



DENMARK

FINANCIAL SYSTEM STABILITY ASSESSMENT

December 2014

The Financial System Stability Assessment for Denmark was prepared by a staff team of the IMF for the Executive Board's consideration on December 5, 2014. This report is based on the work of the IMF Financial Sector Assessment Program (FSAP) mission to Denmark during June 17–July 2, 2014. The FSSA was completed in December.

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FINANCIAL SYSTEM STABILITY ASSESSMENT

November 12, 2014

Approved By:

**Christopher Towe and
Mahmood Pradhan**

Prepared By:

**Monetary and Capital Markets
Department**

This report is based on the work of the Financial Sector Assessment Program (FSAP) mission that visited Denmark in March and June–July 2014. The findings were discussed with the authorities during the Article IV Consultation mission in September 2014.

- The FSAP team consisted of James Morsink (Mission Chief), Oana Croitoru Nedelescu (Deputy Mission Chief), Timo Broszeit, Emanuel Kopp, Prachi Mishra, Mala Nag, Miguel Savastano, Constant Verkoren, Christopher Wilson, (all MCM); Kazuko Shirono (EUR), and Carine Chartouni (LEG); and William Rutledge, Robert Sheehy, and Ian Tower (external experts).
- FSAPs assess the stability of the financial system as a whole and not that of individual institutions. They are intended to help countries identify key sources of systemic risk in the financial sector and implement policies to enhance its resilience to shocks and contagion. Certain categories of risk affecting financial institutions, such as operational or legal risk, or risk related to fraud, are not covered in FSAPs.
- Denmark is deemed by the Fund to have a systemically important financial sector and the stability assessment under this FSAP is part of bilateral surveillance under Article IV of the Fund's Articles of Agreement.
- This report was prepared by James Morsink and Oana Croitoru Nedelescu with contributions from the members of the team.

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Glossary

AML/CFT	Anti-Money Laundering and Combating the Financing of Terrorism
BCP	Basel Core Principles
BRRD	Bank Recovery and Resolution Directive
BU	Bottom-Up (Stress Test)
CCB	Counter Cyclical Buffer
DFBA	Danish Financial Business Act
DFSA	Danish Financial Supervisory Authority
DGS	Deposit Guarantee Scheme
DKK	Danish Krone
DN	Danmarks Nationalbank
D-SIFIs	Domestic Systemically Important Financial Institutions
DSTI	Debt-Service-to-Income
EA	Euro Area
ELA	Emergency Liquidity Assistance
ELC	Excess Liquidity Coverage
ESRB	European Systemic Risk Board
EU	European Union
FSAP	Financial Sector Assessment Program
FSI	Financial Soundness Indicators
FSC	Financial Stability Company
FSSA	Financial System Stability Assessment
HQLA	High Quality Liquid Assets
HtM	Hold to Maturity
IMF	International Monetary Fund
IO	Interest-Only
LCR	Liquidity Coverage Ratio
LTV	Loan-to-Value
MCIs	Mortgage Credit Institutions
MOBG	Ministry of Business and Growth
NSFR	Net Stable Funding Ratio
NPL	Nonperforming loan
ROE	Return on Equity
RWA	Risk Weighted Assets
ROSCs	Reports on the Observance of Standards and Codes
SPVs	Special Purpose Vehicles
SRC	Systemic Risk Council
SSM	Single Supervisory Mechanism
TD	Top-Down (Stress Test)
VaR	Value-at-Risk
WEO	World Economic Outlook

EXECUTIVE SUMMARY

The Danish authorities have taken important steps in recent years to improve financial system resilience. Financial regulation and supervision have been strengthened. A new bank resolution framework that includes bail-in of creditors has been adopted and deployed to resolve small and medium-sized banks. An institutional framework for macroprudential policy has also been adopted. Recent legislation requires maturity extension of covered bonds in stress situations, with the aim of reducing refinancing risk in the mortgage finance system.

Although stress tests suggest that financial stability risks are contained, the financial system's large size and interconnectedness call for additional measures to further strengthen resilience.

In a severe stress scenario, solvency levels at large banks and mortgage credit institutions (MCIs) remain well above regulatory requirements, owing to high current capital ratios. Stress tests also suggest that concentration risk and extreme increases in covered bond spreads would be manageable. However, this analysis cannot fully capture second-round and non-linear effects, and so may underestimate contagion risks that are material in light of the large size and interconnectedness of balance sheets in Denmark. For this reason, staff recommends the measures described below to further enhance systemic resilience.

Given that covered bonds backed by mortgage loans are at the heart of the financial system, risks in mortgage finance should be reduced. The mortgage finance system has a long history of good performance based on important strengths, including a “balance principle” that limits most non-credit risks. However, the rapid growth of adjustable-rate and interest-only (IO) mortgage loans have increased the share of long-term loans funded by short-term covered bonds (refinancing risk), increased the risk of payment difficulties when interest rates rise (credit risk), and reduced resilience to house price declines. It would be advisable to use regulatory policies to encourage longer bond maturities, ensure that eventual interest-rate increases are better reflected in loan pricing and approvals, and increase buffers in loans with interest-only periods, e.g. by reducing the loan-to-value (LTV) ceiling. The proposed prudential limits on MCIs' higher-risk activities are welcome.

Prudential supervision is generally sound, but there is scope for further improvement. The intensity of the risk-based approach and the early and firm enforcement policy are areas of strength. However, additional resources are needed to increase the frequency of onsite inspections, including for AML/CFT supervision, and the operational independence of the Danish Financial Supervisory Authority (DFSA) should be ensured. In banking supervision, the information on operational and market risk that is reported routinely should be broadened, and systemic review of Pillar III disclosures should be implemented. In insurance supervision, a minimum solvency level should be established, and assessments of companies' governance and management—as well as the supervision of market conduct, fraud, and AML/CFT—should be enhanced.

It is also important to continue to strengthen the macroprudential framework in light of high interconnectedness and the limits on monetary policy implied by the fixed exchange rate. The recent creation of the Systemic Risk Council (SRC), the imminent imposition of capital surcharges on

domestic systemically important financial institutions (D-SIFIs), and the forthcoming introduction of the framework for the countercyclical capital buffer are important steps. The authorities are encouraged to further develop the macroprudential policy framework, including by: expanding the capacity to identify and monitor systemic risk; developing instruments to address time-varying systemic risk, such as ceilings on LTV and debt-service-to-income (DSTI) ratios; and establishing a framework for higher risk weights to lending to specific sectors. Also, institutional arrangements should be reviewed, to ensure their independence, especially with regard to the appointment of the government as the designated authority for most macroprudential instruments.

There is a need to strengthen the resolution regime to enable the effective resolution of all banks, including systemic institutions. In line with international good practices and the European Union (EU) Bank Recovery and Resolution Directive (BRRD), work should be prioritized in the following three areas: (i) the preparation of resolution plans and resolvability assessments; (ii) the establishment of early resolution triggers and the strengthening of funding arrangements and the toolkit for resolution; and (iii) the enhancement of the deposit guarantee scheme (DGS), including by removing mandatory offsetting, strengthening backstop arrangements, and introducing depositor preference.

Given Denmark's strong financial links with other Nordic countries, regional cooperation is essential. Danske Bank has a large presence in other Nordic and Baltic countries while Nordea, a large Swedish bank, plays an important role in the Danish banking system. The authorities should continue to strengthen cooperation on macroprudential policy and harmonize resolution frameworks, coordinated at a regional level for those institutions whose failure may generate regional spillovers.

Table 1. Key Recommendations^{1/}	
Recommendations	Priority^{2/}
Mortgage finance	
➤ Reduce refinancing risk by putting into place regulatory policies to encourage longer bond maturities (DFSA, MOBG)	Short term
➤ Limit impact of the eventual normalization of interest rates by ensuring that the credit risk is adequately taken into account in loan pricing and approvals (DFSA, MOBG)	Short term
➤ Increase buffers in loans with interest-only (IO) periods by lowering LTV limits for such loans, requiring amortization to a lower ceiling, and/or by imposing higher capital charges or credit loss provisions until IO periods expire (DFSA, MOBG)	Short term
Prudential supervision	
➤ Reduce the length of examination cycles for banks and insurance companies (DFSA), which will require additional supervisory resources (MOBG)	Short term
➤ Ensure the operational independence of the DFSA by establishing a set of supervisory imperatives wholly within the authority of the Director General and by lengthening the terms of the Board members and establishing a formal vetting process (MOBG)	Medium term
Bank supervision	
➤ Broaden routine reporting of information on operational and market risk (DFSA)	Short term
➤ Ensure systematic review of Pillar III disclosures (DFSA)	Medium term
Insurance supervision	
➤ Enhance the supervision of conduct of business, fraud, and AML/CFT (DFSA)	Short term
➤ Establish a solvency level below which companies may not operate (DFSA)	Short term
➤ Require risk, compliance, internal audit, and actuarial functions in all insurers and better integrate qualitative assessments of governance and management with off-site analysis (DFSA)	Medium term
Macroprudential policy	
➤ Develop new instruments capable of addressing time-varying systemic risk, such as limits on loan-to-value (LTV) and debt service to income (DSTI) ratios (DN, DFSA)	Short term
➤ Expand the range of analytical tools used to identify and monitor systemic risk (DN)	Medium term
Crisis management and bank resolution	
➤ Establish early resolution triggers and strengthen funding arrangements and the resolution toolkit (MOBG, FSC, DFSA)	Short term
➤ Prepare resolution plans and resolvability assessments (FSC, DFSA)	Short term
➤ Enhance the deposit guarantee scheme by removing mandatory offsetting, strengthening back-stop arrangements, and introducing depositor preference (MOBG)	Medium term
Stress testing	
➤ Further exploit synergies between micro- and macroprudential stress testing through intensified cooperation (DFSA, DN)	Medium term
➤ Develop a macroprudential stress testing framework for the insurance sector (DFSA)	Medium term
➤ Expand financial stability analyses to include insurance and pension funds (DN)	Medium term
1/ See Appendix I for the status of implementation of the recommendations of the 2006 FSAP.	
2/ Short-term indicates within 18 months; medium-term indicates from 18 months to three years.	

STRUCTURE AND RECENT PERFORMANCE OF THE FINANCIAL SECTOR

A. Large and Interconnected Financial System

1. Denmark's financial system is large, with assets over 650 percent of GDP (Figure 1). The banking sector—comprising 95 banks and mortgage credit institutions (MCIs)—accounts for two thirds of financial sector assets and is large in comparison with other countries. The banking sector is dominated by six domestic systemically important financial institutions (D-SIFIs), the largest of which is Danske Bank Group (with assets of about 180 percent of GDP). The insurance sector is also large (130 percent of GDP), partly due to the fact that life insurers are major providers of occupational pension schemes.

2. The large size of the financial system reflects in part the high level of domestic interconnectedness. Household assets and liabilities as shares of GDP are among the highest in the world. Household pension savings in the form of claims on life insurance companies and pension funds represent 140 percent of GDP. In turn, institutional investors hold large amounts of covered bonds. The covered bonds market is 150 percent of GDP (four times the size of the government debt market). Lending by banks and MCIs to households amounts to 130 percent of GDP.

3. Denmark's high level of household gross debt is an underlying vulnerability (Figure 2). Household net wealth is relatively high, but a large share of household assets is illiquid (housing and pension savings), so households have limited liquid buffers to deal with shocks. In the post-crisis years, household deleveraging has negatively affected private consumption. Household arrears have been generally low and stress tests using household-level data performed by DN suggest that the impact of an interest rate increase on nonperforming loans (NPLs) would be limited.

