period until 31 December 2020. At the end of December 2020, the European Commission and the UK government agreed on an agreement on the future relationship between the EU and the UK, which entered into force on 1 January 2021.

In a broader context, the Brexit debate reflected a global trend of increased scepticism of free trade. In the USA, for example, there was focus on bilateral trade deficits and the renegotiation of trade agreements under threat of punitive tariffs. As of 2018, the USA repeatedly imposed punitive tariffs on imports from China, and China responded with tariff increases on US goods.<sup>34</sup>

Danmarks Nationalbank emphasised that a large part of the prosperity in Denmark as well as many other countries was based on international trade, and that increased protectionism could hit the Danish economy hard. Since Denmark is a small, open economy, Danish companies and jobs were particularly dependent on foreign demand for Danish goods and services, and Danish companies and consumers demanded goods produced abroad to a large extent. If international trade were to be based on bilateral trade agreements, a small country like Denmark would have a weak negotiating position with large trading partners. Consequently, it was important for Denmark to actively support free trade and rules-based international cooperation with the opportunity to influence common rules.<sup>35</sup>

### **From soft landing outlook to coronavirus pandemic**

In its projection from the 2nd half of 2019, Danmarks Nationalbank expected growth in the Danish economy to slow slightly in line with the prospect of weaker export market growth. But given the boom with no significant imbalances building up, the outlook was for a soft landing, with growth broadly matching the potential of the economy.<sup>36</sup> This picture changed abruptly when Denmark and the rest of the world were hit by the

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34 See Danmarks Nationalbank, Boom with no signs of imbalances, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 15, September 2018; Box 3, *The trade conflict has escalated in 2019*, in Danmarks Nationalbank, *Slightly lower growth in the coming years, Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 20, September 2019; Jens Vedelsdal Aurup, Jannick Damgaard and Mette Kanstrup Petry, *Trade conflict does not improve US current account*, *Danmarks Nationalbank Analysis*, No. 18, September 2019.

35 See Deanie Marie Haugaard Jensen, Casper Winther Nguyen Jørgensen and Anders Farver Kronborg, *What is driving the weak world trade?*, *Danmarks Nationalbank Monetary Review*, Vol. 55(3), September 2016; *Danmarks Nationalbank Monetary Review 4th quarter 2016*.

36 See Danmarks Nationalbank, *Slightly lower growth in the coming years, Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 20, September 2019; *Danmarks Nationalbank's comments on the Economic Council's discussion paper autumn 2019*, 8 October 2019.

coronavirus pandemic.<sup>37</sup> The coronavirus outbreak began in China, where the spread of infection accelerated in early 2020. Then the virus spread rapidly to the rest of the world during February and March. This was the start of a prolonged period in which the pandemic development controlled the Danish and international economy. In many countries, restrictions and partial lockdowns were imposed on large parts of society several times. This was to limit the spread of infection during the various waves of the epidemic, in order to avoid overburdening the health sector.<sup>38</sup>

In Denmark, hotels, restaurants, tourism and the experience industry saw a significant decline. Other parts of the economy benefited from a shift in consumption towards areas subject to fewer restrictions, such as supermarkets, construction and the housing market. The Danish economy became a multi-speed economy where supply limitations led to pent-up consumption and high savings.<sup>39</sup>

Large government relief packages were implemented in Denmark to keep employment and companies afloat through the partial lockdowns in 2020, including schemes to compensate companies for labour costs and overheads, extension of payment deadlines for VAT and tax, and government guarantees for companies' bank loans. In other countries too, large-scale fiscal measures were implemented to mitigate the negative impact of the pandemic on the economy.<sup>40</sup>

The outbreak of the pandemic led to short-term turmoil in financial markets in spring 2020, with sharp falls in oil and equity prices, rising risk premia and large fluctuations in bond yields.<sup>41</sup> Central banks in several

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37 See Danmarks Nationalbank, Prospects for gradual economic recovery, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 12, June 2020; Danmarks Nationalbank, Prospects of moderate recession in the coming year, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 18, September 2020; Danmarks Nationalbank, Spread of coronavirus delays recovery, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 26, December 2020; *Danmarks Nationalbank Annual Report 2020*.

38 See Rasmus Bisgaard Larsen and Johannes Poeschl, How do non-pharmaceutical interventions affect the spread of COVID-19? A literature review, *Danmarks Nationalbank Economic Memo*, No. 4, April 2021.

39 See Svend Greniman Andersen, Nicolai Risager Christensen and Rasmus Mose Jensen, High savings during corona were driven by restrictions rather than precautionary consumers (in Danish only), *Danmarks Nationalbank Economic Memo*, No. 2, February 2021.

40 See the overview of measures in Niels Bartholdy, Helle Eis Christensen, Nicolai Risager Christensen, Thomas Pihl Gade and Rasmus Mose Jensen, International economic policy measures during the COVID-19 crisis (in Danish only), *Danmarks Nationalbank Economic Memo*, No. 4, June 2020; Box 1 on Government liquidity support measures and compensation schemes in Danmarks Nationalbank, Banks ready for expiry of government liquidity support, *Danmarks Nationalbank Analysis*, No. 10, April 2021.

41 See Danmarks Nationalbank, Stabilisation of financial markets after COVID-19 turmoil, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 11, June 2020; Danmarks Nationalbank, Stable financial markets support economy in recession, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 17, September 2020; Jens Skovsted Halsnæs, Jonas Ladegaard Hensch and Nastasija Loncar, Danish mortgage bond liquidity briefly impacted by covid-19, *Danmarks Nationalbank Analysis*, No. 22, November 2020.

countries – including the US Federal Reserve and the ECB – responded by expanding banks' access to liquidity and increasing purchases of government and corporate bonds. In addition, several central banks established reciprocal swap lines to ensure access to foreign exchange.

In Denmark, Danmarks Nationalbank implemented a number of extraordinary lending facilities in March 2020 to ensure access for monetary policy counterparties to liquidity in kroner, dollars and euro if needed.<sup>42</sup> Moreover, temporary pressure on the krone to depreciate against the euro prompted Danmarks Nationalbank to intervene in the foreign exchange market in support of the krone by buying kroner worth around kr. 65 billion and raise interest rates by 0.15 percentage points. The pressure on the krone did not reflect speculation about the Danish fixed exchange rate policy or the perception of the krone exchange rate. Rather, it was a result of the international turmoil.<sup>43</sup> From the end of March, global financial markets stabilised relatively quickly again, well supported by the strong monetary policy measures taken by the major central banks and the generally accommodative financial conditions.

Spring 2020 was characterised by turmoil in the financial markets and a sudden and substantial increase in the expected government financing requirement. This entailed a need to use more sources of funding in government borrowing.<sup>44</sup> But since Denmark entered the crisis with sound public finances and low government debt, Danmarks Nationalbank believed that there was fiscal scope for the massive easing without doubts about fiscal sustainability. However, Danmarks Nationalbank also stressed that the measures should be temporary so as not to damage business dynamics and labour market mobility.<sup>45</sup>

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42 See press release *Danmarks Nationalbank's interest rates unchanged and launch of extraordinary lending facility* from Danmarks Nationalbank, 12 March 2020; press release *Danmarks Nationalbank has established a bilateral swap agreement in dollars with the Federal Reserve* from Danmarks Nationalbank, 19 March 2020; press release *Interest rate increase and expansion of lending facility* from Danmarks Nationalbank, 19 March 2020; press release *Danmarks Nationalbank and ECB reactivate swap line to provide euro liquidity* from Danmarks Nationalbank, 20 March 2020.

43 The value of dollar investments decreased significantly in March 2020. As a result, the need for Danish pension companies and other investors to hedge assets in dollars through forward sales of dollars decreased. Consequently, they chose to buy back some of the dollars sold against selling kroner. In March, the reduction of the insurance and pension sector's dollar hedging gave rise to a sale of kroner of kr. 61 billion, see Danmarks Nationalbank, *Losses on dollar assets contributed to pressure on the Danish krone*, *Danmarks Nationalbank News*, No. 7, July 2020; Asger Munch Grønlund and Lars Risbjerg, *Pressure on the Danish krone in times of crisis*, *Danmarks Nationalbank Economic Memo*, No. 11, July 2020.

44 Including activation of the short-term government borrowing programmes in foreign currency, see Danmarks Nationalbank, *The Danish government has a good starting point to finance the expenses related to Corona*, *Danmarks Nationalbank Analysis*, No. 6, April 2020; Danmarks Nationalbank, *Danish Government Borrowing and Debt 2020*.

45 See *Danmarks Nationalbank's comments on the recommendations of the Danish government expert committee*, 27 May 2020; press release *Prospects of moderate recession* from Danmarks Nationalbank, 23 September 2020.

## On being able to cover the costs of the pandemic

“Relief packages, more general economic measures, higher disease testing and disease control costs drain government finances. At the same time, normal fiscal policy rules have been temporarily suspended. Danmarks Nationalbank shares the Chairmanship’s assessment that, due to generally healthy government finances, the budgetary situation is not a cause for concern at present.”

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Quote from *Danmarks Nationalbank’s comments on the Economic Council’s discussion paper, autumn 2020*, 20 October 2020.

When the first Danish lockdown was imposed in March 2020, Danmarks Nationalbank was about to publish its half-yearly projection of developments in the Danish economy. It had to be postponed. Both the risk of infection and the measures to contain it led to behavioural changes in households and companies that made it impossible to make economic estimates using traditional macroeconomic models based on the experience of recent decades without similar pandemics. Instead, at the beginning of April, Danmarks Nationalbank chose to publish a number of possible economic scenarios. They illustrated that real GDP growth for the year 2020 as a whole could be between -3 per cent and -10 per cent.<sup>46</sup> The coronavirus pandemic prompted Danmarks Nationalbank to develop new indicators and tools to oversee the Danish economy<sup>47</sup>, and from June 2020 Danmarks Nationalbank again published actual projections of the Danish economy.

At the end of 2020, it was still uncertain how the roll-out of coronavirus vaccines would support the recovery of the Danish and international economy. It was also uncertain whether the coronavirus pandemic would leave a more permanent mark on economic structures, e.g. in relation to consumption patterns, global supply chains and digitalisation.

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46 See Danmarks Nationalbank, Danish and international economy hit by pandemic, *Danmarks Nationalbank Analysis*, No. 4, April 2020.

47 See Danmarks Nationalbank, Total card turnover back at 2019 level, *Danmarks Nationalbank Statistics (Payments)*, June 2020; Danmarks Nationalbank, New tools for assessing the economy, *Danmarks Nationalbank News*, No. 6, July 2020; Adrian Michael Bay Schmith, Rasmus Rold Sørensen and Morten Werner, Use of input-output methods and high-frequency indicators when assessing GDP developments in 2020 (in Danish only), *Danmarks Nationalbank Economic Memo*, No. 12, July 2020; Danmarks Nationalbank, Increased uncertainty reduces investment appetite during covid-19, *Danmarks Nationalbank News*, No. 8, November 2020; Erik Grenestam and Adrian Michael Bay Schmith, A factor model approach to nowcasting Danish GDP, *Danmarks Nationalbank Economic Memo*, No. 2, March 2021; Mikkel Bess, Erik Grenestam, Alessandro Tang-Andersen Martinello and Jesper Pedersen, Uncertainty and the real economy: Evidence from Denmark, *Danmarks Nationalbank Working Paper*, No. 165, November 2020.





# Cash and digital retail payments

The years after the millennium saw significant changes in Danes' use of means of payments. The volume of digital card payments – and later mobile payments – increased sharply at the expense of cash.

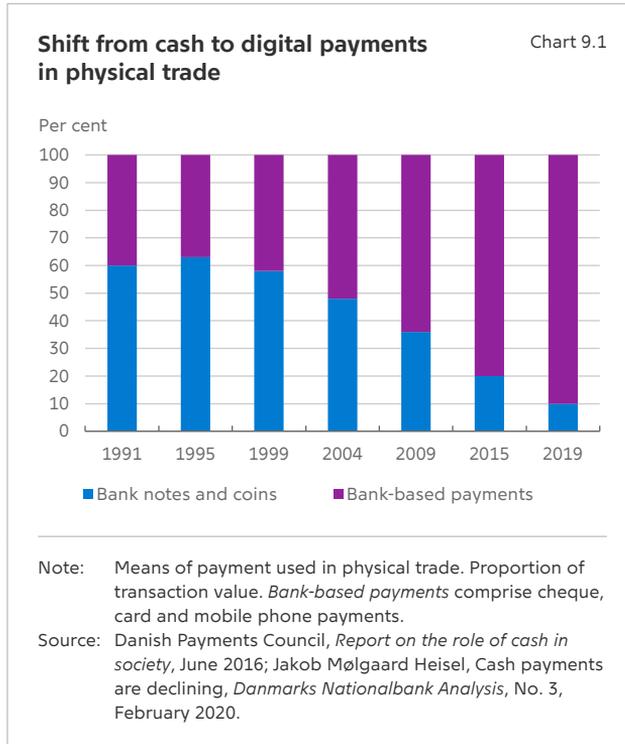
Modernisation of underlying IT systems, carried out by the Danish financial sector in partnership with Danmarks Nationalbank, supported the increase in new digital payment methods. In 2014, instant transfers from one bank account to another were introduced, making it possible e.g. to buy a car on a Sunday morning and pay for it instantly. That way, the car dealer could safely hand over the keys.

The change in the use of cash also impacted Danmarks Nationalbank's task of issuing banknotes and coins. Ever since it came into being in 1818, Danmarks Nationalbank has been responsible for issuing banknotes and, from 1975, also coins. Following the sharp drop in the use of cash in the years after 2005, it was no longer financially viable for Danmarks Nationalbank to produce new banknotes and coins internally. So, in 2014 it was decided to outsource the production of banknotes and coins to external suppliers. But although the production has been outsourced, Danmarks Nationalbank is still responsible for designing and issuing cash in Denmark.

It was debated whether central banks should issue a digital supplement or alternative to physical banknotes and coins. Danmarks Nationalbank published its first analysis of this topic in 2017. The analysis concluded that, in a country such as Denmark with an efficient and modern payments infrastructure, it was difficult to see the need for or benefits of central bank digital currency (CBDC) for retail use. In Denmark, consumers and businesses were already able to make fast and secure digital payments using the payment solutions offered by Danish banks. However, it was important to continue monitoring developments and prepare further analyses.

## New digital payment habits

The years after the millennium saw significant changes in Danes' use of means of payment in physical retail trade, see chart 9.1.<sup>1</sup> The volume of digital payments increased sharply at the expense of payment using banknotes and coins. In 2019, cash accounted for just 10 per cent of turnover against almost 50 per cent in 2004. And cash was less prevalent across all age groups when paying for goods and services in physical trade.