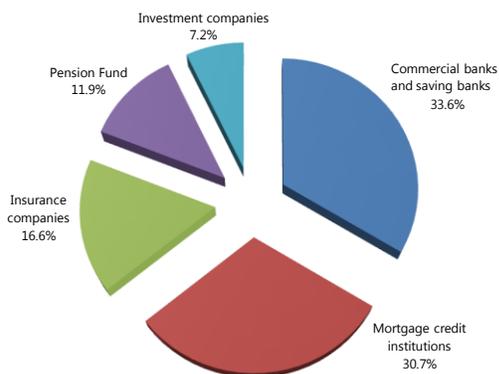
4. Nonfinancial corporate sector debt rose rapidly during the boom years, but has stabilized at 110 percent of GDP, a level similar to other advanced economies. The nonfinancial corporate sector is gradually reducing its reliance on debt financing. However, the number of corporate defaults remains higher than before the crisis, and the recovery of corporate profitability has been slow.

5. The banking system has strong ties with the Nordic and Baltic countries. The operations and exposures of all major Nordic banks are concentrated within the Nordic-Baltic region through complex cross-border business arrangements. Danske Bank's lending and deposit market shares range from 5–10 percent in the other Nordic and Baltic countries (with the exception of Latvia). While most other Nordic banks have a small presence in Denmark, the Swedish-headquartered Nordea is the second-largest bank in the country with important deposit and lending market shares for both households and corporates.

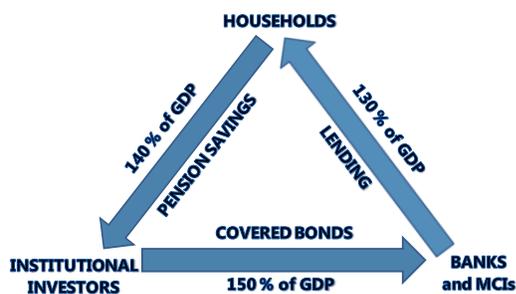
Figure 1. Denmark: Structure of the Financial System

Banks and MCIs account for two-thirds of financial system assets...

Composition of the Financial System
(Share of total assets)



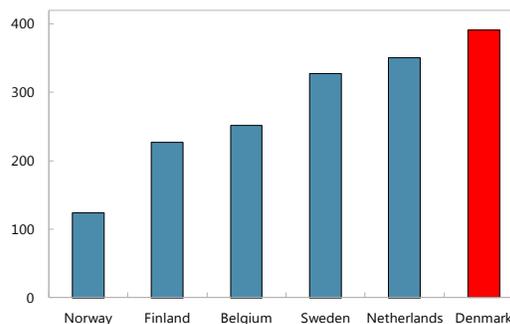
The large financial system reflects high domestic inter-connectedness...



Note: Not all covered bonds are held by insurance and pension funds.

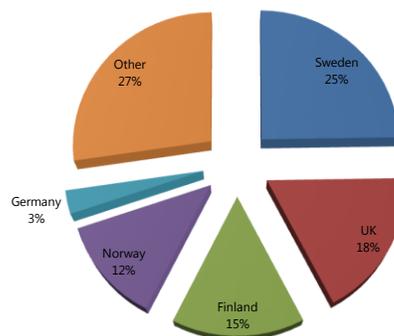
...and represent a large share of GDP.

Banking System Assets Across Countries
(Percent of GDP, 2013)



... as well as strong ties with other Nordic countries.

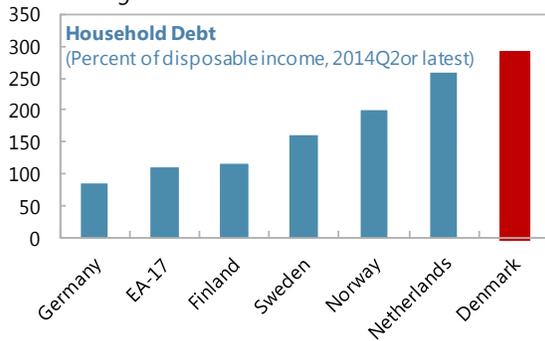
Banks' Foreign Exposures
(In Percent of Total External Assets)



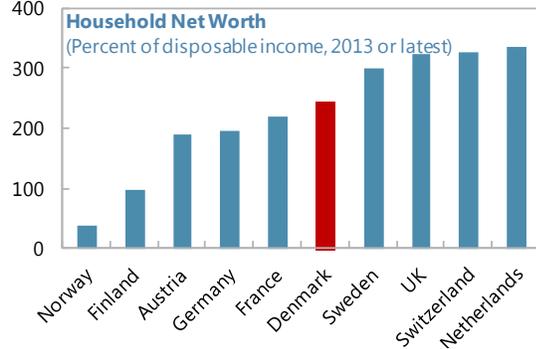
Sources: DFSA, FSI Databases, BIS Consolidated banking statistics, and Fund Staff Calculations.

Figure 2. Denmark: Household Balance Sheets

Household debt in Denmark is the highest among advanced economies...

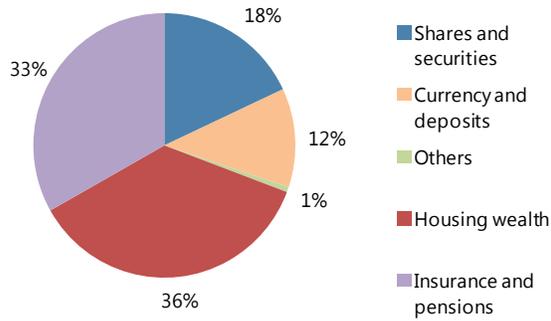


...and household net worth is also relatively high compared with peers.

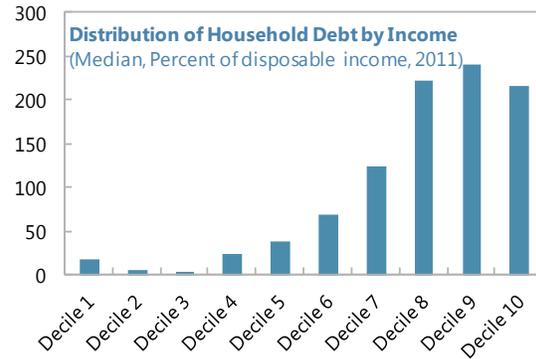


However, a large share of household assets is illiquid (housing and pensions), leaving limited liquid buffers...

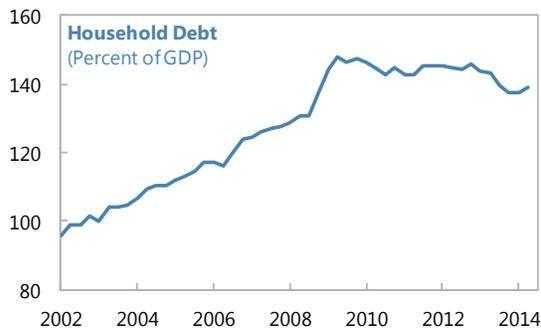
Composition of Household Assets (As of 2013Q2)



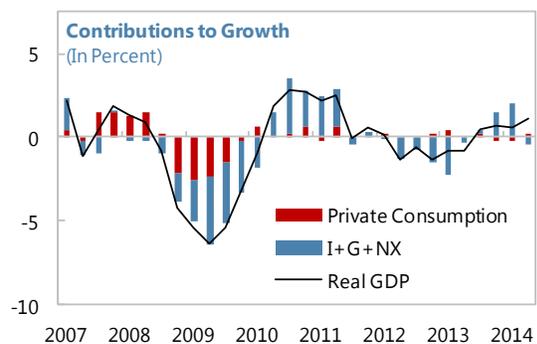
...while household debt is more skewed toward high income families.



Households have deleveraged...



...which has dampened consumption.



Sources: Haver Analytics, Danmarks Nationalbank, and Fund staff calculations.

B. Global Crisis and Aftermath

6. Denmark's response to the global crisis was prompt and decisive. In the initial phase of the crisis, commercial banks faced severe liquidity strains due to their excessive reliance on short-term wholesale funding. The DN provided extraordinary liquidity support and banks' access to funding was ensured through large-scale government guarantees. As the economy underwent a sharp downturn and the real estate bubble burst, banks recorded write downs of loans equivalent to about 8½ percent of GDP (2008–2011) which significantly eroded banks' profitability (Table 2).¹ In 2010, the authorities introduced a clear distinction in their approach to dealing with banks under stress: viable banks would be supported by government guarantees and capital injections, whereas weak banks would be either resolved through private solutions (mergers) or closed. The government adopted six rounds of measures (the "Bank Packages," Box 1). However, the authorities have explicitly excluded large banks from the new resolution scheme, which means that an effective resolution regime for D-SIFIs remains necessary.

Table 2. Financial Soundness Indicators (2006–2013)

	2006	2007	2008	2009	2010	2011	2012	2013
Deposit-taking institutions: Total								
Regulatory capital to risk-weighted assets	13.8	12.3	14.1	17.9	17.9	20.1	22.1	22.3
Regulatory Tier I capital to risk-weighted assets	10.9	9.2	10.7	14.6	15.1	17.2	19.2	19.5
Core / Common Equity Tier 1 capital to risk-weighted assets	N/A	8.7	10.0	11.8	12.2	14.4	16.3	16.7
Nonperforming loans net of provisions to capital	4.5	5.0	18.0	20.6	22.9	22.0	22.9	22.4
Bank provisions to Nonperforming loans	51.7	45.6	42.1	53.7	55.2	50.2	50.8	51.0
Nonperforming loans to total gross loans	1.5	1.2	3.8	7.0	7.9	7.9	8.3	8.7
Sectoral distribution of loans to total loans, <i>of which</i>								
Nonfinancial corporation	71.2	69.5	72.8	69.4	66.7	64.2	64.4	65.2
Households (including individual firms)	26.7	28.0	24.9	28.3	31.1	32.5	33.1	32.0
ROA (aggregated data on a parent-company basis) 1/	1.2	0.9	-0.1	-0.4	0.1	0.1	0.2	0.4
ROA (main groups on a consolidated basis) 2/	0.9	0.7	0.0	-0.1	0.1	0.1	0.2	0.4
ROE (aggregated data on a parent-company basis) 1/	19.7	16.2	-2.9	-6.4	1.7	1.3	2.7	5.7
ROE (main groups on a consolidated basis) 2/	20.3	17.5	0.5	-2.7	2.2	2.1	3.4	6.9
Interest margin to gross income	71.8	78.1	87.4	78.5	70.1	73.4	67.0	64.2
Noninterest expenses to gross income	25.8	23.4	25.9	36.0	42.7	43.8	44.9	47.2
Liquid assets to total assets	24.5	21.3	19.9	28.4	27.8	23.6	27.0	30.9
Liquid assets to short-term liabilities	34.8	31.6	30.3	44.3	45.6	37.3	45.4	49.8
Foreign currency position	N/A	9.6	6.4	3.3	3.4	2.8	1.4	1.2
1/ All credit institutions' aggregated data on a parent-company basis.								
2/ Consolidated data for the five main banking groups (IFRS).								

¹ MCIs fared better, sheltered by superior asset quality and the stability of the covered bond market. The insurance sector was affected by lower interest rates, but overall remained profitable.

Box 1. Denmark: Government Measures to Strengthen Financial Stability

Bank Package 1 (October 2008): Established a temporary state guarantee for all claims of depositors and other unsecured creditors, with the financial sector covering losses up to DKK 35 billion (2 percent of GDP). It also created the Financial Stability Company (FSC) to wind up failing financial firms.

Bank Package 2 (January 2009): Established temporary facilities for the provision of state-guaranteed senior funding and solvency support (hybrid Tier 1 capital instruments). Banks drew DKK 46 billion (2.6 percent of GDP) in solvency support and DKK 193 billion (11 percent of GDP) in state-guaranteed debt instruments. Almost all guaranteed bonds issued and solvency support drawn in 2009–10 have been redeemed.

Bank Package 3 (October 2010): Created a new scheme for the orderly resolution of (non-systemic) distressed financial firms that allocates losses to the private sector. The scheme provides for the transfer of a distressed firm's assets and part of its liabilities to the FSC or a third party, and puts the residual bank in ordinary liquidation, with all unsecured (and uninsured) creditors being subjected to a haircut (bail-in), including deposits above DKK 750,000 (EUR 100,000). This has enabled the authorities to resolve non-systemic banks at minimal cost to the taxpayer. The FSC has taken over loans and guarantees from several distressed institutions equivalent to about 5½ percent of GDP, much of which has already been wound up.

Bank Package 4 (September 2011): Created greater incentives for viable financial institutions to acquire the assets of distressed financial firms, either directly or via the FSC. It strengthened the funding structure of the Danish Guarantee Fund for Depositors and Investors via the introduction of annual fixed payments.

Bank Package 5 (March 2012): Allocated resources to finance economic growth and exports.

Bank Package 6 (October 2013): Introduced more stringent solvency requirements for D-SIFIs.

7. The financial system has deleveraged since the global crisis (Figure 3). Both cross-border exposures and domestic credit have declined. The ratio of private credit to GDP has declined from about 205 percent at end-2009 to about 185 percent at end-2013. House prices fell sharply during 2007–12. Recently, house prices have started to rise gradually and are now estimated to be not far from fundamentals, with a valuation gap of less than 10 percent.

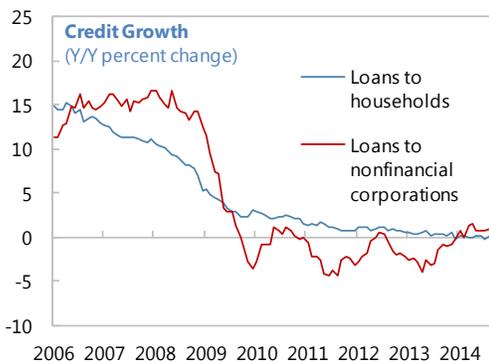
8. Macroeconomic policies have been broadly sound. The longstanding tight peg to the euro has kept inflation anchored. Fiscal policy has been generally countercyclical and gross government debt remains relatively low, helping to underpin the sovereign's triple-A credit rating. Denmark's external position has been and is expected to remain strong, with a current account surplus expected to remain at above 6 percent of GDP. Looking forward, output growth is forecast at 1½–2¼ percent in 2015 and beyond.

Commercial banks

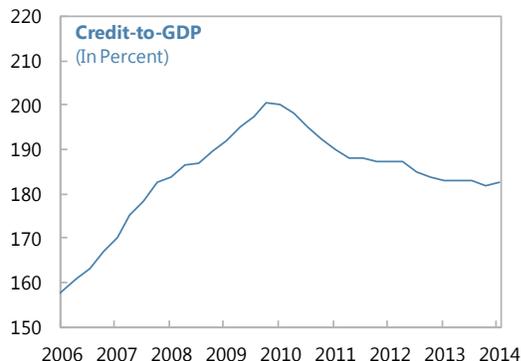
9. Commercial banks' capitalization and funding have improved significantly since the global crisis (Figures 4 and 5). Several banks raised capital through share issuance. The DFSA actively imposes additional Pillar 2 capital requirements, which are publicly disclosed. Reliance on wholesale short-term funding has decreased and the deposit-to-loan ratio has increased. Liquidity has improved. Earnings are under pressure from low lending volumes and interest margins. All large

Figure 3. Denmark: Credit Growth and House Prices

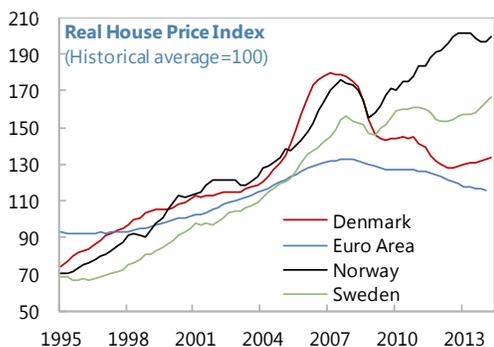
Credit growth has been subdued...



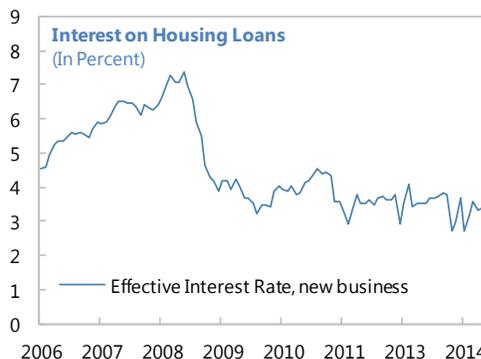
...leading to a decline in the credit-to-GDP ratio.



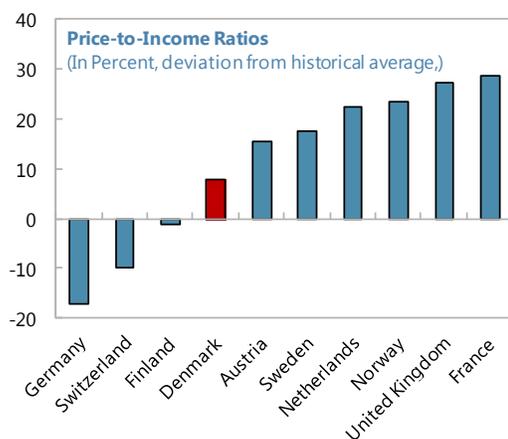
House prices have fallen sharply...



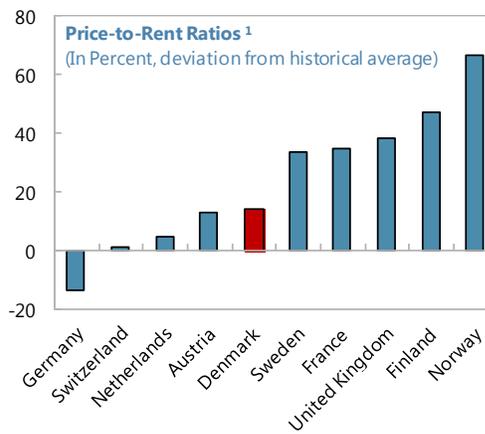
...despite a large decline in interest rates.



House price valuation measures ...



...are not far from historical averages.

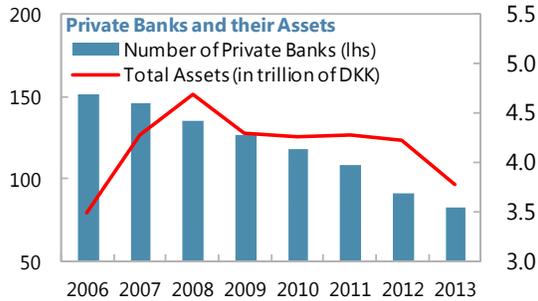


Sources: Danmarks Nationalbank, Haver Analytics, OECD, IMF Global Housing Watch and Fund staff calculations.

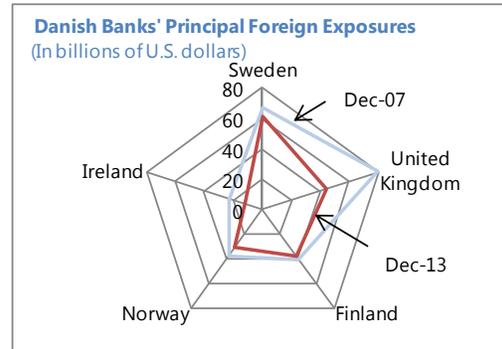
¹ The price-to-rent ratio in Denmark is influenced by rent controls.

Figure 4. Denmark: Banking Sector

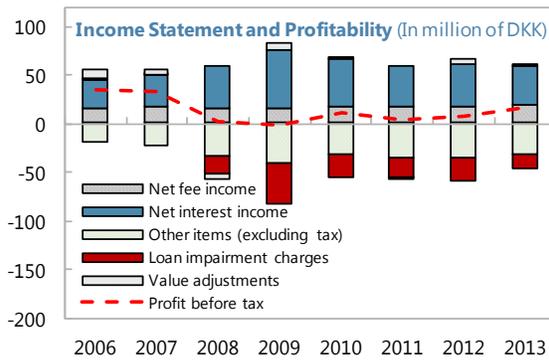
Deleveraging and consolidation have been substantial...



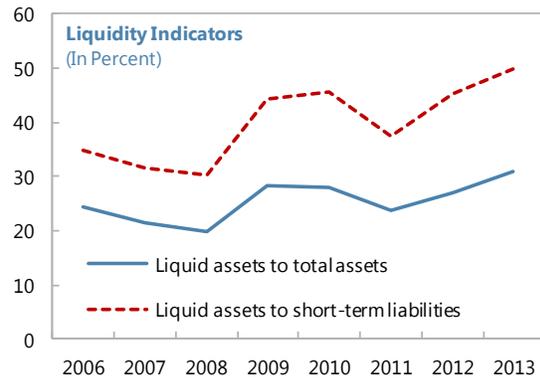
...and cross-border exposures have declined.



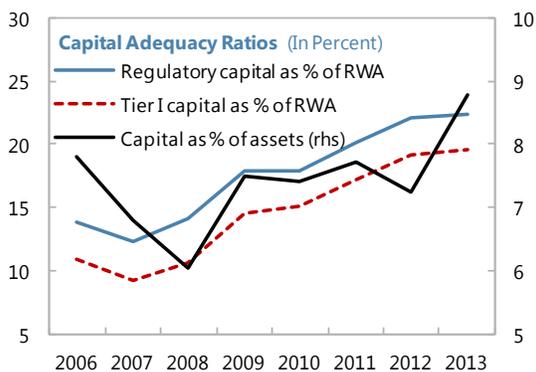
Profitability remains low...



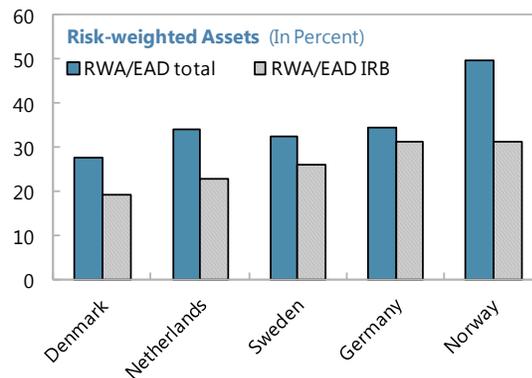
...but liquidity indicators have improved.



Capital adequacy continues to rise...



...though risk weights are low.¹

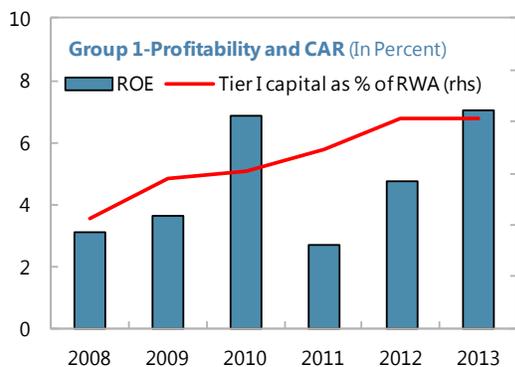


Source: Danish authorities, Bankscope, and Fund staff calculations.

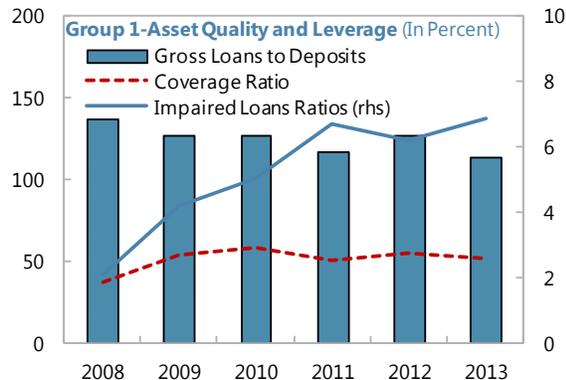
¹ Low risk weights reflect the high share of mortgage lending and low loss-given-defaults.