Except for banknotes, the last remaining paper-based means of payments disappeared completely from physical trade.<sup>2</sup> Already at the end of 2007, the system of Dankort payments based on paper vouchers and mechanical imprinters was abolished, and paper cheques – accounting for only about 2 per cent of retail payments in 2004 – were de facto phased out completely in 2016.

1 See Johan Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, *Danmarks Nationalbank Working Paper*, No. 74, September 2011; Victor Gørtz Smestad, Danish households opt out of cash payments, *Danmarks Nationalbank Analysis*, No. 24, December 2017; Jakob Mølgaard Heisel, Cash payments are declining, *Danmarks Nationalbank Analysis*, No. 3, February 2020.

2 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

However, innovation was booming in digital payment solutions based on bank deposits. New mobile phone-based payment solutions were launched, for instance MobilePay (2013), the mobile Dankort (2017), Apple Pay (2017) and Google Pay (2018),<sup>3</sup> enabling card payments without the use of physical payment cards.<sup>4</sup>

### On the decline in the use of cash

“With still more and smarter alternatives, the significance of cash has been declining for decades. First, the Dankort was launched, then MobilePay (...) followed by the contactless Dankort (...).

The balance between card payments and cash tipped in favour of card payments in the 2000s, and since then payment cards have been the dominant means of payment.”

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Quote from Governor Per Callesen’s feature article *The upcoming battle for cash (in Danish only)*, Jyllands-Posten, 24 June 2016.

In 2014, contactless Mastercard and Visa payments were introduced,<sup>5</sup> followed in 2015 by contactless Dankort payments. And in 2020, all retail card terminals came with contactless functionality. Now all you had to do was touch your card on the reader rather than inserting it in the terminal, and for small-value payments you had to enter your PIN only after a certain number of payments. Contactless payments helped reduce the already low level of card fraud because they made it more difficult for criminals to intercept the PIN.<sup>6</sup>

Danes were quick to embrace the new payment options. Within three years of the launch of MobilePay, this mobile payment solution had been adopted by 3 million users. When the Dankort was launched in 1984, it took more than 15 years for the card to be adopted by the same number of users.<sup>7</sup>

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3 See Marcus Clausen Brock and Jakob Mølgaard Heisel, Denmark is among the most digitalised countries when it comes to payments, *Danmarks Nationalbank Analysis*, No. 2, February 2022.

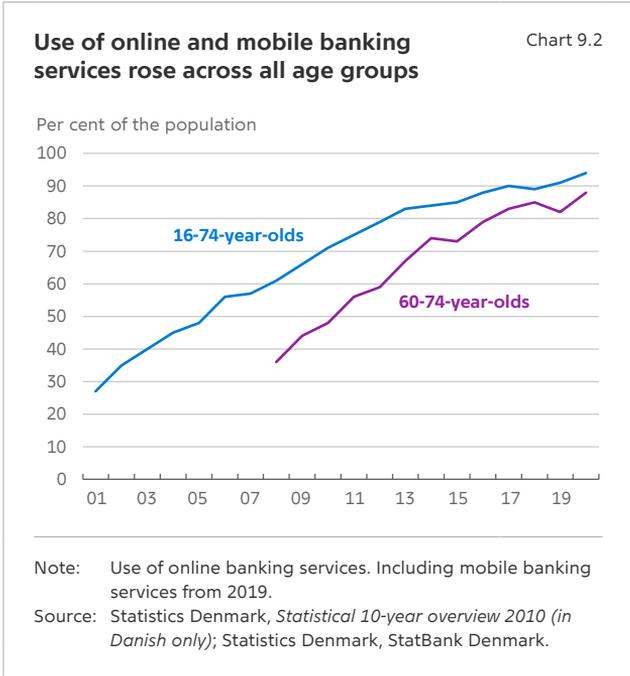
4 MobilePay also facilitated person-to-person credit transfers.

5 See Finance Denmark, *Banks pave the way for digitalisation in Denmark (in Danish only)*, December 2021.

6 See Danmarks Nationalbank, Danes have become contactless payers, *Danmarks Nationalbank Statistics (Payments)*, December 2019; Jakob Mølgaard Heisel and Stefan Bak Pedersen, Danes primarily opt for electronic payment solutions, *Danmarks Nationalbank Analysis*, No. 15, September 2020; Danmarks Nationalbank, Danes tap and pay, *Danmarks Nationalbank Statistics (Payments)*, May 2021.

7 See Lindis Oma, Danes are front-runners in electronic payments, *Danmarks Nationalbank Analysis*, No. 6, March 2017.

Online banking also became prevalent. In 2005, less than 50 per cent of the adult population used online banking services. In 2020, about 95 per cent of the population used online or mobile banking services, and in the 60-74 age group, the proportion was close to 90 per cent, see chart 9.2.



**On the public sector’s active role in the digitalisation of Denmark**

“To facilitate digital interactions with public authorities each Dane has a personal e-ID to access services securely – NemID – (“easy-ID”), a mandatory bank account for transfers from authorities – NemKonto – (“easy account”), and a digital mailbox for letters and messages from the public sector – e-boks – (“e-box”). (...) Handling your tax business has also become digital. In March, all Danes get the result of the tax evaluation, and within a few days almost all Danes have checked out the result. In case you have paid too much tax, the authorities will automatically transfer money back to your personal bank account. Credit institutions and employers report the vast majority of tax information and deal with everything from capital to labour income, leaving you with maximum a few manual tax deductions to fill out online.”

Quote from Governor Lars Rohde’s speech at SUERF conference, The European Money and Finance Forum, in New York, 16 October 2019.

Increased payment digitalisation was underpinned by a number of public sector digitalisation initiatives. Already in 2003, all consumers and businesses were required to hold a *NemKonto* with a bank (a normal bank account assigned as a *Nemkonto*) to enable digital payments from the public sector (for instance SU student grants or tax refunds).<sup>8</sup> And 2010 saw the launch of the Danish national digital identification solution – *NemID*. The *NemID* solution was based on an agreement between Danish banks and the public sector, and the solution was a joint login function for both public and private self-service solutions such as online banking services.<sup>9</sup>

### **Faster payments for consumers and businesses**

Modernisation of underlying IT systems, to which all banks were connected directly or indirectly, supported the increase in new digital payment methods.

In spring 2009, as part of the parliamentary committee debate on the Danish Act on Payment Services, the Business Committee asked the Minister for Economic and Business Affairs to examine why it took longer to complete payments in Denmark than in the Netherlands and the UK. Therefore, in May 2009, the Minister asked Danmarks Nationalbank to chair a working group to analyse settlement times for domestic payment transfers in Denmark. When the working group was founded, its participants included the Ministry of Economic and Business Affairs, the Danish Financial Supervisory Authority, the Ministry of Finance, the Agency for Public Finance and Management, the National IT and Telecom Agency, the Danish Bankers Association, the Danish Consumer Council, the Confederation of Danish Industry (DI), the Danish Chamber of Commerce, the Danish Federation of Small and Medium-Sized Enterprises and the then PBS (Payment Business Services).

The working group's analyses resulted in the formulation of a major project with a range of specific measures designed to make it faster for consumers and businesses to make payments. This project was conducted by the financial sector in partnership with Danmarks Nationalbank during the period 2012-14.<sup>10</sup>

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8 See The Danish Public Payments Act (act no. 1203 of 27 December 2003 (in Danish only)); Danmarks Nationalbank, *Payment systems in Denmark*, 2005.

9 Starting in 2021, *NemID* was gradually replaced by *MitID* with increased digital security, see the Agency for Digital Government's news item *Starting today, NemID becomes MitID* (in Danish only), 6 October 2021.

10 See Working group on domestic payment transfers, *Report on domestic payment transfers in Denmark* (in Danish with an English summary), January 2010; Jesper Bakkegaard, Tommy Meng Gladov and Anders Mølgaard Pedersen, Settlement times for payments in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 50(2,1), June 2011; Working group on domestic payment transfers, *Report on domestic payment transfers in Denmark* (in Danish with an English summary), January 2012; Danmarks Nationalbank's press release *Modernisation of Danish Payments*, 27 January 2012; Jakob Mygind Korsby and Peter Toubro-Christensen, Faster Payments in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 51(3,1), September 2012; Morten Fremmich Andresen and Lars Egeberg Jensen, Express transfers in Denmark, *Danmarks Nationalbank Monetary Review*, Vol. 53(3), September 2014; Anders Tofthøj Andersen and Tommy Meng Gladov, Initial experience with instant payments, *Danmarks Nationalbank Monetary Review*, Vol. 54(1), March 2015.

An especially noteworthy outcome of the project was that, in November 2014, it became possible to make instant transfers from one bank account to another (instant clearing or instant settlement). As a result, funds up to a certain amount (not exceeding kr. 500,000) could be transferred through online banking services 24/7/365. These funds were available to the recipient within seconds after the payment was made. So now it was possible e.g. to buy a car on a Sunday morning and pay for it instantly. That way, the car dealer could safely hand over the keys.

The project also enabled faster settlement of Dankort payments during weekends and access to making same-day credit transfers on weekdays, regardless of the amount, using, for instance, online or mobile banking services. Previously, it would normally take one day to complete digital payments, and on weekends and public holidays, it could take several days. For instance, if a consumer made a credit transfer using his or her online banking services on a Tuesday morning, the amount would be debited to the payer's account on the same day. The amount was transferred from the payer's bank to the recipient's bank on the night between Tuesday and Wednesday, meaning that the recipient would not have access to the amount in his or her account until Wednesday morning. If the consumer made a credit transfer using his or her online banking services late Tuesday night, the amount would not be credited to the recipient's account until Thursday, and if the transfer was made late Friday night, the amount would not be available to the recipient until the coming Tuesday.

#### **Entitlement to a payment account for socially vulnerable groups and easing of the cash rule in physical trade**

In response to the trend towards a more cashless society dominated by digital payments, legislation was amended in various areas, for instance to ensure that socially vulnerable groups had access to a bank account just as the rest of the population.

In April 2015, the Folketing (Danish parliament) adopted a statutory provision<sup>11</sup> stipulating that, for a certain maximum annual fee, banks were required to offer all household customers a basic deposit account with a debit card and balance control and access to making payments. Previously, it followed only from good practice rules that a bank could usually not refuse to open an ordinary deposit account for household customers with access to withdrawing and depositing cash and receiving transfers, and there were no rules on charging fees for such accounts.<sup>12</sup>

In April 2016, the Folketing also adopted<sup>13</sup> that all consumers should have access to a basic payment account with a bank (either free of charge or

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11 As follow-up to Commission Recommendation of 18 July 2011 on access to a basic payment account (2011/442/EU).

12 See *Report on access to deposit accounts on fair and reasonable terms (in Danish only)*, Danish Financial Supervisory Authority, 2014; Danish Payments Council, *Annual Report 2014*.

13 As a result of the EU PAD Directive (2014/92/EU) on, inter alia, access to payment accounts with basic features.

against a reasonable fee) with more features than a basic deposit account, for instance access to online banking and direct debit services.<sup>14</sup>

With the increase in digital payments, the special cash rule or cash obligation under Danish law came up for discussion.<sup>15</sup> The cash rule was introduced with the Danish Payment Card Act in 1984 when the Dankort was introduced. Under the cash rule, retailers could generally not refuse to accept cash. This rule was to ensure competition for the Dankort and ensure that cash could still be used for payment in all stores despite the prevalence of card payments.

When the cash rule was introduced, the ban on refusing cash payments applied during normal opening hours only. In 2000, this ban was expanded to apply throughout the store's opening hours. But it was emphasised that retailers were not obliged to accept cash payments in remote sales or unstaffed self-service environments.<sup>16</sup>

Retailers criticised the obligation to accept cash because cash was costly to handle and exposed them to a risk of robbery. But consumers pointed out that cash – requiring no technology in the payment situation – still played a special role for certain groups in society, particularly senior citizens, disabled people, socially vulnerable groups and children.

The cash obligation was retained, but with the adoption of the Danish Payments Act in June 2017, certain adjustments were made to reduce the risk of robbery. So, starting in January 2018, staffed retailers were no longer required to accept cash during evening and night hours when the risk of robbery was higher.<sup>17</sup>

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14 See Danish Payments Council, *Report on the role of cash in society*, June 2016. But, in certain cases, the bank could decline to open a basic payment account, for instance if the customer already held a payment account in Denmark or the customer's behaviour had been offensive or caused a nuisance to other customers of the bank or to its staff.

15 See Danish Payments Council, *Report on the role of cash in society*, June 2016.

16 See Danish Payments Council, *Report on new payment solutions*, November 2013.

17 In addition to the cash rule, the use of cash in physical trade was restricted by the cash ban of the Danish Anti-Money Laundering Act, which stipulated a general limit on the amount of cash payments retailers were allowed to accept. This limit was introduced in mid-2013, and the original limit was kr. 50,000 (regardless of whether the payment was made as a lump sum or over several linked payments), see bill no. L 164 to amend of the Danish Penal Code, Administration of Justice Act and various other acts (in Danish only) (adopted by the Folketing (Danish parliament) at the third reading on 3 June 2013 and included in act no. 634 on amendment of the Danish Penal Code, the Administration of Justice Act and various other acts of 12 June 2013 (in Danish only)). On 1 July 2021, the limit was reduced to kr. 20,000, see bill no. L 193 A to amend the Guarantee Fund for Non-Life Insurers Act, the Investment Associations etc. Act, the Act on Measures to Prevent Money Laundering and Terrorist Financing (the Anti-Money Laundering Act) and various other acts (in Danish only) (adopted by the Folketing (Danish parliament) at the 3rd reading on 1 June 2021). Prior to the 2013 amendment, the cash ban of the Anti-Money Laundering Act was narrower – it stipulated only that dealers in objects and organisers of auctions were not allowed to accept cash payments of kr. 100,000 or more, see act no. 117 on measures to prevent money laundering and terrorist financing of 27 February 2006. Prior to the 2006 legislative amendment, Denmark had no cash ban, but dealers in objects and organisers of auctions could become subject to the Anti-Money Laundering Act if the cash amounts exceeded 15,000 euro, see act no. 422 to amend the act on measures to prevent money laundering of 6 June 2002.

### **On the easing of the cash rule**

“Danish politicians will soon have to make a decision on an issue that may be of interest to the public: the issue of whether Danish retailers should be obliged to accept cash – i.e. Danish coins and banknotes.

This issue has previously been debated, and experience shows that the debate could rapidly become polarised. (...)

But then again this is unlikely to be a big issue. Retailers must be expected to want to serve people with banknotes and coins in their pockets. Most retailers want to attract as many customers as possible and generate as much revenue as possible.

We are confident that cash has long-term staying power, no matter what happens. And, incidentally, we believe that payments should generally keep up with the times and technological advances.”

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Quote from Governor Per Callesen’s feature article (in Danish only), Jyllands-Posten, 24 June 2016.

### **Establishment of the Danish Payments Council to promote a secure and efficient payments infrastructure**

Danmarks Nationalbank established the Danish Payments Council in 2012 to strengthen the institutional framework for developments in retail payments. The Council was to serve as a forum for collaboration among all parties involved in consumer and corporate payments. Its purpose was to help promote the efficiency and security of payments. The Council was also to help provide better statistics for payments in Denmark.<sup>18</sup>

Danmarks Nationalbank chaired and provided secretariat services to the Danish Payments Council. When the Council was established, in addition to Danmarks Nationalbank, it comprised representatives from the Danish Chamber of Commerce, the Confederation of Danish Industry (DI), the Ministry of Business and Growth, the Danish Bankers Association, the Danish Consumer Council, the Danish Federation of Small and Medium-Sized Enterprises and Nets.<sup>19</sup>

The Danish Payments Council discussed a broad range of issues of significance to the Danish payments infrastructure as well as the use and supply of payment services and products, and the Council’s reports and recommendations were published on Danmarks Nationalbank’s website, along with other information about the Council.

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18 See Danmarks Nationalbank, *Terms of reference for the Danish Payments Council*, May 2012.

19 See Danmarks Nationalbank, *Members of the Danish Payments Council*, May 2012.

## Lower social costs of payments

Total social costs of consumer-to-business payments for purchases of goods and services in Denmark declined from 1.0 per cent of the gross domestic product (GDP) in 2009 to 0.5 per cent of GDP in 2016 – despite the fact that the number of payments grew by 16 per cent during this period. Consumer-to-business payments accounted for more than 80 per cent of total payments in Denmark in 2016.<sup>20</sup>

The calculation of social costs comprises the aggregate resource costs of the parties involved in payment transactions, that is: both payment intermediaries (Danmarks Nationalbank, banks, card companies, cash-in-transit companies, Nets etc.), consumers and businesses. Resource costs include, e.g., the time spent by all parties or payroll costs associated with payments, depreciation of ATMs, cash registers, IT systems and card terminals, data connectivity costs, costs related to fraud and robbery and costs for devices used in the production of cash and payment cards. Social costs are the net combined resource costs involved in a payment transaction. Therefore, social costs do not include, for instance, consumer fees on payment cards or the fees payable by retailers to acquirers for accepting card payments. These fees are costs for one party but income for another, so they cancel each other out.

### On social costs of payments

“The fall in the social costs of payments is a benefit for society. It is pleasing to see that this is also the case for cash which in 2016 was at the same level as debit cards. Danmarks Nationalbank expects a continuing fall in the use of cash for payment. However, we do not expect the cashless society to be just around the corner (...).”

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Statement from Governor Per Callesen in the press release *Payments between households and firms have become significantly cheaper*, 24 September 2018.

The decline in social costs of payments from 2009 to 2016 reflected lower resource consumption for both payment intermediaries, households, retailers and businesses, and social costs per payment had not increased for any payment methods (cash, Dankort, international debit cards, international credit cards, credit transfers).

The decline in social costs of payments from 2009 to 2016 reflected several factors. One was the switch in payment habits from cash to digital payments

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<sup>20</sup> See Danmarks Nationalbank, *Costs of payments in Denmark*, November 2011; Danish Payments Council, *Background to series on the costs of payments in Denmark*, September 2018; Danish Payments Council, *The aggregate costs of payments in Denmark were kr. 15.6 billion in 2016*, September 2018; Danish Payments Council, *The costs of consumer-to-business payments have decreased considerably*, September 2018; Danmarks Nationalbank, *The costs of payments have fallen*, *Danmarks Nationalbank News*, No. 5, September 2018.

and enhancement and streamlining of digital payments due to technological advances. Another was a reduction of cash handling costs for retailers and, particularly, banks, which had widely outsourced cash handling processes.

### **Outsourcing of the banknote and coin production following decline in the use of cash**

Ever since it came into being in 1818, Danmarks Nationalbank has been responsible for issuing Danish banknotes. Originally, Danish banknotes were printed by private printing works, but in 1918 Danmarks Nationalbank took over the task of printing. Following the transfer of the Royal Danish Mint from the government to Danmarks Nationalbank in 1975, Danmarks Nationalbank also became responsible for issuing Danish coins.<sup>21</sup>

As a result of the sharp drop in the use of cash in the years after 2005 – and the improved quality of banknotes that gave them a longer lifetime<sup>22</sup> – it was no longer financially viable for Danmarks Nationalbank to produce new banknotes and coins internally. Therefore, in October 2014, it was decided to outsource the production of banknote and coins to external suppliers, as done by central banks in many other countries.<sup>23</sup> But although production was outsourced, Danmarks Nationalbank still designed and issued banknotes and coins.

In 2015 and 2016, Danmarks Nationalbank produced banknotes and coins for storage to be able to meet demand for cash until external suppliers had been chosen through a tender process. At the end of 2016, Danmarks Nationalbank discontinued its production of banknotes of coins.

In May 2016, the supplier of Danish coins was chosen: Mint of Finland, which had experience in the production of coins for several euro area member states.<sup>24</sup> Mint of Finland began its first production of Danish 20-krone coins in March 2017.<sup>25</sup>

The printing of banknotes was outsourced to the French company Oberthur Fiduciaire SAS in February 2018.<sup>26</sup> Oberthur Fiduciaire SAS had

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21 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

22 In 2017, a 50-krone banknote was estimated to have to be replaced after three or four years, while the lifetime of a 1000-krone banknote was normally more than 10 years, see Danmarks Nationalbank, *The supply of cash in Denmark*, September 2017.

23 See Danmarks Nationalbank's press release *Danmarks Nationalbank adapts to falling demand for new banknotes and coins*, 20 October 2014; *Danmarks Nationalbank Report and Accounts 2014*; *Danmarks Nationalbank Report and Accounts 2015*; *Danmarks Nationalbank Report and Accounts 2016*; *Danmarks Nationalbank Report and Accounts 2017*.

24 See Mint of Finland, *Mint of Finland's story*, Mint of Finland's website, 2021.

25 See Danmarks Nationalbank's press release *Mint of Finland has been chosen to produce Danish coins starting in 2017*, 19 May 2016; Danmarks Nationalbank's press release *Production of Danish coins in Finland has begun*, 21 March 2017; Danmarks Nationalbank's press release *Mint of Finland to continue producing Danish coins from 2021*, 16 March 2020.

26 See Danmarks Nationalbank's press release *The new supplier of Danish banknotes has been chosen*, 21 February 2018.

customers in 70 countries and years of experience in printing banknotes, including for euro area member states.<sup>27</sup> Oberthur Fiduciaire SAS supplied the first Danish banknotes (new 500-krone banknotes with upgraded security elements) in October 2020 and they came into circulation the following month.<sup>28</sup>

### **Faroese and Greenlandic banknotes**

Following the adoption of Act no. 248 on banknotes etc. in the Faroe Islands of 12 April 1949, Danmarks Nationalbank has been producing special Faroese banknotes of the same denominations as Danish banknotes. In 2019, following a tender process, Oberthur Fiduciaire SAS was also chosen as the future supplier of Faroese banknotes.<sup>29</sup>

In June 2007, Act on banknotes in Greenland entered into force. This Act made it possible to introduce special Greenlandic banknotes, in line with the Faroese banknotes, and preparatory work was initiated. In January 2010, the Danish government informed Danmarks Nationalbank that Landstinget (Greenlandic parliament) wanted to reconsider the introduction of special Greenlandic banknotes. Consequently, the work on Greenlandic banknotes was suspended. In autumn 2010, the Greenlandic government announced that they did not want to introduce special Greenlandic banknotes. This prompted Danmarks Nationalbank to stop the work on a Greenlandic banknote series.<sup>30</sup>

### **Focus on security of cash supply**

In the mid-2000s, cash in circulation was distributed to businesses and consumers through cash depots at banks that had concluded cash depot agreements with Danmarks Nationalbank. Danmarks Nationalbank supplied the cash depots with new banknotes and received banknotes and coins for scrapping from the depots. The cash depots handled the supply of cash to other banks and retailers in local areas and were responsible for sorting, counting, quality assuring and recirculating banknotes and coins that were fit for circulation.<sup>31</sup> In 2006, Denmark had a total of 12 cash depots across the country at 7 banks<sup>32</sup>.

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27 See Antti Heinonen, *The first euros. The creation and issue of the first euro banknotes and the road to the Europa series*, Bank of Finland, Suomen Pankki, and European Central Bank, 2015.

28 See Danmarks Nationalbank's press release *New editions of 500-krone banknote issued*, 17 November 2020. The upgraded 500-krone banknote is shown at Danmarks Nationalbank's website in the leaflet *New versions of Danish banknotes*, November 2020. All other banknotes issued by Danmarks Nationalbank since 1818 (excluding emergency banknotes) are shown in the appendix in Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

29 See *Danmarks Nationalbank Report and Accounts 2019*.

30 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

31 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

32 Danske Bank, Nordea, Jyske Bank, Spar Nord, Sydbank, Sparekassen Thy and Sparekassen Kronjylland. Moreover, Greenland had one cash depot, and the Faroe Islands had two.

Following a series of violent robberies against cash depots in 2007 and 2008, Danmarks Nationalbank contacted the Danish National Police on the issue of security of the cash supply, and the Danish National Police decided to inspect all Danish cash depots.<sup>33</sup> As a result of these inspections, security at the cash depots was tightened, and the Danish National Police issued a number of recommendations that were subsequently considered by a joint working group established by Danmarks Nationalbank and the Danish Bankers Association in November 2008. This working group submitted its report in May 2009.

In June 2009, based on the report, it was decided to initiate a process to gradually reduce the number of cash depots to just two regional cash depots – one on Zealand and one in Jutland – with very high security standards. Moreover, an industry standard was to be prepared for security design of cash depots and cash transports in Denmark, with inputs from all actors and stakeholders involved in the supply of cash.<sup>34</sup> Finally, it was decided to establish a new cash-in-transit company, to be jointly owned by Danmarks Nationalbank and Danish banks and certified under the new security standard. This new company could offer to assume responsibility for the practical handling of cash from banks, and Danmarks Nationalbank and the Danish Bankers Association agreed that, in the longer term, they would use the services of certified cash-in-transit companies only.

The new joint cash-in-transit company (Bankernes Kontantservice A/S (BKS)) was established in August 2010, and Danmarks Nationalbank held a 25 per cent stake of the share capital. Ninety-eight banks were co-owners of the company. The actual establishment of the company did not alter the allocation of responsibilities for the supply of cash between Danmarks Nationalbank and the banks. Danmarks Nationalbank continued to enter into cash depot agreements with individual banks, and the banks could opt to outsource the practical handling of cash to BKS. BKS was to operate on commercial terms, without any exclusivity, so if banks did not want to perform the tasks themselves, they were free to choose other companies.

Danmarks Nationalbank had joined the BKS group of owners to help provide a higher level of security in cash handling. Once that goal had been achieved, Danmarks Nationalbank could divest its stake in the company. In August 2016, BKS was acquired by the cash-in-transit company Loomis.

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33 See *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Report and Accounts 2009*; *Danmarks Nationalbank Report and Accounts 2010*; *Danmarks Nationalbank Report and Accounts 2012*; *Danmarks Nationalbank Report and Accounts 2016*; Danmarks Nationalbank, *Costs of payments in Denmark*, November 2011; Danish Payments Council, *Report on the role of cash in society*, June 2016.

34 In addition to Danmarks Nationalbank and the Danish Bankers Association/banks, these were cash-in-transit companies, the security industry, Insurance & Pension Denmark, PostDanmark, Finansforbundet (union for employees in finance), Vagt- og Sikkerhedsfunktionærernes Lands sammenslutning (union for employees in security companies) and Danish Police.

### **On Loomis' acquisition of Bankernes Kontantservice in 2016**

"We are content that now there is a buyer to Bankernes Kontantservice (BKS).

BKS was established in 2010, and at the time Danmarks Nationalbank joined the circle of owners in order to increase security in cash handling. This was necessary to prevent a recurrence of the violent robberies that the sector was exposed to in the previous years."

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Statement by Governor Hugo Frey Jensen in connection with Loomis' acquisition of BKS, 19 August 2016.

The number of cash depots was gradually reduced, and in 2017 only two cash depots were needed in Denmark<sup>35</sup> with very high security standards.<sup>36</sup>

### **Crypto-assets and central bank digital currency for retail use**

In December 2013, the European Banking Authority (EBA) and the Danish Financial Supervisory Authority issued a warning to consumers on potential risks of buying, selling and holding crypto-assets (often also referred to as virtual currencies or crypto-currencies) with no issuer and with no underlying assets.<sup>37</sup> One of the crypto-assets attracting massive media attention was bitcoin, launched in 2009 and created in an online network through a complex mathematical process.

In March 2014, Danmarks Nationalbank followed up on the supervisory authorities' warning through communication about the difference between crypto-assets and money in the form of cash and bank deposits.<sup>38</sup> The price of crypto-assets such as bitcoin could swiftly surge or plummet, see chart 9.3. So, their purchasing power could change drastically overnight, making them unfit for use as a means of payment, unit of account or store of value – that is: the characteristics normally assigned to money. The authorities also emphasised that crypto-assets were not regulated. Consequently, the use of crypto-assets for payments was not subject to the normal protective

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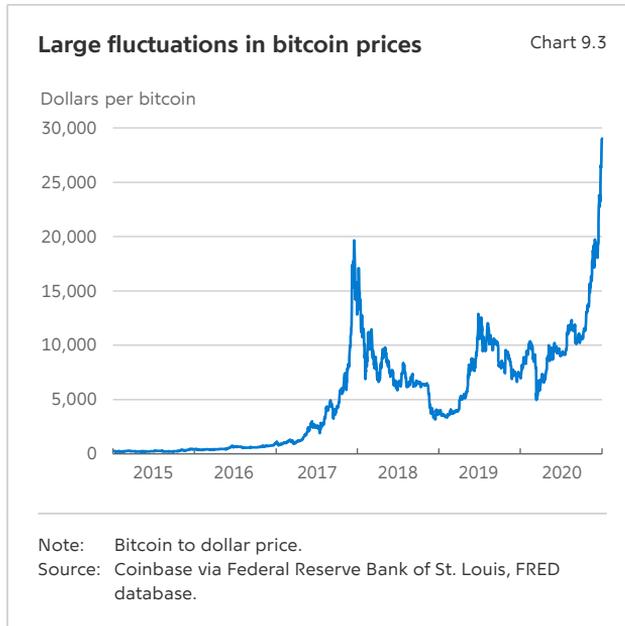
35 One in Copenhagen (with Nordea as depositary bank) and one in Aarhus (with Danske Bank as depositary bank). Local banks in the Faroe Islands and Greenland also had cash depots.