Figure 5. Denmark: Banking Indicators by Group

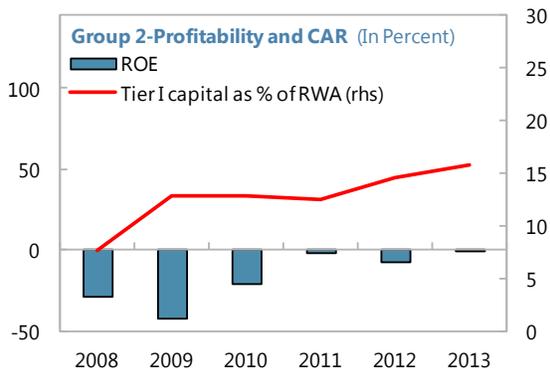
Large banks improved capital, but earnings remain weak...



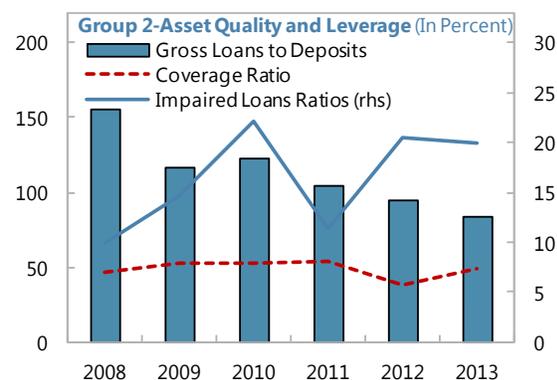
...while impaired loans ratios are increasing and leverage is still high.



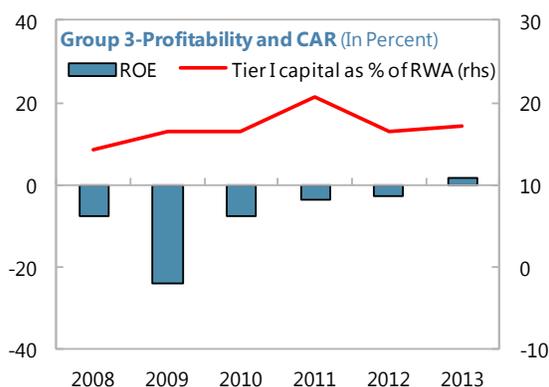
Non-systemic banks' earning capacity is problematic...



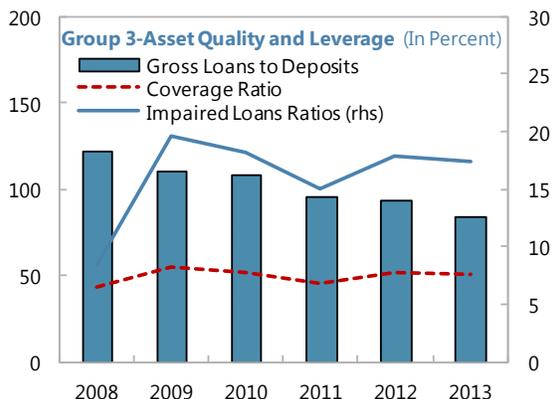
...and large impaired loans remain a problem.



Smaller banks improved earnings...



...but impaired loans are still high.



Source: Danish Authorities
Gross Loans = Loan and Impairment Losses.

commercial banks (accounting for 87 percent of the sector's assets) returned to profitability in 2012, but the return on equity (ROE) in other banks remains very weak.

10. Credit risk trends warrant continued strict monitoring. The impaired loans ratio increased from 1.2 percent in 2007 to 8.7 percent in 2013, reflecting the sharp drop in property prices (commercial banks supplement the real estate-backed credit provided by MCIs and provide loan loss guarantees to MCIs). Corporate failures are still high and commercial real estate prices remain weak. Developments are particularly worrisome in some medium-sized non-systemic banks (Group 2),² where further consolidation or resolution may be necessary if weak earnings persist.

11. The implementation of Basel III/CRD IV is underway. Banks are already adjusting portfolios in anticipation of regulatory changes and are generally expected to be able to meet the stricter quantitative and qualitative capital and liquidity requirements.

Mortgage credit institutions

12. The Danish mortgage finance system has important strengths, but product innovation has introduced significant risks. Historically, the maturities of covered bonds closely matched those of the underlying fixed-rate, thirty-year mortgage loans, with little market or refinancing risk retained by MCIs (Box 2). However, since the 1990s, the rapid growth of adjustable and variable rate loans (75 percent of total mortgage debt at end-2013) gave rise to an increasing amount of refinancing risk for MCIs (Figure 6). Such loans are financed mainly by short-term bonds, most of which must be rolled over annually. Interest rate increases on the bonds are passed through to the underlying mortgage loans, giving rise to interest rate risk for borrowers. In addition, interest-only (IO) periods of ten years have become common, and many borrowers will be faced with the expiry of their IO periods over the next several years. Although borrowers often refinance their loans before the end of the IO period, the increase in LTV ratios due to the decline in house prices during 2007–12 will preclude many from doing so.

² Group 1 are banks whose working capital is more than 65 billion DKK (87 percent of total assets); Group 2 are banks whose working capital is between 12 and 65 billion DKK (8 percent of total assets); and Group 3 are banks whose working capital is between 250 million and 12 billion DKK (5 percent of total assets).

Box 2. Denmark: Balance Principle in Mortgage Credit Institutions

The activity of Danish MCIs is limited by law to the granting of mortgage loans funded by the issuance of covered bonds from specific capital centers segregated from the general balance sheet (similar to SPVs). A small margin over the covered bond cost, currently around 65–85 basis points, is charged to cover administrative costs, risk, and profit. MCIs do not accept deposits and have little or no unsecured debt.

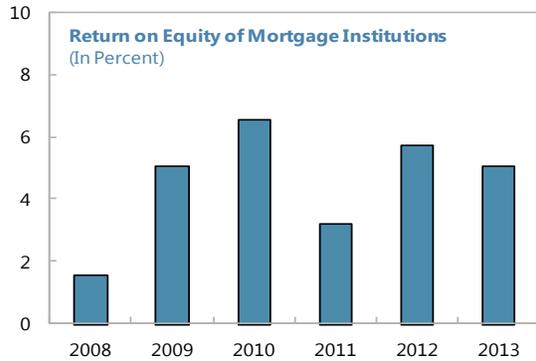
MCIs must adhere to the balance principle, which requires overcollateralization of each capital center to cover retained interest rate, foreign exchange, volatility and liquidity risk. Under the balance principle, interest rate risk is determined on the basis of various stress tests of borrowers and may not exceed a small percentage of the overcollateralization in the relevant capital center. Similar stress tests and criteria apply for foreign exchange risk. Volatility and liquidity risks are either limited by special restrictions or covered by additional overcollateralization. The balance principle ensures that MCIs pass most noncredit risks, including prepayment risk, on to the bond investors, but it does not address refinancing risk.

Since 2007, commercial banks have also been allowed to issue covered bonds to finance certain types of loans. Such loans must be kept separate from other assets in special cover registers, which must adhere to the balance principle. The risk allowances under the balance principle are less restrictive for commercial banks than for MCIs, reflecting the wider range of their business activities. Commercial banks account for a small share of mortgage lending and covered bond issuance.

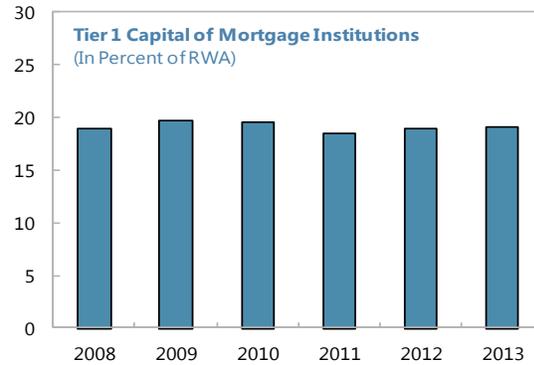
13. MCIs performed relatively well during and following the global crisis, but some underlying vulnerabilities remain. Although impaired loans have risen, MCIs experienced low impairment charges, generated better ROEs than commercial banks, and maintained stable capitalization. In contrast to most international bond markets, the Danish covered bond market remained relatively liquid during the crisis, enabling lending volumes to continue to grow and supporting profitability. However, many borrowers of adjustable and variable rate loans could face payment shocks when interest rates return to historical norms, which are 3–4 percentage points above current levels. A rise in interest rates could also put downward pressure on house prices, increasing LTVs and requiring additional collateralization for outstanding covered bonds. Moreover, the higher loan payments associated with the scheduled expiry of IO periods over the next few years could lead to additional loan impairments, though analyses of household-level data by the DN and the MOBG indicate that most of those affected by higher interest rates and the prospective end of IO periods would be able to continue to service their debts.

Figure 6. Denmark: Mortgage Credit Institutions

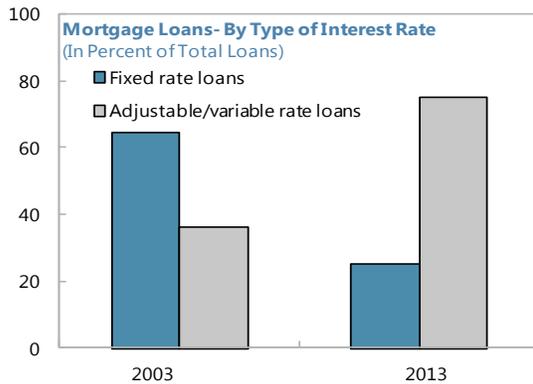
MCI maintained profitability throughout the crisis...



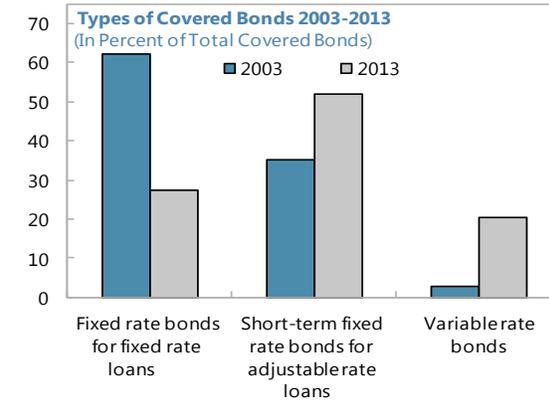
...and their capital adequacy remains very strong.



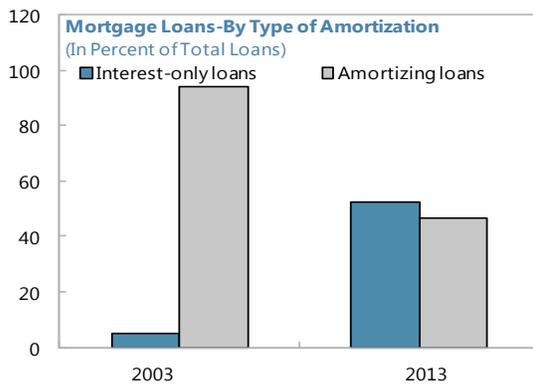
Most mortgages have now adjustable/ variable interest rates...



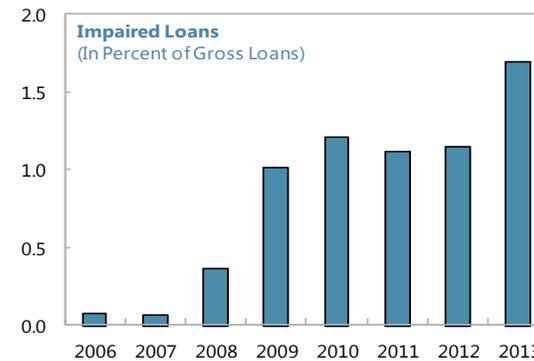
... and are mainly financed by short-term covered bonds.



IO loans became widespread...



... and impaired loans are raising, although from a low base.



Source: Danish Authorities

14. Concerns about refinancing risk prompted new legislation that requires the extension of covered bond maturities in the event of an auction failure.³ The new law also limits the increase in interest rates of the extended bonds to 5 percentage points. The risks inherent in the maturity mismatch between adjustable rate loans and their financing are thus passed on to bond investors,⁴ though at the cost of added complexity and the risk of more pro-cyclicality in the covered bond market. The interest rates on the underlying mortgage loans would be raised to reflect the higher rate on the bonds, resulting in larger loan payments. The new legislation is estimated to have increased covered bond spreads by only about 5–10 basis points, though investors' reaction may have been muted in the current search-for-yield environment.