36 See Danmarks Nationalbank, *The supply of cash in Denmark*, September 2017.

37 See the EBA's press release *EBA warns consumers on virtual currencies*, 12 December 2013; the Danish Financial Supervisory Authority's press release *Warning on virtual currencies (bitcoins etc.) (in Danish only)*, 17 December 2013. The warning was reiterated in March 2021 and March 2022, see the Danish Financial Supervisory Authority's press release *EU financial regulators warn consumers on the risks of crypto-assets (in Danish only)*, 24 March 2021; the Danish Financial Supervisory Authority's press release *Warning – Crypto-currency market is an Eldorado for scammers (in Danish only)*, 24 March 2022.

38 See Jon Hasling Kyed and Anders Laursen, *Virtual currencies, Danmarks Nationalbank Monetary Review*, Vol. 53(1), March 2014.

measures for payments based on bank deposits, for instance that online consumers paying by card had chargeback rights for merchandise that was not delivered or was defective. Also, crypto-assets were not covered by a depositor guarantee, and users were not entitled to compensation for losses if their digital wallets were hacked. Conversely, rules for compensation applied to losses following online banking burglary.



While scepticism surrounded the value of crypto-assets as a means of payment, the underlying blockchain technology<sup>39</sup>, on which a number of crypto-assets were based, attracted much interest in terms of its potential use for other purposes.

### On the difference between virtual currencies and money

“Bitcoin is a virtual currency without any value anchor and hence it may rise sharply or fall very suddenly. A core property of money is that its value is stable so that its purchasing power does not change markedly from day to day.”

Statement by Governor Hugo Frey Jensen in material published in connection with Danmarks Nationalbank’s press conference, 18 March 2014.

<sup>39</sup> A blockchain could be seen as a public ledger of transactions, ensuring that the individual unit of the virtual currency did not appear more than once, see Danish Payments Council, *Annual Report 2014*.

It was also debated whether central banks should issue a digital supplement or alternative to physical banknotes and coins. Danmarks Nationalbank published its first analysis of this topic in 2017. The conclusion was that it was difficult to see the need for or benefits of introducing central bank digital currency (CBDC) for retail use in Denmark.<sup>40</sup> The conclusions of the analysis took a number of considerations into account.

### **On central bank digital currency**

“For very different reasons it is neither to be recommended that central banks change their entire business model from being the banks of banks to issuing digital currency to the general public, say by opening an account for every citizen and company (including foreigners?). For a start it would not create something which is not already offered by private banks. It would not be a substitute to notes and coins but to private bank accounts. It would therefore rather open a highway to bank runs, challenging financial stability, unless the amount allowed would be limited to an extent where it could not serve useful transactions purposes. It would add competitive distortions at the expense of private institutions and very substantial costs in terms of IT, staff and regulatory compliance.”

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Quote from Governor Per Callesen’s speech at CBS’ 100 Years Celebration Event, 30 October 2017.

Firstly, Danmarks Nationalbank could see a potential role for CBDC for consumers and businesses in countries that did not have effective payment systems and where transfers of funds could take a long time to complete. But Denmark had an efficient and modern payments infrastructure, enabling consumers and businesses to make fast and secure digital payments. For a number of years, physical banknotes and coins had seen declining usage as a means of payment; most Danish consumers and businesses were already predominantly using digital payment solutions based on bank deposits that were covered by a depositor guarantee of up to about kr. 750,000 kr. So, in a Danish context, it was difficult to see any major benefits of CBDC for retail use that were not already offered by existing payment solutions.

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<sup>40</sup> See Danmarks Nationalbank, Central bank digital currency would not result in better payment solutions, *Danmarks Nationalbank News*, No. 12, December 2017; Kirsten Elisabeth Gürtler, Søren Truels Nielsen, Kristine Rasmussen and Morten Spange, Central bank digital currency in Denmark?, *Danmarks Nationalbank Analysis*, No. 28, December 2017. Also see Danmarks Nationalbank, Knowledge about digital money and e-kroner (in Danish only), June 2019, [www.nationalbanken.dk](http://www.nationalbanken.dk).

Secondly, the introduction of consumer CBDC accounts with Danmarks Nationalbank could increase the risk of a systemic bank run if households and businesses were able unrestricted to transfer their deposits from commercial banks to an account with Danmarks Nationalbank within a few seconds. That could leave banks with an acute funding need, leading to financial instability.

Thirdly, the issuance of CBDC for retail use would fundamentally change Danmarks Nationalbank's role in the financial system as banker to banks. If Danmarks Nationalbank were to provide deposit accounts and digital payment solutions to households and businesses, it would become a direct competitor to commercial banks.

In other words, several aspects of CBDC called for attention. Therefore, it was important for Danmarks Nationalbank to continue monitoring developments of central banks working to introduce CBDC and undertake further analyses of this area.<sup>41</sup> In June 2020, it was announced that the Bank for International Settlements (BIS), in partnership with Danmarks Nationalbank and the central banks of Iceland, Norway and Sweden, established a Nordic BIS Innovation Hub Centre, with CBDC, among other topics, on its work programme.<sup>42</sup>

#### **Fewer cash payments and more e-commerce during the coronavirus pandemic**

In the first part of 2020, the coronavirus outbreak caused concern about the risk of infection from cash transactions. But Statens Serum Institut assessed that cash handling had a minimal impact on the spread of infection.<sup>43</sup> Moreover, laboratory tests carried out on behalf of the European Central Bank indicated that the coronavirus survived longer on steel surfaces such as door handles than on ordinary cotton-fibre banknotes.<sup>44</sup>

So, although there were no indications that the use of cash involved a particular risk of infection, the proportion of cash payments in supermarkets dropped considerably during the spring 2020 lockdown.

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41 See Samuel Eddie Mogensen, Søren Truels Nielsen and Julia Weismann Seixas, New types of digital money, *Danmarks Nationalbank Analysis*, No. 8, June 2022. This analysis describes retail CBDC as well as wholesale CBDC.

42 See Danmarks Nationalbank's press release *BIS to establish Innovation Hub Centre in Stockholm*, 30 June 2020; Danmarks Nationalbank's press release *Bank for International Settlements (BIS) and Nordic central banks launch Innovation Hub Nordic Centre*, 16 June 2021; the BIS press release *BIS Innovation Hub to focus on CBDC, payments, DeFi and green finance in 2022 work programme*, 25 January 2022.

43 See the Ministry of Industry, Business and Financial Affairs' memo *Evaluation for use in revision of the cash rule (in Danish only)*, 11 December 2020 (the Business Affairs Committee (ERU) 2020-21. ERU General part – Appendix 121).

44 See Jakob Mølgaard Heisel, Marianne C. Koch and Stefan Bak Pedersen, Payments before, during and after the corona lockdown, *Danmarks Nationalbank Analysis*, No. 16, September 2020; Jakob Mølgaard Heisel, The use of cash in society, *Danmarks Nationalbank Analysis*, No. 3, March 2021.

Cash payments gradually picked up again during the subsequent reopening. The cash obligation was not suspended during the coronavirus crisis<sup>45</sup>, but businesses widely encouraged customers to pay digitally.

During the 2020 coronavirus lockdowns, the proportion of e-commerce transactions relative to physical trade was extraordinarily high. The likely explanation was a reduction of consumption options (e.g. lockdowns of restaurants and bars) and a change in demand due to fears of risk of infection in physical retail trade.<sup>46</sup>

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45 See the Danish Consumer Ombudsman's announcement *The cash rule also applies during the coronavirus crisis (in Danish only)*, 12 May 2020.

46 See Danmarks Nationalbank, *Card turnover 0.9 per cent lower than last year, Danmarks Nationalbank Statistics (Payments)*, February 2021; Danmarks Nationalbank, *Card payments in physical stores are back, Danmarks Nationalbank Statistics (Payments)*, November 2021.



# Payment system infrastructure

Over the years, Danmarks Nationalbank has held ownership shares in various specialised financial companies in order to help develop the capital market and financial infrastructure in Denmark. But over time, these evolved into commercial companies exposed to competition, so it no longer made sense for a central bank to hold ownership shares in them. In the years 1998-2020, Danmarks Nationalbank sold its shareholdings in the companies, and at the end of 2020 Danmarks Nationalbank no longer had shareholdings in financial companies.

Danmarks Nationalbank was one of the first central banks in the world to provide banks with an electronic payment system enabling them to make large interbank payments in real time. Already in 1981 the first system, DN Inquiry and Transfer System, was introduced. In 2001, this system was replaced by Kronos, in turn replaced by Kronos2 in 2018. Danmarks Nationalbank's payment system plays a key role in the overall Danish payments infrastructure. Over the period 2005-20, it handled payments for a daily amount equivalent to about one fourth of Denmark's gross domestic product (GDP).

Cybercrime became a serious threat to financial stability as banks increasingly depended on complex IT systems. Danmarks Nationalbank put cyber risk on the agenda of the Systemic Risk Council in 2015. In the following year, together with the financial sector, it established Financial Sector Forum for Operational Resilience (FSOR). One of FSOR's tasks was establishment and testing of a cross-sector national crisis response plan for the financial sector.

There was also increased focus on anti-money laundering and terrorist financing initiatives as part of the fight against crime, which could also undermine customer and investor confidence in the financial sector and thus impact financial stability.

## **Divestment of ownership interests in credit institutions and financial infrastructure**

Over the years, Danmarks Nationalbank has had ownership shares in various specialised financial companies.

Firstly, in the decades after World War II, Danmarks Nationalbank helped to establish a number of credit institutions with the aim of developing the Danish capital market.<sup>1</sup> Over the period 1998-2016, as more market-based solutions emerged, Danmarks Nationalbank divested shareholdings in FIH<sup>2</sup>, DLR Kredit<sup>3</sup>, Grønlandsbanken<sup>4</sup> and Danish Ship Finance<sup>5</sup>.

Secondly, Danmarks Nationalbank has co-owned several companies to help build a common Danish financial infrastructure that was safe and efficient and could limit or eliminate many of the risks associated with the settlement of payments and securities transactions. Danmarks Nationalbank was involved because a common financial infrastructure

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- 1 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018; Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.
  - 2 In 1958, Danmarks Nationalbank was involved in the establishment of Finansieringsinstituttet for Industri og Håndværk, FIH (Finance for Danish Industry) with the purpose of strengthening the industrialisation process by granting medium-term loans to industrial companies and craftsman's businesses. Danmarks Nationalbank sold its shareholding in FIH in 1998 and 1999, see *Danmarks Nationalbank Report and Accounts 1998*; *Danmarks Nationalbank Report and Accounts 1999*.
  - 3 In 1960, Danmarks Nationalbank was involved in the establishment of Landbrugets Realkreditfond, DLR (the Agricultural Mortgage Bank). Its objective was to grant second priority loans secured by agricultural real estate, etc. Danmarks Nationalbank acquired shares in DLR in connection with the conversion of DLR into a public limited company in 2001 but sold them in 2002. As one of the measures to support the liquidity of the banking sector during the financial crisis, Danmarks Nationalbank gave the banks the opportunity, as mentioned in chapter 3, to provide collateral in the form of shares issued by their jointly owned companies (including DLR), and in 2011 and 2012 Danmarks Nationalbank also bought DLR shares from a number of banks to support their liquidity situation. In 2016, Danmarks Nationalbank sold its remaining portfolio of DLR shares to DLR Kredit, see Bjarne Dyreborg-Carlsen, *Fifty years with DLR – A historical review*, DLR Kredit, 2010; *Danmarks Nationalbank Report and Accounts 2002*; *Danmarks Nationalbank Report and Accounts 2011*; *Danmarks Nationalbank Report and Accounts 2012*; the communication *State aid n° SA.34423 (2012/N) – Denmark. Rescue decision for the merger of Vestjysk Bank and Aarhus Lokalbank* from the European Commission, 25 April 2012; the notification *DLR Kredit A/S acquires Danmarks Nationalbank's holding of shares in DLR Kredit A/S* from DLR Kredit to NASDAQ Copenhagen, 13 September 2016.
  - 4 In 1967, Danmarks Nationalbank was involved in the establishment of Grønlandsbanken with a view to setting up a bank in Greenland to be an authorised currency dealer, among other functions. In 2005, Danmarks Nationalbank sold its shareholding in Grønlandsbanken to the Greenland Home Rule, see *Danmarks Nationalbank Report and Accounts 2003*; *Danmarks Nationalbank Report and Accounts 2004*; *Danmarks Nationalbank Report and Accounts 2005*.
  - 5 In 1961, Danmarks Nationalbank was involved in the establishment of Danmarks Skibskreditfond (Danish Ship Finance), DSF, with the purpose of granting loans secured by ships. DSF was transformed into a public limited company in 2005, in which Danmarks Nationalbank, alongside the other guarantors, bought shares. Danmarks Nationalbank sold its shareholding in DSF in 2016, see *Danmarks Nationalbank Report and Accounts 2004*; *Danmarks Nationalbank Report and Accounts 2005*; *Danmarks Nationalbank Annual Report 2016*.

requires a critical mass of participants for the system to be efficient.<sup>6</sup> Over time, these companies evolved into commercial companies exposed to competition, and since it would not make sense for a central bank to be co-owner of such companies, Danmarks Nationalbank initiated a process of gradual divestment of its ownership shares.

In 2014, Danmarks Nationalbank sold its portfolio of shares in Nets.<sup>7</sup> Danmarks Nationalbank had originally become co-owner of the company in 2003 by buying shares in the then PBS<sup>8</sup> from Danske Bank, which had been ordered by the competition authorities to reduce its shareholding in connection with a merger<sup>9</sup>. PBS was responsible for Danish banks' joint payment solutions (such as Betalingservice (direct debit payment method) and Dankort (the national card scheme)). Over time, Nets developed into an international company offering payment solutions in competition with other companies. Given Danmarks Nationalbank's role as overseer of Nets, it no longer made sense for Danmarks Nationalbank to be a co-owner of the company for several reasons. In connection with the sale of its shareholding in Nets, Danmarks Nationalbank found it important to maintain a common, open payments infrastructure where all bank accounts in Denmark are interconnected. Such infrastructure makes it possible, for example, to use the Dankort for payment in a store without necessarily having the same banker as the store. The common, open payments infrastructure was secured through continuation of existing agreements between Danmarks Nationalbank, the banks' stakeholder organisation<sup>10</sup> and Nets on the settlement of retail payments in Danish kroner, such as payment of salary and pension, person-to-person transfers via online banking, payment of bills via direct debit and purchases in physical trade or online using payment cards.<sup>11</sup>

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6 See chapter 1 in *Danmarks Nationalbank Payment Systems in Denmark, 2005*.