Insurance companies and pension funds

15. Insurance companies have recorded mostly positive but low premium growth since 2010 (Figure 7). Solvency levels have increased, especially among life insurers, mainly reflecting good investment returns during 2009–12. Profitability has declined recently, but is still relatively high in the non-life sector, reflecting favorable underwriting results and relatively low expense ratios. Non-life companies are facing growing claims from more frequent weather-related events.

16. For life insurers, investing in the current environment of prolonged low interest rates is a challenge. The large share of occupational pension contracts contributes to more stability than in other European countries. Within traditional life insurance business, there is a clear shift from guaranteed products into non-guaranteed and unit-linked business. High guaranteed interest rates tend to reduce profitability, given a relatively large (though declining) legacy portfolio of contracts with annual guarantees of more than 4 percent. Attracting new business in a low interest rate environment is difficult and mainly limited to unit-linked products.

17. Despite low investment returns, the performance of the pension fund sector has been solid. The reserve indicator of Arbejdsmarkedets Tillægspension (ATP)—the largest institution, to which contributions are mandatory—has been stable and stood at 309 percent at end-2013.⁵ Multi-employer pension funds, which—together with company pension funds—form the second pillar of the Danish pension system, recorded an average solvency ratio of 591 percent at end-2013.

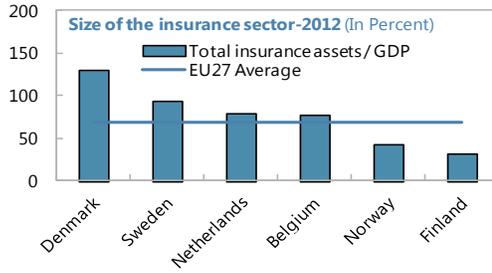
³ A failed auction is defined as one in which bids are not sufficient to cover the bonds on offer or if bids require an increase in the interest rate on the bonds of more than 5 percentage points. No such event has occurred.

⁴ Much of the impact would be borne by domestic investors (of which financial institutions account for about half), which hold more than 80 percent of total covered bonds and have few high quality investment alternatives. Investors based in the EU hold most of the remaining bonds, the bulk of which are denominated in euro; about half of such investors have close ties to domestic financial institutions and are unlikely to reduce their covered bond portfolios in the event of a financial crisis.

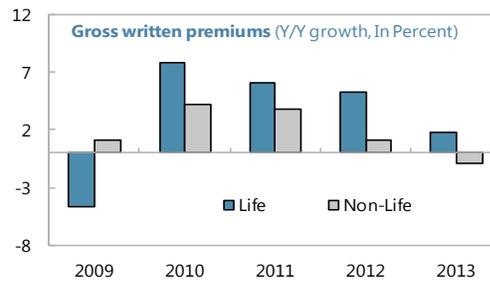
⁵ ATP is not subject to a regulatory solvency regime, but calculates its capital requirement broadly in line with Solvency II requirements.

Figure 7. Denmark: Insurance Sector

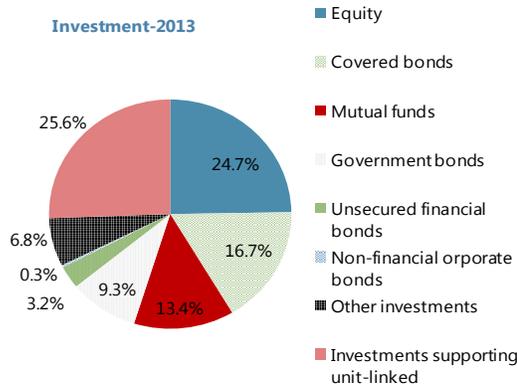
Denmark's insurance sector is large...



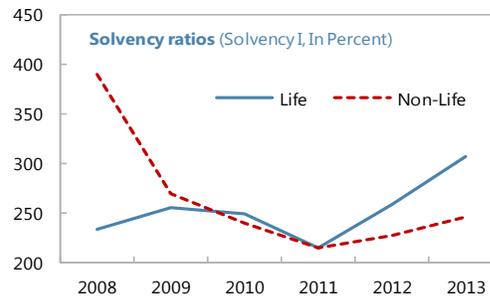
...but its growth rate has declined in recent years.



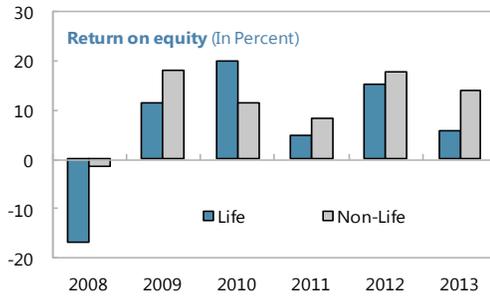
Investments are diversified.



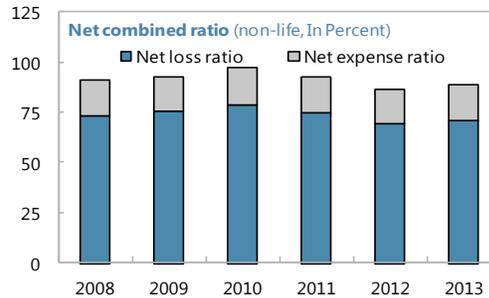
Solvency ratios have been recovering, especially in the life sector.



Profitability has declined recently but it is still high in the non-life sector.



The profitability of non-life insurers reflects in part few large catastrophes and low expenses.



Sources: DFSA, EIOPA, Eurostat

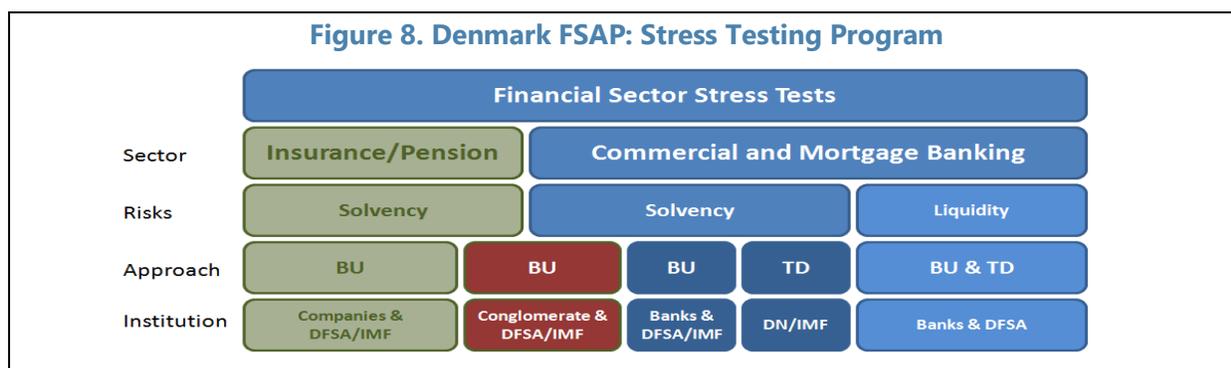
FINANCIAL SECTOR RESILIENCE

18. The principal risks to the Danish financial system are threefold (see the Risk Assessment Matrix in Appendix II):

- First, a protracted period of slower global growth could lead to weaker GDP growth and higher unemployment in Denmark, in turn reducing asset quality and financial sector profitability.
- Second, a surge in global financial market volatility could lead to liquidity strains, a broad-based correction in asset valuations, and sharply lower output and employment, which in turn could increase nonperforming loans and loan impairment charges.
- Third, an increase in Denmark-specific risk (i.e., a reassessment of household credit quality) could lead to higher spreads in the covered bond market.

Going forward, the combination of a protracted period of low euro area interest rates and an economic recovery in Denmark could create overheating pressures in asset markets, particularly in the housing market.

19. The impact of these risks on the financial system was assessed through comprehensive stress tests of banks, MCIs, insurance companies, and the largest pension fund (Figure 8 and Appendix III).⁶ An integrated solvency stress test for a financial conglomerate (Danske Group) was also conducted.⁷

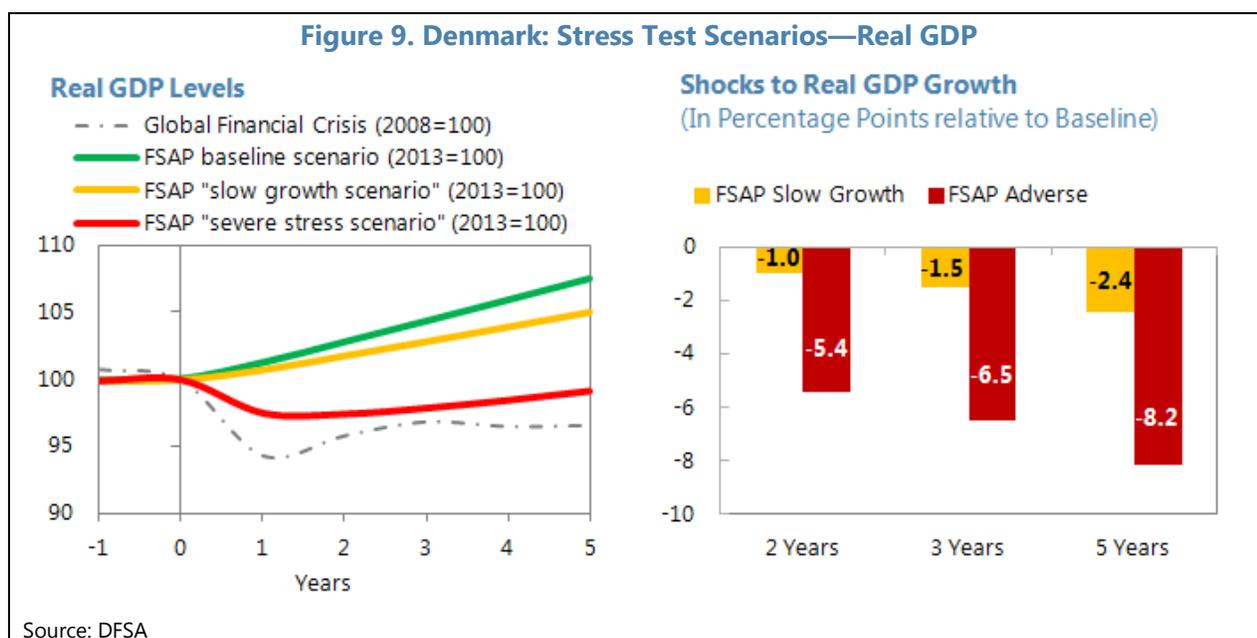


20. In the solvency tests, a baseline and two adverse scenarios were analyzed (Figure 9). The “protracted slow growth” scenario assumes a five-year cumulative shock to real GDP growth of

⁶ For more details see *Technical Note on Stress Testing the Banking, Insurance, and Pension Sectors*.

⁷ The same macroeconomic scenarios were applied to the insurance and banking arms of Danske Group. Losses were then consolidated according to existing accounting standards. Results for the banking groups include the results from the conglomerate stress test. Results cannot be shown separately due to confidentiality.

about one standard deviation. The “severe stress” scenario assumes a two-year cumulative shock to GDP growth of 2½ standard deviations.



A. Banking Sector Stress Tests

Solvency risk

21. Stress test results suggest that commercial banks and MCIs are in strong positions to withstand severe shocks, given their already high capital buffers (Figure 10).

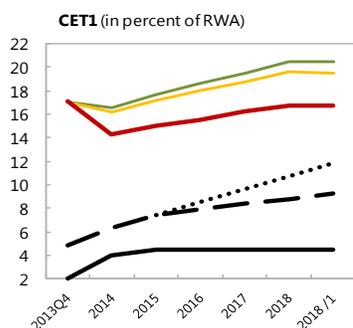
- Under the **baseline scenario**, the capital ratio would rise further, as credit losses remain low and the increase in profitability due to higher GDP growth would more than offset the impact of increases in risk weights and the phase-out of hybrid capital instruments due to the implementation of the new EU Capital Requirements Directive.
- Under the **slow growth scenario**, profits would be lower and credit risk higher, so the capital ratio would remain at roughly its current level.
- Under the **severe stress scenario**, the capital ratio would fall sharply, mainly driven by a rise in risk weights, loan losses, and lower gross profits. The further house price shock would reduce collateral values and thus raise effective loss rates. Given MCIs' greater exposure to the housing market, the contribution of loan losses and increases in risk weighted assets (RWA) to the changes in capital ratios would be somewhat larger than at commercial banks. However, loan losses at MCIs would be mitigated by high collateralization, lower LTV ratios than commercial

banks, and loan loss guarantees provided by commercial banks. All institutions in the sample remain well above regulatory minima throughout the forecasting time-horizon.⁸

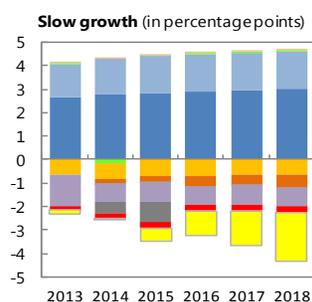
Figure 10. Denmark: Solvency Stress Test—Commercial Banks and MCIs

Commercial Banks

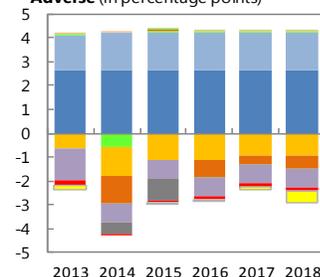
A. Evolution of CET1 Ratios



B. Key Drivers of CET1 Ratio

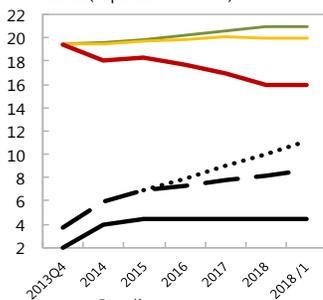


Adverse (in percentage points)

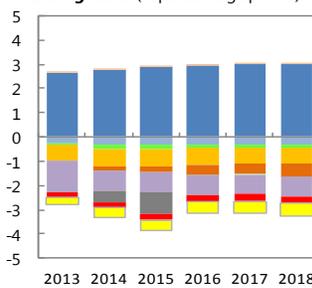


Mortgage Credit Institutions

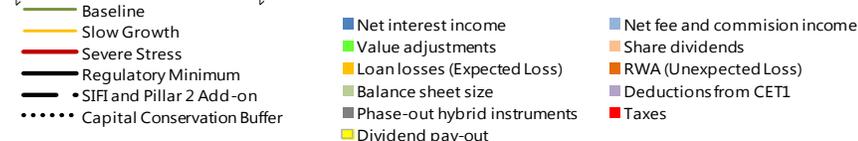
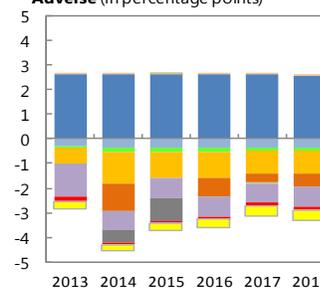
A. Evolution of CET1 Ratios



B. Key Drivers of CET1 Ratio



Adverse (in percentage points)



Sources: Company information and IMF staff calculation.

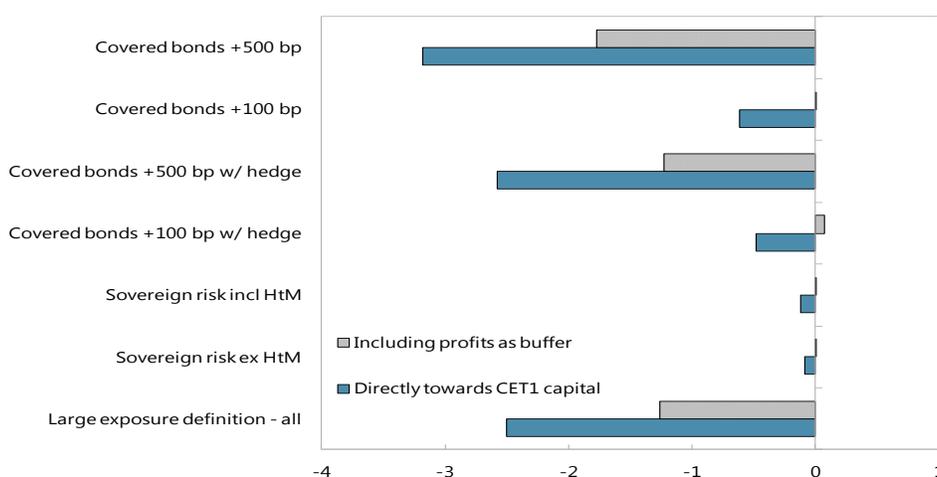
Notes: 1/ The 2018 capital ratios are also given assuming a front-loading of capital deductions (fully phased-in).

22. Sensitivity tests show that even extreme changes in covered bond spreads would be manageable (Figure 11). The tests evaluate the impact of one shock at a time, assuming that the impact materializes immediately. Even an extreme shock to the covered bond spread of 500 bps would reduce the aggregate CET1 ratio by just 1.7 percentage points (taking into account profits), as

⁸ Parallel top-down (TD) stress tests confirm the results of the constrained bottom-up (BU) test.

the increase in funding costs would be mostly passed on to borrowers.⁹ A two standard deviation sovereign yield shock would result in only a small reduction in the CET1 ratio, as the volatility of Danish sovereign bonds has been low and exposures to foreign sovereign bonds are small. If the entire sovereign debt holdings were marked-to-market, the impact would increase only marginally. Concentration risk has come down in recent years as a result of supervisory actions and is currently at a manageable level.

Figure 11. Denmark: Solvency Stress Tests—Sensitivity Results
(In Percent of CET1)



Sources: Company information and IMF staff calculation

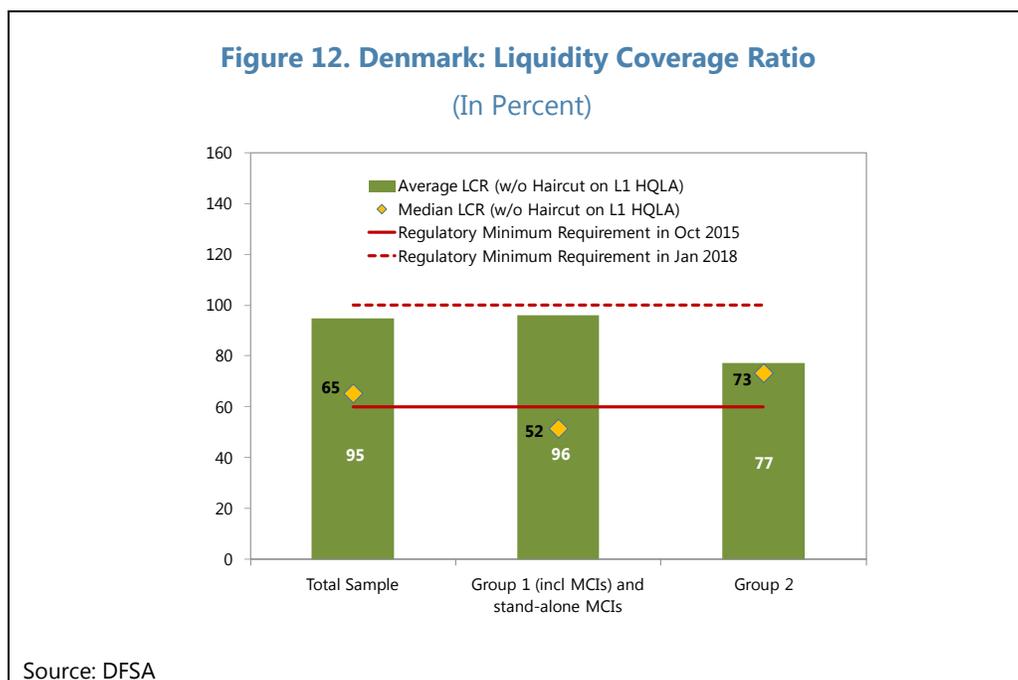
Liquidity risk

23. Banks and MCIs are expected to meet the liquidity coverage ratio (LCR), as implemented in the EU (Figure 12).¹⁰ The European Commission (EC) recently specified that high-quality covered bonds that meet certain criteria may be classified as Level 1 HQLA up to a ceiling of 70 percent and with a haircut of 7 percent. On this definition, the average bank in the sample had an LCR of 95 percent as of end-2013, reflecting slightly stronger liquidity positions in Group 1 banks and stand-alone MCIs than in Group 2 (medium-sized) banks. The liquidity shortfall for the sample is DKK 17 billion (about 1 percent of GDP) for the 60 percent requirement applicable from October 2015 and DKK 82 billion (about 4½ percent of GDP) for the 100 percent requirement applicable from January 2018. Of the latter shortfall, only DKK 6 billion (less than ½ percent of GDP) would remain, if institutions switched current holdings of ineligible HQLA to eligible HQLA. Banks are

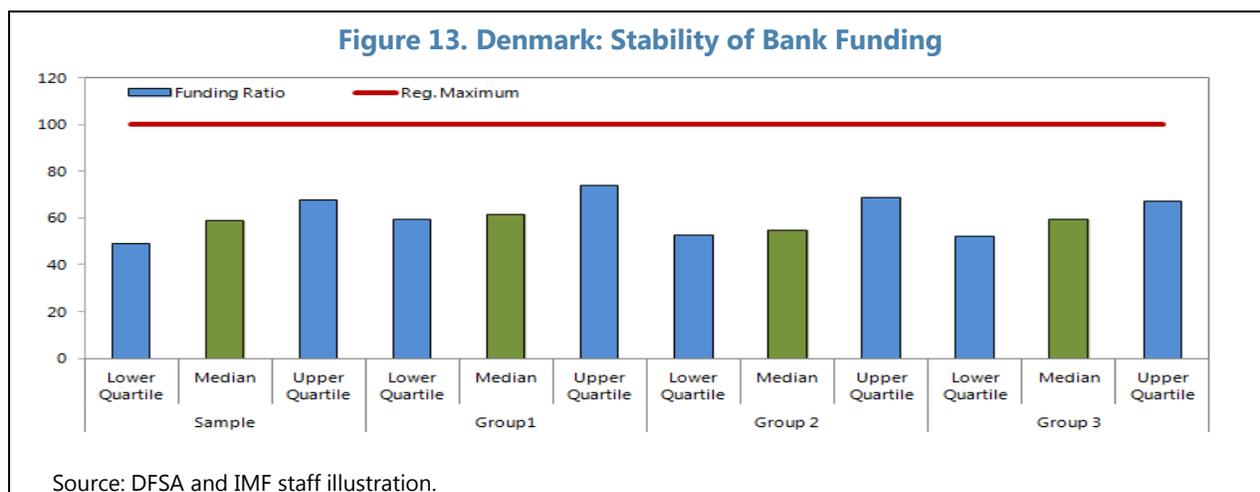
⁹ During the global financial crisis, the covered bond spread peaked at about 150 basis points, suggesting that a 500 bps shock is an extremely low-probability tail event

¹⁰ Due to issues of data confidentiality, the DFSA organized the BU liquidity stress test with the banks and performed TD analyses. Methodologies and scenarios were agreed with the FSAP team.

expected to meet the phased-in LCR requirement in the EU, including by exchanging some covered bonds for sovereign bonds.



24. Danish banks' funding patterns appear solid (Figure 13). The funding ratio (FR) gives the relationship between lending and stable (long-term) funding sources (MCIIs are not subject to the FR requirement). With two exceptions, all banks have ratios below the regulatory ceiling of 100 percent.



B. Insurance and Pension Sectors Stress Tests

25. The bottom-up solvency stress tests for insurance companies and pension funds were based on the same macrofinancial scenarios as the banking sector stress tests (Appendix IV).