7 See Danmarks Nationalbank's press release *Why Danmarks Nationalbank's shares in Nets are for sale*, 5 March 2014; *Danmarks Nationalbank Report and Accounts 2014*; *The Danish Payments Council, Annual Report 2014*.

8 PBS was renamed Nets in 2010 after a merger with its Norwegian counterpart (Nordito). In August 2019, Mastercard entered into an agreement with Nets to buy, among other things, Betalingservice (completed in 2021), and in November 2020 Nets and Nexi entered into a merger agreement (completed in 2021), see Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; Danmarks Nationalbank, *Oversight of the financial infrastructure 2020, Danmarks Nationalbank Report*, No. 3, May 2021.

9 In connection with the merger between Danske Bank and RealDanmark in 2001, Danske Bank made a number of commitments to the Danish Competition Authority, including that Danske Bank should reduce its shareholding in PBS, see *Danmarks Nationalbank Payment Systems in Denmark, 2005*.

10 At that time called the Danish Bankers Association, which became Finance Denmark in 2016 after the merger with the Association of Danish Mortgage Banks and the Danish Mortgage Banks' Federation, see Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

11 See Danmarks Nationalbank, *Assessment of the Danish retail payment systems, Danmarks Nationalbank Report*, No. 5, May 2018.

## On Danmarks Nationalbank's sale of its shares in Nets

“Since Danmarks Nationalbank had acquired those shares, PBS/Nets had developed into an international enterprise competing with other companies offering advanced payment solutions in multiple countries. It was clearly no longer a company in which a central bank should have a stake. Furthermore, we wanted to be beyond reproach in relation to performance of our oversight tasks, which also comprise Nets.”

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Quote from Governor Hugo Frey Jensen's speech at the Director's Conference of the Danish Bankers Association, 8 September 2014.

In 2020, Danmarks Nationalbank sold its shares in VP Securities to Euronext.<sup>12</sup> Danmarks Nationalbank had originally become co-owner of VP Securities when it was transformed into a public limited company in 2000, but Danmarks Nationalbank had been among the stakeholders ever since VP was established in 1980 as a self-governing institution for registration of ownership of Danish securities as well as settlement of transactions and periodic payments such as interest and repayments linked to the securities.<sup>13</sup> Securities management had been continuously liberalised over the years in EU member states in order to create a competitive single market for securities services. Moreover, Danmarks Nationalbank was overseer of VP Securities, so in this respect too there were several reasons why Danmarks Nationalbank should no longer be a co-owner of the company. When selling the shareholding, Danmarks Nationalbank emphasised that, from the point of view of financial stability, Euronext as owner could develop VP Securities and ensure competitive securities management services in Denmark.

As mentioned in chapter 9, Danmarks Nationalbank divested its ownership share in BKS in 2016. Thus, at the end of 2020, Danmarks Nationalbank no longer had ownership shares in Danish financial companies.

In the years after 2005, Danmarks Nationalbank also divested a number of shareholdings in non-financial corporations that were the result of selective

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12 VP Securities was then named Euronext Securities Copenhagen, see the press release *Danmarks Nationalbank has concluded an agreement to divest its ownership share in VP Securities* from Danmarks Nationalbank, 23 April 2020; Danmarks Nationalbank, Oversight of the financial infrastructure 2019, *Danmarks Nationalbank Report*, No. 3, May 2020; Danmarks Nationalbank, Oversight of the financial infrastructure 2021, *Danmarks Nationalbank Report*, No. 3, May 2022; *Danmarks Nationalbank Annual Report 2020*.

13 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; Richard Mikkelsen, *Monetary History of Denmark 1960-1990 (in Danish only)*, Danmarks Nationalbank, 1993; *Danmarks Nationalbank Report and Accounts 2000*. Danmarks Nationalbank increased its shareholding in VP Securities in 2002 by purchasing shares from Danske Bank, which had given the Danish Competition Authority an undertaking to reduce its shareholding in VP Securities in connection with Danske Bank's merger with RealDanmark, see *Danmarks Nationalbank Report and Accounts 2002*.

credit arrangements in the past. These were the sale of shares in Bella Center (2005<sup>14</sup>), SAS (2013<sup>15</sup>) and Messecenter Herning (2016<sup>16</sup>).

### **On Danmarks Nationalbank's sale of its shares in VP Securities**

“Historically, Danmarks Nationalbank has co-owned several joint companies in the financial sector, with each shareholding having its own history. The role of Danmarks Nationalbank in this area is to act as the authority for and not the co-owner of commercial companies exposed to competition. For that reason, we have withdrawn from this type of companies in recent years (...).”

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Statement by Governor Hugo Frey Jensen in the press release *Danmarks Nationalbank has concluded an agreement to divest its ownership share in VP Securities* from Danmarks Nationalbank, 23 April 2020.

### **Danmarks Nationalbank's payment system: from Kronos to Kronos2 – and beyond**

Danmarks Nationalbank was one of the first central banks in the world to provide banks with an electronic payment system enabling them to make large interbank payments in real time. This happened in 1981 with DN Inquiry and Transfer System, replaced by Kronos in 2001.<sup>17</sup>

In 2005, payments averaging around kr. 425 billion were sent through the Danish payments infrastructure per day, and by 2020 this figure had risen to around kr. 675 billion, see chart 10.1. These amounts were equivalent to about one fourth of Denmark's GDP. Danmarks Nationalbank's payment system played a key role in the infrastructure. This applied not only to the settlement of large, time-critical payments between banks and mortgage credit institutions, such as uncollateralised overnight money market loans, or to Danmarks Nationalbank's monetary policy lending to credit institutions. Danmarks Nationalbank's payment system was also in play as a result of Danmarks Nationalbank's role as a settlement bank for other payment and settlement systems, e.g. in connection with the settlement of retail payments or the money side of securities transactions. In 2017, 88 participants – mainly Danish banks and mortgage credit institutions and foreign banks' branches in Denmark – had direct access to Danmarks Nationalbank's payment system, while approximately 1,800 banks from 117

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14 See *Danmarks Nationalbank Report and Accounts 2005*.

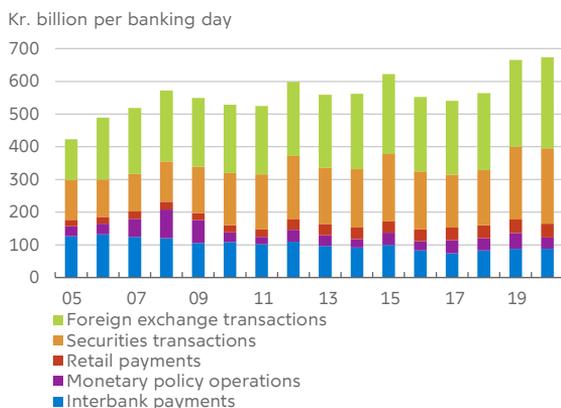
15 See *Danmarks Nationalbank Report and Accounts 2012; Danmarks Nationalbank Report and Accounts 2013*.

16 See *Danmarks Nationalbank Annual Report 2016*.

17 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

## Large amounts through the Danish payments infrastructure every single day

Chart 10.1



Note: The value of transactions in the Danish payments infrastructure. Krone transactions. The figure for retail payments for 2013 is estimated. *Interbank payments* include banks' and mortgage credit institutions' settlement of large, time-critical payments – e.g. uncollateralised overnight money market loans – via Danmarks Nationalbank's payment system (Kronos2 since 20 August 2018 and before that Kronos). *Monetary policy operations* include Danmarks Nationalbank's certificates of deposit and monetary policy loans settled via Danmarks Nationalbank's payment system. *Retail payments* include payments by consumers, companies and public authorities using, for example, Dankort, credit transfers via online banking or Betalingservice – calculated and reconciled in the Sumclearing, Intradagclearing or Straksclearing with subsequent settlement of net amounts in the banks' accounts at Danmarks Nationalbank via Danmarks Nationalbank's payment system. The banks then distribute the money to the bank accounts of individual consumers and companies. *Securities transactions* are calculated as the market value of the securities leg in transactions in bonds, shares and investment certificates reported to VP Securities/Euronext Securities Copenhagen, where net amounts from the money side of the transactions are settled in the banks' accounts at Danmarks Nationalbank via Danmarks Nationalbank's payment system. The banks then distribute the money to the bank accounts of individual investors. *Foreign exchange transactions* include FX spot, FX forward and FX swap transactions executed via CLS, where net amounts in kroner are settled via Danmarks Nationalbank's payment system.

Source: Danmarks Nationalbank *Financial stability*, various editions; Danmarks Nationalbank, *Oversight of the financial infrastructure*, various editions.

different countries had indirect access by using one of the direct participants as a correspondent bank.<sup>18</sup>

Kronos was replaced by Kronos2 in August 2018. Kronos2 was a modern payment system with underlying IT systems based on international standard modules. This made it possible to give Danish banks and mortgage credit institutions access to settle transactions in securities denominated in Danish kroner on the European Central Bank's (ECB's), pan-European Platform for Securities Settlement (TARGET2-Securities (T2S)) in October 2018.<sup>19</sup>

At the end of 2020, Danmarks Nationalbank announced that the ECB's payment system (TARGET2) was planned over a number of years to be able to fully handle payments in currencies other than euro, including Danish kroner, and that the intention was to replace Kronos2 with migration to the ECB's payment and securities settlement platform (TARGET Services<sup>20</sup>) in 2025.<sup>21</sup> This announcement came after an evaluation process involving the ECB, European central banks and representatives of the Danish financial sector. Danish banks had already started using TARGET2 to settle euro payments in May 2008 when the euro part of Kronos was transferred to TARGET2.<sup>22</sup>

### **On the benefits of moving to a pan-European payment and securities settlement platform**

"Consolidation of the Danish krone settlement at Target Services will pave the way for closer collaboration with other central banks in Europe as well as provide economies of scale from joint use of the IT platform. Target Services underpins the central banks' joint efforts and collaboration to ensure a safe and efficient settlement of payments – as well as counter cyber threats (...)."

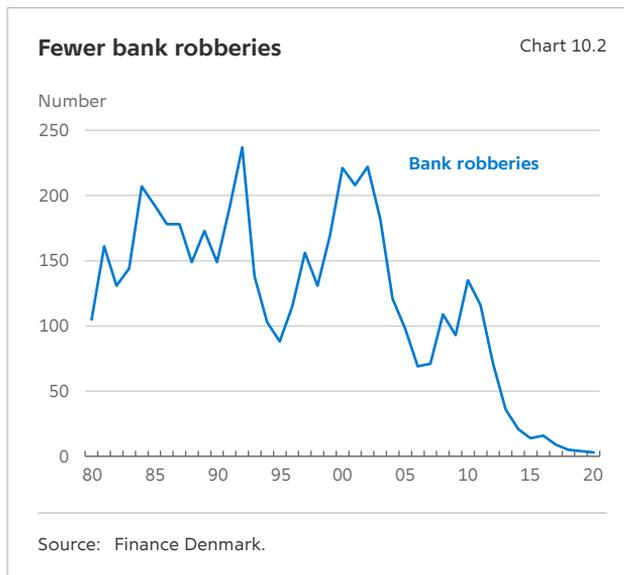
Statement by Assistant Governor Karsten Biloft, Danmarks Nationalbank, in the press release *Danish kroner on new settlement platform* from Danmarks Nationalbank, 8 December 2020.

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- 18 See Søren Truels Nielsen, Banks from more than 100 countries send payments via Kronos, *Danmarks Nationalbank Analysis*, No. 19, November 2017.
- 19 See *Danmarks Nationalbank Annual Report 2018*; Danmarks Nationalbank, Oversight of the financial infrastructure 2018, *Danmarks Nationalbank Report*, No. 3, June 2019. VP Securities joined T2S with settlement of Danish securities in euro in September 2016 and settlement of Danish securities in kroner in October 2018, see Danmarks Nationalbank, Oversight of the financial infrastructure 2017, *Danmarks Nationalbank Report*, No. 4, April 2018; Danmarks Nationalbank, Oversight of the financial infrastructure 2019, *Danmarks Nationalbank Report*, No. 3, May 2020.
- 20 Consisting of TARGET2, T2S and the TARGET Instant Payment Settlement (TIPS) system.
- 21 See Danmarks Nationalbank's press release *Danish kroner on new settlement platform*, 8 December 2020.
- 22 See *Danmarks Nationalbank Report and Accounts 2008*; Morten Valentiner, Denmark migrates to TARGET2, *Danmarks Nationalbank Monetary Review*, Vol. 47(2), June 2008.

It was expected that the migration to a pan-European IT platform such as TARGET Services would strengthen IT security. Moreover, it would provide economies of scale, as the costs of maintaining and further developing the system would be shared between a large number of participants.

### From bank robberies to cyber security

Only a few decades ago, physical bank robberies were at the top of the agenda in any debate on security in the financial sector, see chart 10.2.<sup>23</sup> In line with increased dependence on complex IT systems interconnected across the sector, high IT security became important for interdependence in the financial system. For example, consumers and companies should have confidence that the payment systems would normally be operating, that the risk of e.g. burglary in their online banking services would be low, that data would not be lost through power outages or faulty system updates, and that confidential data would not reach unauthorised persons in the event of hacker attacks.



The work on payment system security consumed vast resources in both banks and Danmarks Nationalbank. Extra attention was paid to overseeing systemically important systems according to international standards and analysing the risk of extreme events that could lead to major breakdowns in the settlement of payments, securities transactions, etc. There was also focus on emergency procedures and backup facilities so that the financial system could quickly function again after breakdowns and the like.<sup>24</sup>

<sup>23</sup> See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

<sup>24</sup> See the chapter Danmarks Nationalbank's policy for oversight of the Danish financial infrastructure in *Danmarks Nationalbank Financial stability 2007*; Danmarks Nationalbank, *Oversight of the financial infrastructure in Denmark 2012*.

Cyber security was the focus of attention particularly in the second half of the 2010s when computers, networks, etc. were increasingly exposed to attacks related to crime, espionage, activism or terrorism. Denmark was one of the most digital societies in the world, and especially the financial sector was a front-runner in offering digital solutions. That is why the extensive digitalisation also made Denmark an obvious target for cyberattacks.