The market and underwriting risks were specified in more detail. Asset price shocks were front-loaded, while interest rates were assumed to change every year. As an additional shock, a higher

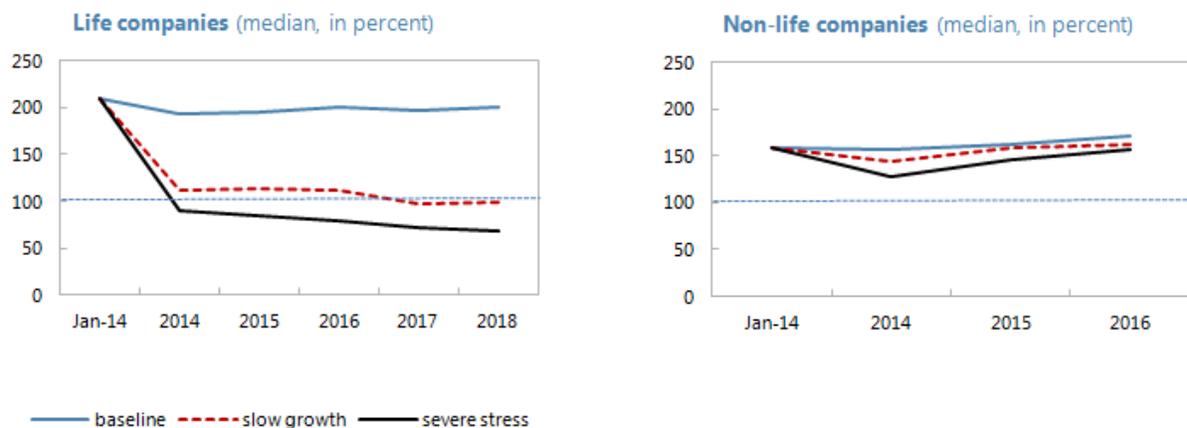
rate of policyholders surrendering their life insurance policies was assumed in the first year. All shocks were applied to both assets and liabilities, consistent with the “total balance sheet approach” of the Danish regulatory regime and the forthcoming Solvency II regime.

26. The stress tests made several conservative assumptions. First, no discretionary management actions were allowed as only existing hedge positions were assumed to roll over. In practice, if adverse shocks materialize, insurance companies would react quickly to limit the impact on solvency ratios, at the cost of reducing profitability in the short run. Second, no investment returns were assumed from 2015 to 2018, apart from changes in the value of fixed-income instruments driven by the change in interest rates. Finally, the stress test did not consider some mitigating factors from Solvency II (e.g., the volatility adjustment) which would provide for additional buffers in a stressed scenario.

27. The adverse scenarios have large negative effects on insurance companies, mostly due to the asset price and interest rate shocks (Figure 14). The drop in stock prices and the surge in corporate bond spreads lead to large declines in available capital, especially at life insurers. Also, as life insurers rely on interest rate derivatives to reduce their asset-liability mismatch, roll-over risks become relevant. Net income of life insurers (low to begin with) does not recover, reflecting mainly the assumption of zero investment returns. Non-life insurers would break even in 2014, but then quickly recover to pre-stress levels, due to profitable underwriting business and less reliance on investment returns.

28. Sensitivity tests point to the risks from exposures to covered bonds and the resilience of non-life companies to catastrophic events. In the extreme event of a 500 bps increase in the covered bond spread, insurers’ solvency ratios would fall sharply. A severe windstorm would reduce solvency ratios of non-life insurers only a little, reflecting the large use of reinsurance.

29. The largest domestic pension fund (ATP) shows a large degree of resilience in the stress test. ATP’s excess cover (relative to its individual reserve requirement) drops slightly under the baseline and by a bit more in the two stress scenarios, but stays comfortably close to ATP’s internal targets. ATP’s discounting framework allows for a nearly complete offsetting of changes in the value of bond holdings in the valuation of technical provisions. The main driver of the reduction in the bonus potential is the equity shock. The corporate bond shock does not materially affect ATP. The stress scenarios reduce ATP’s profits, which would turn negative in both scenarios.

Figure 14. Denmark: Insurance Stress Test—Solvency Ratios

Source: Company information and IMF staff calculations.

C. Improving Risk Assessments

30. The authorities are advised to exploit synergies between micro- and macroprudential stress testing through intensified cooperation between the DFSA and DN. In addition, given the size and interconnectedness of insurance companies and pension funds, the authorities should strengthen their analysis of the sector and its inter-linkages with other parts of the financial system. Finally, for insurance companies, the DFSA is encouraged to complement micro-prudential stress testing with macroprudential stress testing. The macro stress test should be severe but plausible, tailored to address specificities of the insurance sector (i.e. concentrations in covered bond holdings), comprehensive (including risk factors beyond Solvency II, such as changes in the ultimate forward rate), forward-looking, and based on a clear narrative.

D. Interconnectedness and Spillovers

Domestic interconnectedness

31. The macro-financial system is characterized by large inter-sector exposures (Figure 15). The banking sector and the corporate sector are the largest lenders and borrowers. The largest exposures across sectors are households' claims on insurance and pension funds, the rest of the world's claims on the banking sector, and the banking sector's claims on households.

Figure 15. Denmark: Cross-Sector Exposures

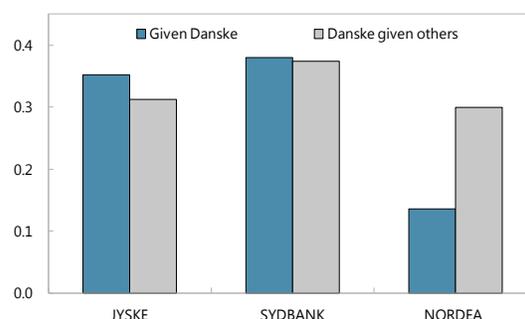
Gross Claims (as % of GDP) Asset of	Liabilities of								
	DN	GG	HH	IC	NFC	IF	Banks	ROW	
Danmarks Nationalbank (DN)	0	0	0	0	0	0	4	24	29
General government (GG)	12	9	8	1	18	2	6	1	58
Households (HH)	2	2	0	144	56	24	51	6	286
Insurance corporations and pension funds (IC)	0	20	0	3	6	52	42	47	170
Non-financial corporations (NFC)	1	2	5	5	187	19	27	77	323
Investment Funds and Other financial intermediaries (IF)	0	4	0	3	21	32	37	63	161
Banks, MCIs, and Other monetary financial institutions (Banks)	13	9	129	6	64	12	110	80	422
Rest of the world (ROW)	2	18	0	7	89	5	140	0	261
	30	65	142	168	442	146	417	299	

Source: Danish authorities and IMF staff calculations.

32. Estimates suggest that the largest bank, Danske Bank, tends to be the recipient (rather than the source) of spillover effects from other sectors. A global Vector Auto Regression is applied to measures of financial stress for the sovereign, the corporate sector, Danske Bank, credit growth, and economic growth.¹¹ Danske's credit spread rises appreciably in case of distress in the economy, the corporate sector, and the sovereign. The larger impact of corporate distress on credit growth (compared to bank distress) suggests that credit growth may be more constrained by demand rather than supply factors.

33. Estimates of distress dependence confirm that cross-bank spillovers are very high (Figure 16). Distress dependence is estimated using financial market data on four banks: Danske, Jyske, Sydbank, and Nordea (parent bank data). Conditional probabilities of distress are estimated for each pair of banks. On average over 2009–2014, conditional probabilities of default for other banks given that Danske is in distress are slightly higher than the conditional probabilities of default for Danske given other banks in stress, with the exception of Nordea. If Nordea is in distress, there is a much higher probability of Danske being in distress, compared to the opposite situation.

Figure 16. Denmark: Cross-Bank Spillovers
(average 2009–2014)

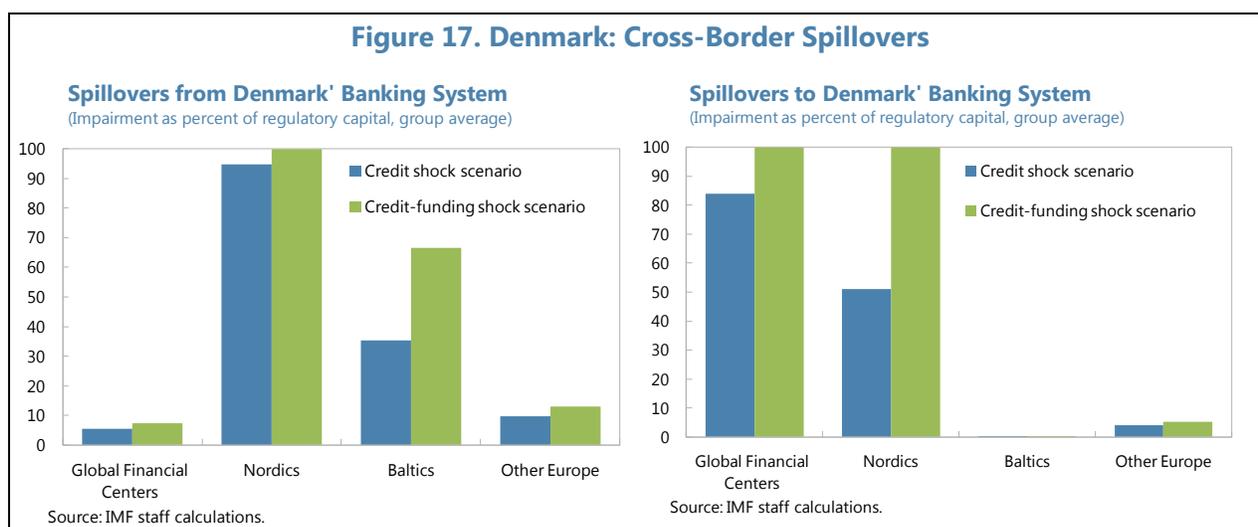


Source: IMF staff calculations

¹¹ Cross-sector spillovers are measured by responses of credit spreads for Danske Bank, corporates, and the sovereign, and of the growth rates of credit and real GDP to a one standard deviation shock to each sector.

Cross-border spillovers

34. Network analysis shows that Denmark's banking system is closely interconnected with those in the Nordic and Baltic countries (Figure 17).¹² The Danish banking system is vulnerable to extreme credit and funding shocks to banks in Norway, Sweden, and Finland. Not surprisingly, given the role of the United Kingdom and United States as global financial centers, shocks to banks in these countries would also have a large impact on banking sector stability in Denmark. An extreme credit and funding shock in Denmark would have a significant regional impact and affect banking systems in both Nordic and Baltic countries, reflecting the importance of Danish banks in the region as well as the interconnectedness of the Nordic banking system.



FINANCIAL OVERSIGHT FRAMEWORK

A. Mortgage Finance¹³

35. The risks in the mortgage finance system due to product innovations should be mitigated. Current low interest rates and the flat yield curve provide an opportunity to implement measures aimed at reducing the refinancing and interest rate risk by lengthening the maturity of covered bonds at a time when the cost to borrowers is minimal. The measures could include:

¹² The spillover analysis assesses the impact of severe stress using the Espinosa-Vega and Sole (2010) methodology, which traces the network spillovers resulting from hypothetical credit and funding events to specific banking systems, using two sets of simulations: (i) a simulation of a banking system becoming insolvent and being unable to repay interbank loans to others; and (ii) a simulation of a banking system becoming insolvent and unable to rollover funding to others.

¹³ For more details, see the *Technical Note on Systemic Issues in Mortgage Loans and Covered Bond Finance*.