Danmarks Nationalbank put cyber risk on the agenda of the Systemic Risk Council in December 2015, and in follow-up discussions with the financial sector there was broad agreement on the need for formalised cooperation between authorities and key private actors in the area. In 2016, Danmarks Nationalbank and the financial sector established the Financial Sector Forum for Operational Resilience (FSOR) aiming to increase operational resilience in the sector, including resilience to cyberattacks.<sup>25</sup> Danmarks Nationalbank chaired and provided secretariat services to FSOR, whose members at the time of its establishment were systemically important banks and mortgage credit institutions (Danske Bank, DLR Kredit, Jyske Bank, Nordea, Nykredit, Sydbank), payment and settlement systems (Nets, VP Securities)<sup>26</sup>, data centres, etc. (Bankdata, BEC, JN Data, SDC), trade associations (the Danish Bankers Association, Insurance & Pension Denmark, the Association of Danish Mortgage Banks), authorities (Centre for Cyber Security, Ministry of Industry, Business and Financial Affairs, the Danish Financial Supervisory Authority, Danmarks Nationalbank) and other actors (e-nettet, Finansiell Stabilitet A/S, Nasdaq).

### On cybercrime and FSOR

“It is important to remember that attacks to computer systems are not unintentional. There are criminal minds at work, and they are constantly fine-tuning their methods. So the threats are changing all the time. This means that an attack may actually be difficult to detect in time.

(...)

The FSOR is a forum for collaboration between authorities and all key financial sector participants. Its task is to implement “joint measures to ensure financial sector resilience”. The focus is on preventing failures, but also on handling them if they, nevertheless, occur.”

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Quote from Governor Lars Rohde’s speech at the Annual Meeting of the Danish Bankers Association, 5 December 2016.

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25 See the press release *Meeting of the Systemic Risk Council* from the Systemic Risk Council, 15 December 2015; FSOR, *Terms of reference for the Financial Sector Forum for Operational Resilience (FSOR)*, December 2016; *Danmarks Nationalbank Annual Report 2016*; *Danmarks Nationalbank Annual Report 2017*; *Danmarks Nationalbank Annual Report 2019*.

26 As well as Danmarks Nationalbank and the Danish Bankers Association as system owners of Kronos and the retail payment systems, respectively.

One of FSOR's tasks was establishment and testing of a cross-sector national crisis response plan for the financial sector. In 2020, in collaboration with the Centre for Cyber Security<sup>27</sup>, a large-scale crisis response test was also carried out for the first time with a fictitious cyberattack across six critical sectors (transport, shipping, health, telecommunications, energy and finance).<sup>28</sup>

Since the beginning of 2019, Danmarks Nationalbank has also coordinated testing of cyber resilience in the financial sector under the TIBER-DK programme<sup>29</sup>. TIBER tests simulated advanced attacks from government-supported groups or organised criminal groups in real production environments. The goal was to identify strengths and weaknesses in cyber defence and increase cyber resilience by addressing weaknesses.

When the coronavirus pandemic broke out in early 2020, FSOR's members focused on ensuring staffing of socially critical business functions and reducing infection among employees. This was done, among other things, through the use of split teams, virtual meetings and teleworking. This model was also used at Danmarks Nationalbank.<sup>30</sup> The operation of the sector's critical functions proceeded steadily and there was no need to activate FSOR's crisis response in the context of the pandemic in 2020.<sup>31</sup> Information from FSOR on the situation during the pandemic across the financial sector was shared with the National Operational Staff (NOST)<sup>32</sup>, which had a key role in ensuring cooperation and coordination between authorities during the pandemic.

### **Money laundering and big data**

The focus on combating money laundering was strongly emphasised in 1990 when an international expert group (Financial Action Task Force on Money Laundering (FATF))<sup>33</sup> made 40 recommendations for requirements

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27 The Centre for Cyber Security was established in 2012 as part of the Danish Defence Intelligence Service, see Danish Defence Intelligence Service, *Report 2013-2014*.

28 See FSOR, *Annual Report 2020*.

29 Threat Intelligence Based Ethical Red-teaming (TIBER) based on the TIBER-EU framework developed by the European Central Bank, see Danmarks Nationalbank, Tests are to increase cyber resilience in Denmark, *Danmarks Nationalbank News*, No. 7, December 2018; Danmarks Nationalbank, Oversight of the financial infrastructure 2019, *Danmarks Nationalbank Report*, No. 3, May 2020; Press release *Testing with ethical hackers continues in the financial sector* from Danmarks Nationalbank, 6 May 2021; Danmarks Nationalbank, *TIBER-DK in brief*, May 2021.

30 See *Danmarks Nationalbank Annual Report 2020*.

31 See FSOR, *Annual Report 2019*; FSOR, *Annual Report 2020*.

32 NOST was established by the government in 2005 in order to strengthen the cooperation and coordination of state authorities at operational level in connection with management of major crises or incidents, see the Ministry of Justice's answer to question no. 635 (General part) from the Legal Affairs Committee of the Folketing (Danish parliament) of 5 March 2021.

33 The FATF was established at the G7 summit in 1989 and was originally composed of experts from the G7 countries, the European Commission and 8 other countries, see Helene Vinten, Measures to prevent money laundering and terrorist financing, *Danmarks Nationalbank Monetary Review*, Vol. 47(1), March 2008.

for preventive measures in financial companies. One of the basic elements of the recommendations was the Know Your Customer principle: Financial companies had to check the identity of their customers and generally make sure to monitor customer relationships.

The FATF recommendations were incorporated into EU law with the EU Anti-Money Laundering Directive of 1991, which was implemented in Denmark by way of the Anti-Money Laundering Act in 1993. The FATF's recommendations were expanded after the 9/11 terrorist attack on the United States, and since then EU legislation on anti-money laundering and terrorist financing was updated and expanded several times.<sup>34</sup> Anti-money laundering and terrorist financing also became part of the International Monetary Fund's Financial Sector Assessment Program.<sup>35</sup>

### **On banks' anti-money laundering responsibility**

"Banks play a key role in the financial infrastructure. And with this role comes an important social responsibility. A responsibility for ensuring that their businesses are not used for illegal activities.

(...)

It is the role of the authorities to investigate cases of money laundering if there is suspicion of illegal activities. But before it comes to that, the banks have a responsibility not to engage in customer relationships if the real motives of the customers are dubious."

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Quote from Governor Lars Rohde's speech at the Annual Meeting of Finance Denmark, 3 December 2018.

Danmarks Nationalbank welcomed the legislative initiatives on money laundering and terrorist financing as part of the fight against crime.<sup>36</sup> From Danmarks Nationalbank's point of view, the misuse of a bank for illegal activities could also undermine customer and investor confidence in that bank, and if the mistrust rubbed off on the rest of the financial sector, it could have an impact on financial stability. But Danmarks Nationalbank also stressed the bank management responsibility to allocate sufficient resources and have policies, procedures and systems in place to prevent

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34 See *Report No. 1447 on Anti-Money Laundering Legislation (in Danish only)* issued in 2004 by the Ministry of Justice Committee on Financial Crime and Computer Crime.

35 See *Danmarks Nationalbank Report and Accounts 2002; Danmarks Nationalbank Report and Accounts 2003; Danmarks Nationalbank Report and Accounts 2004*.

36 See *Consultation response regarding Anti-Money Laundering Bill (in Danish only)* from Danmarks Nationalbank, 13 September 2005; *Response to the consultation regarding the draft proposal to amend the Act on Measures to Prevent Money Laundering and Financing of Terrorism (the Anti-Money Laundering Act)* from Danmarks Nationalbank, 21 September 2018; *Consultation response regarding the bill to amend the Act on Measures to Prevent Money Laundering and Financing of Terrorism (the Anti-Money Laundering Act) and the Financial Business Act* from Danmarks Nationalbank, 18 January 2019.

and identify money laundering in their businesses. In addition, Danmarks Nationalbank stressed the need to strengthen cross-border cooperation between authorities.<sup>37</sup>

In terms of resources, it was estimated that in 2020 around 5,500 bank employees were working on anti-money laundering measures and compliance. Their efforts resulted in around 60,000 reports to the authorities in 2020 – quite time-consuming and resource intensive for the authorities to handle.<sup>38</sup> Therefore, in 2020, Danmarks Nationalbank carried out a pilot project to investigate whether the correlation of large amounts of detailed data (big data) on cash flows from banks with other data from authorities could help to detect money laundering and other financial crime earlier and more efficiently. The study was conducted in collaboration with the Danish Business Authority, the State Prosecutor for Serious Economic and International Crime, the Danish Financial Supervisory Authority, Finance Denmark and a major bank. The correlation of data from the participating bank and the authorities was subject to an exemption from the Minister for Industry, Business and Financial Affairs, and the project was carried out under strict data processing principles. All data were anonymised after the correlation, and the subsequent analysis was conducted in a secure data room by analysts with security clearance. Data and hard drives were destroyed on completion of the project.

The results of the study showed that authorities could improve their ability to identify suspicious behaviour and screen out non-relevant cases by combining banks' information on transactions with VAT, business and notification data.

The experience from the pilot project informed a working group headed by the Ministry of Industry, Business and Financial Affairs. The working group was to look at whether a common monitoring and analysis system could be developed using data shared across banks and authorities. Such a system could be used in the work of detecting and preventing financial crime.

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37 See Danmarks Nationalbank, Low interest rates and ample lending capacity put pressure on credit standards, *Danmarks Nationalbank Analysis (Financial stability)*, No. 22, November 2018; *Danmarks Nationalbank, Annual Report 2018*; Speech by Governor Lars Rohde at the Annual Meeting of Finance Denmark, 3 December 2018; Danmarks Nationalbank, Prospects of lower earnings and higher capital requirements for banks, *Danmarks Nationalbank Analysis (Financial stability)*, No. 11, May 2019.

38 See Thais Lærkholm Jensen, Alessandro Tang-Andersen Martinello and Bjarke Mørch Mønsted, Data-driven effort strengthens the fight against money laundering, *Danmarks Nationalbank Analysis*, No. 1, January 2021; press release *Danmarks Nationalbank in pilot project against money laundering and VAT fraud* from Danmarks Nationalbank, 26 January 2021; *Collaboration and data exchange can strengthen the fight against financial crime* by Governor Per Callesen and Thais Lærkholm Jensen in *Finanswatch*, 2 February 2021; Speech by Governor Lars Rohde at Finance Denmark's Annual Meeting, 6 December 2021; Kraka Advisory, *The financial sector – an important element of the transformation of Denmark (in Danish only)*, November 2021.





# Danmarks Nationalbank's financial performance and information activities

Monetary policy in Denmark is undertaken by Danmarks Nationalbank, which also developed as a business in the years 2005-20.

The general trend towards falling nominal interest rates after the financial crisis resulted in a decline in Danmarks Nationalbank's earnings and lower profit transfers to the central government. In 2013, in order to improve the ratio between expected return and risk, Danmarks Nationalbank decided to expose a small part of the foreign exchange reserve to shares, corporate bonds and government bonds with lower credit ratings. This made a positive contribution to earnings.

The total number of full-time employees at Danmarks Nationalbank fell from 521 in 2005 to 424 in 2020, constituting a decrease of around 20 per cent. The development reflected both outsourcing and loss of work tasks as well as the addition of new areas of work.

In 2020, Danmarks Nationalbank moved its headquarters to a temporary lease elsewhere in Copenhagen to make room for a major necessary renovation of the listed building at Havnegade 5.

The financial crisis called for further improvements of financial statistics. Moreover, in 2010, a provision was included in the Danmarks Nationalbank Act on the collection and use of statistical information. It gave Danmarks Nationalbank the opportunity to use information provided by individual reporting financial institutions in connection with the conduct of monetary and foreign exchange policies and financial stability oversight.

Clearer and more targeted communication of messages was another of the issues Danmarks Nationalbank addressed after the crisis. Reports and analyses were published individually and continuously in short, more focused formats rather than being gathered in large publications, and the dissemination was supported by visual elements such as icons and infographics. Emphasis was also placed on targeting a wider audience for messages and knowledge in order to increase general knowledge of Danmarks Nationalbank's objectives and tasks.

## **Danmarks Nationalbank's financial performance amid low and negative interest rates**

The general trend towards falling nominal interest rates after the financial crisis impacted Danmarks Nationalbank's financial performance. As interest rates fell and even turned negative, Danmarks Nationalbank's core earnings contribution became low or negative. The contribution mainly consists of seigniorage and return on investment of the counterpart of Danmarks Nationalbank's net capital.<sup>1</sup>

Seigniorage is Danmarks Nationalbank's profit from issuing banknotes and coins. When cash is provided to banks, their deposits at Danmarks Nationalbank decline. Danmarks Nationalbank's seigniorage is thus linked to the difference between the interest rate on banks' deposits at Danmarks Nationalbank and the interest rate on cash in circulation, which is zero. A falling deposit rate resulted in lower seigniorage, and a negative deposit rate caused seigniorage to turn negative.

Danmarks Nationalbank's lower core earnings were reflected in the profit before value adjustments, which were negative in the second half of the 2010s, see chart A.1.

In 2013, in order to improve the ratio between expected return and risk, Danmarks Nationalbank decided to expose a small part of the foreign exchange reserve to shares, corporate bonds and government bonds with lower credit ratings.<sup>2</sup> Considerable gains were obtained by spreading the risk across slightly more asset categories. At the same time, however, it was important for Danmarks Nationalbank to maintain a liquid foreign exchange reserve in euro in order to safeguard its ability to intervene at any time in the foreign exchange markets to defend the fixed exchange rate policy.

Value adjustments, etc. gave rise to notable fluctuations in Danmarks Nationalbank's profits from year to year, but in the years 2005-20 they resulted in a positive earnings contribution of around kr. 25 billion. About kr. 19.5 billion of this amount came from increases in the value of Danmarks Nationalbank's gold stock as a result of higher gold prices.<sup>3</sup> In the years 2014-20, the equity exposure in the foreign exchange reserve posted a positive earnings contribution of around kr. 5.5 billion.

Danmarks Nationalbank's profits after allocations to reserves were transferred to the central government as laid down in the Danmarks Nationalbank Act, but the decline in Danmarks Nationalbank's core earnings was reflected in lower profit transfers. In the years 2017-20, a share of the profit for the year was not transferred to the central government, see chart A.2 and box A.1. Danmarks

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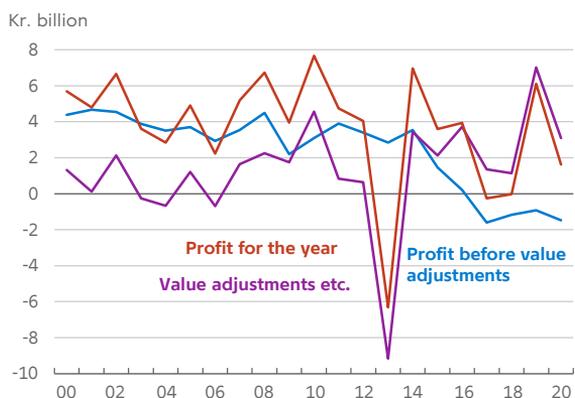
1 Se Danmarks Nationalbank, *Financial management at Danmarks Nationalbank*, 2003.

2 See *Danmarks Nationalbank Report and Accounts 2013*; *Danmarks Nationalbank Report and Accounts 2014*; *Danmarks Nationalbank Report and Accounts 2015*.

3 The historical background for Danmarks Nationalbank's gold stock and its management is described in Kim Abildgren, *Danmarks Nationalbank's gold – a historical overview*, *Danmarks Nationalbank Analysis*, No. 25, October 2021.

### Danmarks Nationalbank's profit before value adjustments turned negative in the second half of the 2010s

Chart A.1



Note: Danmarks Nationalbank's profit. *Value adjustments, etc.* includes value adjustment of gold, market value and exchange rate adjustments of currency exposures, market value adjustments of domestic bonds and impairment charges on financial fixed assets. Since 2015, value adjustments etc. have been calculated excluding mathematical value adjustments due to maturity reductions of the bond portfolio.

Source: Various editions of *Danmarks Nationalbank Report and Accounts* and *Danmarks Nationalbank Annual Report*.

### Lower profit transfer to the central government

Chart A.2



Note: Danmarks Nationalbank's profit transfer to the central government.

Source: Various editions of *Danmarks Nationalbank Report and Accounts* and *Danmarks Nationalbank Annual Report*.

## Principles for Danmarks Nationalbank's profit allocation

Box A.1

Danmarks Nationalbank's profit after allocation to reserves accrues to the central government, see section 19 of the Danmarks Nationalbank Act. According to Danmarks Nationalbank's by-laws (section 4, item 6), the Board of Directors, on the basis of the recommendation of the Board of Governors and the Committee of Directors, decides on allocation and application of profits and submits the accounts for approbation to the Royal Bank Commissioner, i.e. the minister responsible for Danmarks Nationalbank.

In the years 1995-2001, the following principle was applied in the annual decisions on profit allocation: positive value adjustments were transferred to a Value Adjustment Reserve (part of Danmarks Nationalbank's net capital), while negative value adjustments were covered as far as possible by the Value Adjustment Reserve. After transfer to/from the Value Adjustment Reserve, 30 per cent of the amount available was allocated to the General Reserves (another part of Danmarks Nationalbank's net capital) for consolidation of Danmarks Nationalbank. The remaining 70 per cent was transferred to the central government.

In the following years, the profit share transferred to the General Reserves after transfer to/from the Value Adjustment Reserve was 20 per cent (2002-07), 30 per cent (2008-10), 40 per cent (2011) and 50 per cent (2012-14). In profit allocation, the aim from 2002 was to maintain the General Reserves at a constant real level in order to consolidate Danmarks Nationalbank.

In light of, among other things, the low seigniorage and the shift between interest income and value adjustments, the principles for allocation of Danmarks Nationalbank's profits were reconsidered in 2014. The Board of Directors decided – and the Royal Bank Commissioner approved – that from 2015 profit allocation should be based on a new model with Danmarks Nationalbank transferring a share of the average of the last five years' financial results, excluding value adjustment of gold, to the central government. The remaining part of the profit for the year should be transferred to Danmarks Nationalbank's General Reserves. The determination of the transfer ratio was to take into account that, over time, Danmarks Nationalbank's net capital would increase at the same rate as nominal GDP – unless there was an extraordinary need for consolidation. In the years 2015-16, the transfer ratio was set at 30 per cent, while for the years 2017-20 it was set at 0 per cent. The decisions not to transfer a profit share to the central government in the years 2017-20 were made on the grounds that Danmarks Nationalbank's earnings in the coming years were expected to be very low or negative as a result of the low interest rates.

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Source: See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; various editions of *Danmarks Nationalbank Report and Accounts* and *Danmarks Nationalbank Annual Report*.

Nationalbank's consolidation was taken into account in determining the profit transfers, and throughout the period 2005-20 Denmark's Nationalbank's net capital was indeed equivalent to a fairly constant share of nominal GDP, see chart A.3.

The low and negative nominal interest rates were also reflected in the remuneration of the central government's account at Denmark's Nationalbank, see chart A.4. The principles governing the remuneration of the account were changed several times during the period 2005-20, including a few times in the second half of the 2010s to comply with the EU Treaty's prohibition of monetary financing in a negative interest rate environment, see box A.2.

### **Remuneration of the central government's account at Denmark's Nationalbank**

Box A.2

On 1 January 1996, the principles for remuneration of the central government's account at Denmark's Nationalbank were changed so that the total balance accrued interest at the discount rate.

With effect from 11 May 2009, it was decided to reduce the rate of interest on the central government's deposits from the discount rate to the discount rate less 1 percentage point, but not below 0 per cent.

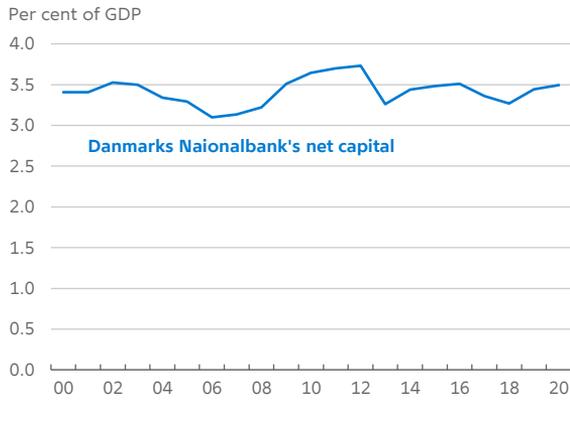
From 1 January 2011, the total balance of the central government's account was remunerated at the current account rate. This was amended with effect from 9 February 2015, so that deposits above kr. 100 billion were remunerated at the certificate of deposit rate, while deposits up to kr. 100 billion were remunerated at the current account rate. Remuneration of the account was changed again with effect from 1 January 2018, so that the total balance was remunerated at an uncollateralised day-to-day money market interest rate. The changes in 2015 and 2018 were made to comply with the EU Treaty's prohibition of monetary financing in a negative interest rate environment.

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Source: Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010; Kim Abildgren and Jens Thomsen, *Monetary Policy after the Crisis – Ten Lessons from a Fixed-Exchange-Rate Regime*, SUERF Studies, Vol. 3, March 2011; various editions of Ministry of Finance, *Finance Bill*; various editions of *Denmark's Nationalbank Report and Accounts*, and *Denmark's Nationalbank Annual Report*.

### Stable development in Danmarks Nationalbank's solvency

Chart A.3

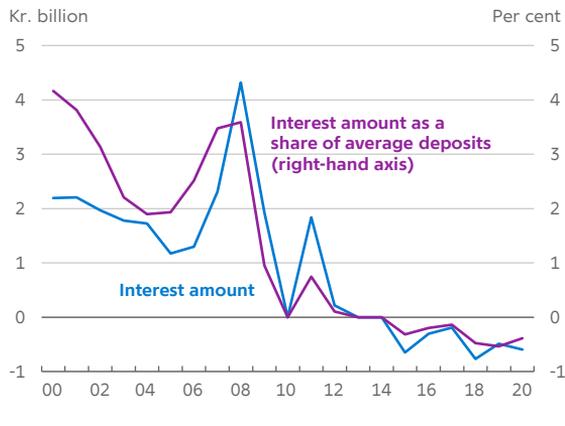


Note: Danmarks Nationalbank's net capital.

Source: Various editions of *Danmarks Nationalbank Report and Accounts* and *Danmarks Nationalbank Annual Report*; Statistics Denmark, *StatBank Denmark*.

### Low and negative nominal interest rates in the second half of the 2010s gave the central government lower interest income from deposits at Danmarks Nationalbank

Chart A.4

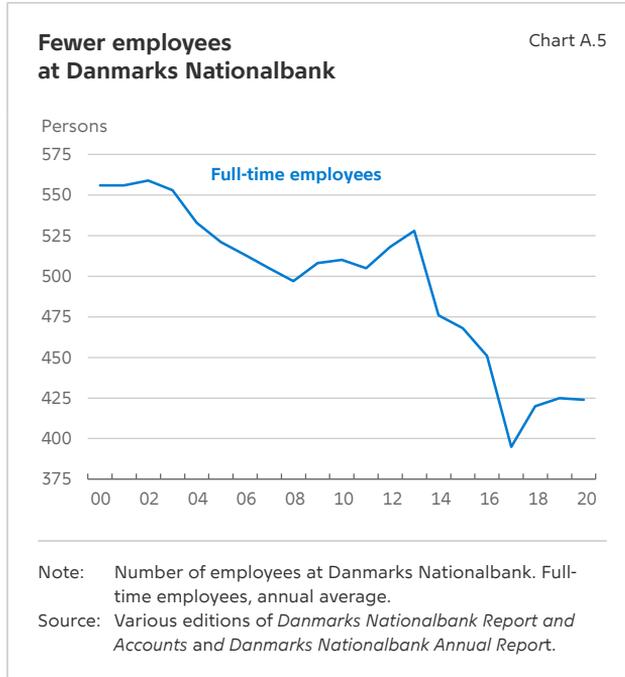


Note: Interest payable to the central government on its deposits at Danmarks Nationalbank. Average deposits at the end of each month of the year.

Source: Various editions of *Danmarks Nationalbank Report and Accounts* and *Danmarks Nationalbank Annual Report*; Danmarks Nationalbank's StatBank.

### Fewer employees despite new tasks

The total number of full-time employees at Danmarks Nationalbank declined from 521 in 2005 to 424 in 2020, corresponding to a reduction of around 20 per cent, see chart A.5. The overall development in the number of employees reflected both outsourcing and loss of work tasks as well as the addition of new areas of work.



In the years 2008-2012, more employees were needed to handle IT tasks and financial stability work during the financial crisis.<sup>4</sup>

At the end of 2013, a process was initiated to reduce the number of employees substantially based on an overall assessment of Danmarks Nationalbank's core tasks. In addition, the extraordinary workload resulting from the financial crisis had decreased.<sup>5</sup> Furthermore, as a result of the decision in 2014 to outsource the production of banknotes and coins, fewer employees were needed in the following years, see chapter 9. The need for employees was also reduced with the outsourcing of a number of operational and development tasks in the IT area in 2017.<sup>6</sup>

<sup>4</sup> See *Danmarks Nationalbank Report and Accounts 2008*; *Danmarks Nationalbank Report and Accounts 2009*; *Danmarks Nationalbank Report and Accounts 2012*.

<sup>5</sup> See *Danmarks Nationalbank Report and Accounts 2013*; *Danmarks Nationalbank Report and Accounts 2014*.

<sup>6</sup> See *Danmarks Nationalbank Annual Report 2017*.

Despite the long-term trend towards fewer employees, there were also new initiatives. Viewed in isolation, these initiatives led to a need for more employees. Examples are the creation of a credit register and focus on cyber security. Furthermore, a research unit was established in 2016 to strengthen collaboration with both national and international universities and other research units.<sup>7</sup> The increase in the number of employees after 2017 reflected a need to strengthen staffing in the areas of financial stability, IT and property and building maintenance.<sup>8</sup> Moreover, in 2019, additional manpower resources were added for data analysis across the organisation, e.g. for processing of big data and for machine learning.<sup>9</sup>

### **Danmarks Nationalbank's buildings**

In the years 2007-08, the employees in the office building at Niels Juels Gade 7 in Copenhagen moved to vacant premises in Danmarks Nationalbank's main building at Havnegade 5 in Copenhagen. The property in Niels Juels Gade was then rented out for a number of years and sold in 2016. Danmarks Nationalbank had originally acquired the property in 1993.<sup>10</sup>

In 2012, coin production was moved from premises at Solmarksvej 5 in Brøndby to premises in the main building in Havnegade. Danmarks Nationalbank had originally acquired the land at Solmarksvej in 1975 and then built the production premises where the Royal Danish Mint moved in in 1978. Danmarks Nationalbank sold the property in Brøndby in 2015.<sup>11</sup>

After these property sales, Danmarks Nationalbank only owned office premises at Havnegade. In addition, there were reception rooms at Nyhavn 18 in Copenhagen, which also contained guest apartments for foreign researchers and artists.<sup>12</sup>

Danmarks Nationalbank's main building at Havnegade 5 was designed by Danish architect Arne Jacobsen and constructed in 1965-78.<sup>13</sup> In 2009, the

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7 See *Danmarks Nationalbank Annual Report 2016*.

8 See *Danmarks Nationalbank Annual Report 2018*.

9 See *Danmarks Nationalbank Annual Report 2019*.

10 See *Danmarks Nationalbank Report and Accounts 1993; Danmarks Nationalbank Report and Accounts 2006; Danmarks Nationalbank Annual Report 2016*.

11 See *Danmarks Nationalbank, The Royal Danish Mint, 1983; Danmarks Nationalbank Report and Accounts 2011; Danmarks Nationalbank, Report and Accounts 2012; Danmarks Nationalbank Report and Accounts 2015*.

12 Danmarks Nationalbank acquired the Nyhavn 18 property in 1970, see *Danmarks Nationalbank Report and Accounts 1968; Danmarks Nationalbank Report and Accounts 1970; Danmarks Nationalbank Report and Accounts 2006*.

13 An extensive collection of photographs of the building and its interior design can be found in the book *Danmarks Nationalbank, Danmarks Nationalbank's building*, 3rd edition, 2016. In 2021, Danmarks Nationalbank posted 3 small films on its website, offering the public a virtual guided tour of the iconic building in Havnegade. Pictures of all Danmarks Nationalbank's headquarters since 1818 can be found in Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

building was listed by the Danish Agency for Culture and Palaces<sup>14</sup> due to its architectural and cultural historical values. The listing meant, among other things, that Danmarks Nationalbank must apply for the Danish Agency for Culture and Palaces' permission before building work can be carried out in addition to general maintenance.<sup>15</sup>

As the owner of the listed Arne Jacobsen building, Danmarks Nationalbank is responsible for protecting its architectural expression and preserving the cultural heritage for posterity. In 2020, Danmarks Nationalbank moved its headquarters to a temporary lease at Langelinie Allé 47 in Copenhagen to make room for a major necessary restoration and renovation of the listed building at Havnegade. The restoration and renovation project includes protection against rising sea water and torrential rain, replacement of marble and glass façades, PCB clean-up and improvement of fire safety, interior design and indoor climate. At the same time, the interiors must be updated to meet the requirements of a modern and flexible workplace. The adaptations are being made in full respect of Arne Jacobsen's architecture and in close dialogue with the Danish Agency for Culture and Palaces.<sup>16</sup>

In 2020, it was estimated that the project to restore and renovate Havnegade 5 would last until 2028.

### **Clearer and more targeted communication**

As mentioned in chapter 2, the Rangvid Committee's report stated that Danmarks Nationalbank had not been very clear in its communication about risks in the financial sector prior to the financial crisis. Clearer and more targeted communication of messages was one of the issues Danmarks Nationalbank addressed after the crisis.

From 2013, press conferences have been transmitted live on Danmarks Nationalbank's website, and in 2016 Danmarks Nationalbank restructured its range of publications so that reports and analyses were published individually and continuously in more targeted, focused and short formats rather than being gathered in large publications.<sup>17</sup> In the new publication design, the communication of clear messages was supported by bullet summaries and visual elements such as icons and infographics.

Emphasis was also placed on targeting a wider audience for messages and knowledge in order to increase general knowledge of Danmarks Nationalbank's objectives and tasks. Social media were adopted (Twitter in 2011; LinkedIn in 2013; Facebook in 2018), and from 2017 Danmarks

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14 From 2012 part of the Danish Agency for Culture and from 2016 part of the Agency for Culture and Palaces, see *Annual Report 2014* for the Danish Agency for Culture; *Annual Report 2016 for the Agency for Culture and Palaces*.

15 See *Danmarks Nationalbank Report and Accounts 2009*.

16 See *Danmarks Nationalbank Annual Report 2019*; *Danmarks Nationalbank Annual Report 2020*; *Danmarks Nationalbank Annual Report 2021*.

17 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

Nationalbank participated in Folkemødet (the Democracy Festival) on Bornholm. In 2018, Danmarks Nationalbank prepared new teaching materials for students in upper secondary education to increase their knowledge about price stability, exchange rate policy and the role of banks in the economy, and from 2020 Danmarks Nationalbank participated in Finance Denmark's Money Week to strengthen financial literacy among lower secondary school students in grade 7-9. In 2020, Danmarks Nationalbank also launched a series of podcasts enabling its economists and other experts to talk about their work in analysing the economy, overseeing financial stability and conducting monetary policy.

The demand for printed publications declined over the years, and in 2014 Danmarks Nationalbank switched to publishing publications only in electronic formats.

### **On Danmarks Nationalbank's communication**

"Nowadays our communication is not only targeting people in the financial markets. We have started a journey on which we aim to communicate much broader and wish to reach all Danes in an effort to pave the way for their understanding of why there is a central bank and what we are doing.

We are not publishing traditional quarterly review anymore. The publication has been cut into slices and is now released on an ongoing basis. We are now working with five different target groups: The professionals, the public servants, the academic community, the journalist and the politician. Publications are edited and targeted to audience groups."

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Quote from Governor Lars Rohde's speech at the ECB's Central Bank Communications Conference, 15 November 2017.

### **Improvements to financial statistics and new statistical provision in the Danmarks Nationalbank Act**

Throughout the 1990s and first part of the 2000s, Danmarks Nationalbank's statistical production had been gradually restructured and expanded in line with international standards and manuals for economic statistics, including standards developed by the European Central Bank, ECB.<sup>18</sup> This enabled Danish financial statistics to be compared with similar data from other countries, and the statistics were continuously kept up to date as international standards and manuals were updated.<sup>19</sup> In addition, the cooperation with Statistics Denmark had been intensified

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18 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

19 See *Danmarks Nationalbank Report and Accounts 2012*.

and formalised, and in 2000 Danmarks Nationalbank was given its own statutory authority for financial statistics through an amendment to the Act on Statistics Denmark, which gave Statistics Denmark the opportunity to entrust Danmarks Nationalbank with the task of collecting, processing and publishing financial statistics.<sup>20</sup>

Moreover, in 2010, a provision was introduced in the Danmarks Nationalbank Act (section 14a) on the collection and use of statistical information.<sup>21</sup> It gave Danmarks Nationalbank the opportunity to use information provided by individual reporting financial institutions in connection with the conduct of monetary and foreign exchange policies and financial stability oversight. That had not been possible with information collected on the basis of Danmarks Nationalbank's statistical statutory authority under the Act on Statistics Denmark – such information could only be used to produce statistics. Danmarks Nationalbank's statistical statutory authority under the Act on Statistics Denmark was repealed in connection with the introduction of the new statistical statutory authority provision in the Danmarks Nationalbank Act.<sup>22</sup>

The lending survey was part of the new statistics produced by Danmarks Nationalbank. The statistics were based on assessments from the credit managers of the largest banks and mortgage credit institutions about changes in lending policy and expectations of credit developments in the coming quarter. The survey was inspired by similar surveys by central banks in other countries and was first published in January 2009. So, it was launched at the right time to play an important role in assessing credit standards during the financial crisis.<sup>23</sup>

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20 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Rosendahls-SchultzGrafisk, 2010.

21 See Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 2010*, Rosendahls-SchultzGrafisk, 2010; *Danmarks Nationalbank Report and Accounts 2010*; Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018.

22 With the legislative amendment in 2010, Danmarks Nationalbank was also authorised to disclose confidential statistical data in connection with its work in the European System of Central Banks (ESCB) and the European Systemic Risk Board (ESRB). An amendment to section 14a of the Danmarks Nationalbank Act in June 2021 clarified which companies were obliged to report information to Danmarks Nationalbank, and as something new, companies with a role in the payments infrastructure also became reporters. Furthermore, Danmarks Nationalbank's statutory authority to use the information obtained to carry out its tasks was clarified (including the use of information about natural persons collected from financial enterprises, e.g. information about customers' loans and payments), and Danmarks Nationalbank's access to disclose confidential information to other relevant national authorities etc. was expanded. Finally, with a recasting of section 20 of the Danmarks Nationalbank Act, a special statutory duty of confidentiality regarding confidential information was inserted for all employees of Danmarks Nationalbank as well as members of the Bank's Board of Directors and Committee of Directors, see Act no. 1163 of 8 June 2021 with comments in Bill No. L 193 tabled by the Minister for Industry, Business and Financial Affairs on 24 March 2021.

23 See Danmarks Nationalbank, *Report and Accounts 2008*; Carina Moselund Jensen and Tania Al-Zagheer Sass, Danmarks Nationalbank's lending survey – New statistics for changes in banks' and mortgage credit institutes' credit policies, *Danmarks Nationalbank Monetary Review*, Vol. 48(1), March 2009.

### **On authority under the Danmarks Nationalbank Act to collect statistics**

“(…) Danmarks Nationalbank’s increased statistical activity has been strengthened by the recent amendment of the statutory basis that allows Danmarks Nationalbank to collect statistical information independently for purposes such as macroprudential work, meaning the interplay between the real economy and the general health of the financial sector. It will furthermore be possible for the Nationalbank to use the collected data for individual respondents in its general work and thus not only for general statistical purposes. This work will be strengthened considerably in the coming years in cooperation with the Danish Financial Supervisory Authority and international players such as the ECB and the new European Systemic Risk Board.”

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Quote from Governor Nils Bernstein’s speech at the Nordic Statisticians Meeting, 12 August 2010.

### **On Danmarks Nationalbank’s lending survey**

“It saw the light of day in early 2009 with the 4th quarter of 2008 as the first observation. The lending survey represents qualitative statistics that provide information on the underlying factors and the development in lending by banks and mortgage-credit institutes. The survey was launched at just the right time. For instance, it helped us in our assessment that the crisis has not given rise to an outright credit crunch in Denmark.”

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Quote from Governor Nils Bernstein’s speech at the Nordic Statisticians Meeting, 12 August 2010.

In 2012, Danmarks Nationalbank and Statistics Denmark entered into an agreement to jointly compile annual household-based (individual-based) wealth and debt statistics. The statistics were first published in 2015 and provided a better basis for assessing the impact of household debt on financial and macroeconomic stability and for analysing the role of the pension system in the Danish economy.<sup>24</sup>

Financial stability oversight was also strengthened by the credit register with detailed information on banks’ and mortgage credit institutions’ lending to all types of borrowers. In 2014, Danmarks Nationalbank had decided to establish this register jointly with the Danish Financial

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<sup>24</sup> See *Danmarks Nationalbank Report and Accounts 2012; Danmarks Nationalbank Report and Accounts 2015*.

Supervisory Authority. At that time, the euro area member states already had plans for such a register of banks' corporate lending, and a similar Danish register would bring the Danish oversight and supervision tools on a par with the rest of Europe and thus contribute to ensuring confidence in the Danish financial system.<sup>25</sup> The content of the Danish credit register was determined on the basis of the list of variables for the European credit register – adapted to a Danish context, as the Danish credit register was to include both corporate and household lending. The detailed information in the credit register made it possible to follow trends and correlations across individual loans and borrowers, which was not possible in more aggregated statistics. The first reports to the credit register were made at the end of 2019, and Danmarks Nationalbank used data from the register for the first time in its stress test of the banking system at the end of 2020.<sup>26</sup>

### On the need for a credit register

"A register of individual credits with information about the debtor, collateral, etc. will improve the basis for Danmarks Nationalbank's oversight of financial stability and for the supervisory activities of the Danish Financial Supervisory Authority.

We are aware that the credit register will involve a lot of work for the sector in terms of establishing the reporting system and regularly reporting information. But not only do we see the credit register as a prerequisite for Danmarks Nationalbank's and the Danish Financial Supervisory Authority's work to ensure financial stability, the establishment of the register will also help to ensure that Denmark's supervisory and oversight instruments are at least as good as those applied elsewhere in Europe. The euro area has decided to establish a similar register from the end of 2016."

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Quote from Governor Hugo Frey Jensen's speech at the Director's Conference of the Danish Bankers Association, 8 September 2014.

### Danmarks Nationalbank's 200th anniversary in 2018

On 4 July 1818, King Frederik VI signed Danmarks Nationalbank's "constitution" (Charter), which authorised Danmarks Nationalbank to operate as a central bank and granted it a monopoly on issuing

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25 See *Danmarks Nationalbank Report and Accounts 2014*; *Danmarks Nationalbank Report and Accounts 2016*.

26 See the announcement *Big data project strengthens Denmark's financial stability (in Danish only)* from BEC Financial Technologies, 13 November 2019; the memo *New major Bankdata project to avert potential financial crisis in the future (in Danish only)* from Bankdata, 8 November 2019; Danmarks Nationalbank, *A few banks fall short of capital requirements in stress test, Danmarks Nationalbank Analysis (Stress test)*, No. 27, December 2020.

banknotes. Consequently, 2018 marked the bicentenary of Danmarks Nationalbank's establishment, and the anniversary year was celebrated with a number of activities that helped to open the bank to the outside world.<sup>27</sup>

On the actual anniversary day, 4 July 2018, a reception was held for several external partners. The participants included Her Majesty Queen Margrethe and representatives from the Folketing (Danish parliament). The official part of the programme included speeches by both the Chairman of Danmarks Nationalbank's Board of Governors<sup>28</sup> and the Royal Bank Commissioner. It was livestreamed on Danmarks Nationalbank's website and Danmarks Nationalbank's Facebook page.

On the same day, an anniversary book and a booklet were published, outlining, in text and illustrations, Danmarks Nationalbank's 200-year history with the main emphasis on the parts that were particularly interesting from today's point of view. In addition, Danmarks Nationalbank published a book on Denmark's coinage history until 1550 with the latest knowledge about, among other things, the use of coins as a means of payment in various parts of society. This well-illustrated book was prepared by employees from The Royal Collection of Coins and Medals at the National Museum of Denmark.<sup>29</sup>

In connection with the anniversary, an interactive exhibition was shown in Danmarks Nationalbank's lobby at Havnegade in Copenhagen. The exhibition illustrated the bank's history and hosted games and activities to convey Danmarks Nationalbank's tasks in connection with the fixed exchange rate policy and financial crises. For a period in autumn 2018, the exhibition was set up at the Industrial Museum in Horsens and was then included in Danmarks Nationalbank's teaching of upper secondary school classes.

In October 2018, Danmarks Nationalbank participated for the first time in the Copenhagen cultural event *Culture Night*, where it was possible to get a tour of the bank and talk to some of the bank's employees.

In September 2018, Danmarks Nationalbank held a professional conference for a number of international partners. The conference was organised in collaboration with the Bank for International Settlements (BIS) and featured presentations from central bank governors and internationally renowned economists. Among the topics were

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27 See *Danmarks Nationalbank Report and Accounts 2018*.

28 See Governor Lars Rohde's speech at Danmarks Nationalbank's 200th anniversary on 4 July 2018. [www.nationalbanken.dk](http://www.nationalbanken.dk).

29 See Kim Abildgren, *Danmarks Nationalbank 1818-2018*, Rosendahls, 2018, (with accompanying web appendix); Danmarks Nationalbank, *Danmarks Nationalbank 200 years*, 2018; Michael Andersen and Tine Bonde Christensen (eds.), *Denar til daler. Danmarks mønthistorie indtil 1550 (in Danish only)*, Danmarks Nationalbank, 2018. All publications are available for free on [www.nationalbanken.dk](http://www.nationalbanken.dk)

unconventional monetary policy measures and challenges for central banks, especially in small open economies.<sup>30</sup>

As part of the celebration of its 200th anniversary, Danmarks Nationalbank provided financial support for two professorships in the field of economics.<sup>31</sup> Each donation consisted of an annual grant of kr. 1 million for five years, to be used for remuneration of the full-time professor and to cover costs for office facilities, travel etc. in connection with the professorship. The professorships could be extended for three years. Aarhus University and the University of Copenhagen were chosen as recipients of the donations following an open process in 2016 where all the country's universities and business schools were invited to apply.<sup>32</sup>

### **On donations to professorships on the occasion of Danmarks Nationalbank's 200th anniversary in 2018**

"We want to strengthen the economic research that is relevant to Danmarks Nationalbank's work. We also hope that this contributes to raising the level in general and thus improving our ability to recruit highly qualified employees with a background in economics."

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Statement by Governor Lars Rohde in the press release *Danmarks Nationalbank supports professorships (in Danish only)*, 16 December 2016.

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30 The papers from the conference can be found at [www.nationalbanken.dk](http://www.nationalbanken.dk), see Danmarks Nationalbank and BIS, *Monetary policy spillovers in a financially integrated world. Conference proceedings*, Joint Danmarks Nationalbank – BIS conference to mark the 200th anniversary of Danmarks Nationalbank, Copenhagen, 7-8 September 2018.

31 See *Danmarks Nationalbank marks its 200th anniversary in 2018 by supporting the establishment of two professorships in economics*, open letter from Danmarks Nationalbank to universities and business schools in Denmark, 27 June 2016; press release *Danmarks Nationalbank supports professorships (in Danish only)* from Danmarks Nationalbank, 16 December 2016; *Danmarks Nationalbank Report and Accounts 2016*.

32 In February 2018, the University of Copenhagen decided to grant the professorship to Emiliano Santoro, while in December 2018 Aarhus University decided to grant the professorship to Mark Weder.