- **Providing incentives to reduce the maturity mismatch and refinancing risk.** While recent legislation provides a mechanism for coping with a failed refinancing auction, steps could be taken to limit the risk of such a destabilizing event in the first place. Regulation could be adapted to either directly restrict the maturity mismatch or require additional capital (e.g. Pillar II reviews or systemic risk buffer) to reflect it. Consideration could be given to modifying the balance principle to require some overcollateralization for this risk.
- **Limiting the potential adverse effect on credit risk of an increase in interest rates.** Higher administrative margins for variable and adjustable rate loans have already encouraged borrowers to lengthen the initial fixed-rate period on their loans, but lenders could be encouraged to increase administrative margins further. Supervisors already require that MCIs employ stressed DSTI criteria in their loan approval process, but the stress test could be made more severe to provide additional protection.
- **Discouraging new loans with interest only (IO) periods.** Such loans involve more credit risk, put stress on MCI balance sheets when housing prices decline, and increase the sensitivity of the system to interest rates increases. IO loans could be discouraged by requiring higher credit loss provisions for loans with longer IO periods,¹⁴ ending or reducing tax deductibility of interest payments on loans with IO periods, or requiring lower LTV ratios for loans with IO periods.

36. The additional measures being considered by the authorities to improve the resilience of MCIs and the real estate market go in the right direction. The proposed Supervisory Diamond for MCIs would provide supervisory guidance in key risk areas (lending growth, loans with short term funding, borrower’s interest-rate risk, interest-only loans, and large exposures). Furthermore, home buyers would need to make a down payment of at least 5 percent when purchasing a home, while commercial properties would be required to generate a positive cash flow before they can be financed.

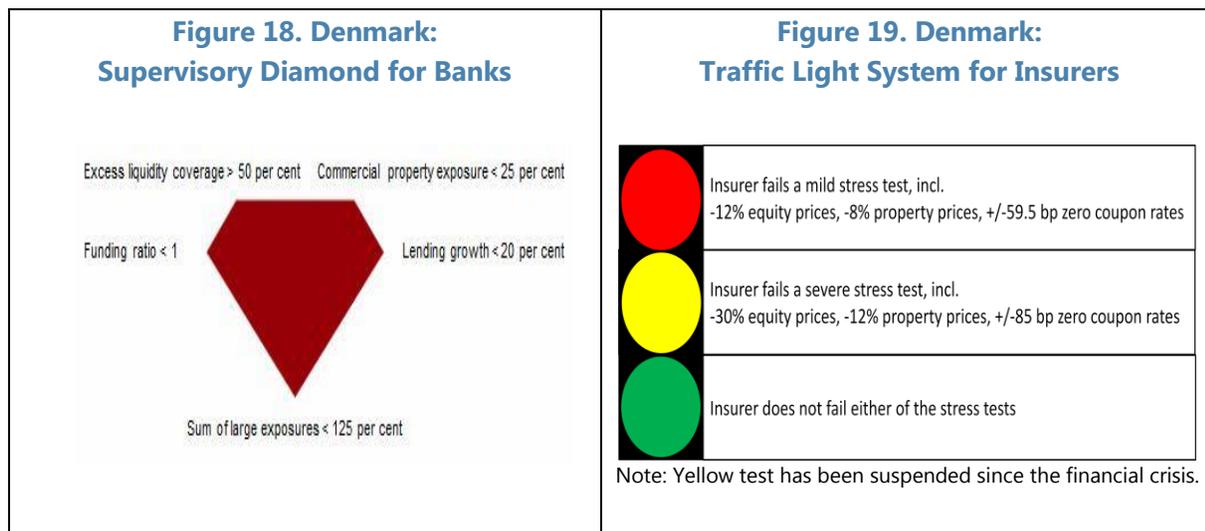
B. Prudential Supervision¹⁵

37. The supervisory approach has been sharpened since the global crisis. The DFSA has been granted additional powers and staffing has increased by about half. The agency has a strong risk-based approach and is rightly focused on credit risk in the banking sector and investment risk in the life insurance sector. The offsite analytical tools—the Supervisory Diamond for banks (Figure 18) and the traffic light system for insurance companies (Figure 19)—are used to detect signs of excessive risk-taking and encourage early intervention. The “power and will to act” quickly and decisively have been demonstrated in recent years. Supervisory expectations are transparently

¹⁴ Such provisions can be justified on a forward-looking basis, as the interest rate on such loans generally includes a premium to cover the additional credit risk.

¹⁵ For more details, see the ROSCs on the Basel Core Principles and the Insurance Core Principles.

conveyed and the DFSA publishes summaries of onsite inspections reports and breaches of the offsite monitoring systems.



38. The Basel Core Principles (BCP) and the Insurance Core Principles (ICP) assessments emphasized the importance of protecting the operational independence of the DFSA. The recent changes to the DFSA's governing body have appropriately eliminated the issue of active industry representatives casting votes on supervisory policy actions. However, it would be advisable to keep certain supervisory imperatives (such as provisioning policy and the inspection schedule) wholly within the authority of the Director General, to lengthen the terms of Board members, and to introduce strict fit and proper appointment criteria. Furthermore, an internal audit function should be established within the DFSA to ensure integrity and consistency of supervisory work.

39. The DFSA would also benefit from increased supervisory resources. In the area of banking supervision, additional resources are needed to raise the frequency of regular onsite inspections and enhance the DFSA's ability to respond to developments with additional onsite work. To improve insurance supervision, the DFSA needs both additional resources and powers to deliver onsite inspection of brokers and effective regulation and supervision in the areas of market conduct and fraud prevention. In both bank and insurance, additional resources and powers are needed for AML/CFT supervision

Banking supervision

40. The level of compliance with the BCP standards is high. Onsite inspections involve an in-depth assessment of risks; the approach on impairment and provisioning is conservative; and Pillar 2 arrangements are well developed and applied consistently. The systemic banks report LCR and Net Stable Funding Ratio (NSFR) on a monthly basis, and all banks regularly submit results of liquidity stress testing and liquidity and funding positions.

41. Banking supervision should be further strengthened by:

- **Shortening the supervisory cycle for smaller institutions and improving the onsite follow up for large institutions.** For small banks, the extended onsite examination schedule (in some cases beyond six years) limits the timeliness with which issues that develop from the monitoring process are identified and addressed. In large banks, the supervisor maintains regular contact with the banks, but onsite follow-up is typically deferred to the next scheduled examination.
- **Expanding the depth and breadth of data used in offsite supervision,** including more effective monitoring of changes in market risk and expanded reporting of operational risk (such as loss event type and changes in the business environment).
- **Ensure systematic review of Pillar 3 disclosures.** Internal policies should be changed to assess completeness and accuracy of filings.
- **Enhancing the regulatory definition and monitoring of related parties.** The definition of a related party should extend to minority shareholders and key risk takers. Monitoring needs more detailed reporting and more frequent analysis.

Insurance supervision**42. The ICP assessment found that the DFSA's prudential standards are generally robust.**

The DFSA requires market-consistent valuations, assesses individual solvency needs, and has addressed weaknesses in the management of longevity risks by establishing a benchmark for mortality rates. The DFSA has also effectively implemented the latest draft EU Solvency II proposals two years ahead of schedule.

43. There is scope to strengthen insurance supervision by:

- **Undertaking more regular onsite work.** With the advent of Solvency II, most large life insurers will be inspected every two years. Small life insurers should be inspected more often than the current practice of once every six years.
- **Enhancing the approach to assessing and recording risk judgments.** All insurers should have functions responsible for risk management, compliance, actuarial and internal audit. Cross-firm/thematic work by the DFSA would help benchmark major companies against these functions and give feedback on practices across the sector. The DFSA should also develop an enhanced risk-based framework to integrate offsite analysis with the assessment of governance, management and controls, fraud prevention, AML/CFT, and market conduct.
- **Formalizing macroprudential surveillance.** The DFSA should establish a process to consider macroprudential issues on a regular basis, including the review of the potential systemic significance of large insurers.

- **Strengthening capital adequacy requirements.** The authorities should establish a minimum capital level below which an insurer is regarded as no longer viable and must close or have its insurance business transferred. Explicit requirements for prior approval of internal model use should be set.
- **Increasing attention to the supervision of market conduct and policyholder protection.** Proportionate governance expectations should be tailored for broker intermediaries and closer attention should be dedicated to product disclosure requirements. In addition, the DFSA's work should be underpinned by an explicit statutory objective of policyholder protection.

C. Macroprudential Policy¹⁶

44. The adoption in 2013 of an institutional framework for macroprudential policy is welcome. The Systemic Risk Council (SRC) brings together representatives from the DN, the DFSA, and relevant ministries, as well as independent experts. The Chairman of the DN's Board of Governors chairs the SRC and the central bank hosts the secretariat. The DFSA and the relevant ministries participate in the secretariat. The SRC's tasks are to identify and monitor systemic financial risks and to issue observations, warnings, and recommendations to the DFSA and the Government. The SRC's transparency and accountability arrangements are sound, such as the "comply or explain" rule and the abstention rule for government representatives and the DFSA on recommendations to the government. The decision-making power on most macroprudential instruments lies with the MOBG, which has been appointed as the designated authority.

45. Domestic systemically important financial institutions (D-SIFIs) have been identified and capital surcharges are being imposed. The six largest banking groups (Danske Bank, Nordea Bank Denmark, Nykredit, Jyske Bank, Sydbank, and DLR Kredit) were designated as D-SIFIs in June 2014. D-SIFIs will be subject to higher capital requirements—which will be phased-in gradually from 2015 to 2019—ranging from 1–3 percent of RWA, depending on their systemic importance. In addition, the framework for the countercyclical capital buffer (CCB) will be phased-in starting in 2015.

46. The macroprudential policy framework should be further developed by:

- **Expanding the range of analytical tools used to identify and monitor systemic risk.** The analyses prepared for the SRC meetings include a broad assessment of risks using indicators in a risk dashboard and notes on specific topics. Risk heat maps (based on thresholds for various indicators) and measures of interconnectedness (across various financial institutions, including insurance companies and pension funds, and economic sectors) would be useful complements.

¹⁶ For more details, see the *Technical Note on Macroprudential Policy*.

- **Developing new policy instruments capable of addressing time-varying systemic risk.** The authorities should develop limits on LTV ratios¹⁷ and DSTI ratios and a framework to apply higher risk weights on lending to particular sectors. To inform the calibration and activation of such instruments, improved data collection is warranted on the distribution of LTVs and DSTIs across loans, types of property, categories of borrowers, and over time.
- **Reviewing the experience with institutional arrangements, especially the appointment of the government as the designated authority for most macroprudential instruments.** Given that decision-making power lies with the government (as opposed to an institution with operational independence), there is a risk that political considerations could delay necessary macroprudential action. Indeed, Denmark is only one of three countries in Europe where the designated authority is the government.

D. Cross-Border Cooperation

47. Denmark actively participates in European and regional fora on financial stability and systemic risk. The DFSA has hosted the supervisory college for Danske Bank since 2009 and participates in other supervisory colleges for Nordic-Baltic banks as a host supervisor. Cross-border coordination at the regional level on crisis management and bank resolution is guided by the Nordic-Baltic cooperation agreement on cross-border financial stability, crisis management, and resolution. The DN and the DFSA are part of the European Systemic Risk Board (ESRB) and participate in pan-European discussions on systemic risk, macroprudential instruments, and macroprudential frameworks. The Nordic-Baltic countries have also established a Macroprudential Forum. Under the aegis of the forum, a task force is looking more closely into how different macroprudential policies are implemented across the region and into possible approaches to reciprocity, which are also being discussed at the European level at the ESRB. Given strong regional ties, policies should be coordinated to avoid unintended consequences (i.e. regulatory arbitrage).

48. Denmark has not yet decided whether to opt in to the EU Banking Union. Joining the Banking Union would harmonize supervisory standards and resolution practices and offer a common backstop. These potential benefits need to be weighed against potential costs related to the giving up of national standards and practices, and the risk that Denmark may have to contribute to legacy costs, although the ECB's comprehensive assessment of euro area banks mitigates such concerns. Denmark's decision on whether to participate in the Banking Union will depend on a thorough assessment of the benefits and costs, which is currently under way.

E. AML/CFT

49. The authorities have taken a number of steps to enhance their AML/CFT framework since the Fund-led AML/CFT assessment in 2006, but deficiencies remain. In a progress report

¹⁷ Denmark has an LTV limit on mortgage loans that are funded by covered bonds. Borrowers can supplement those types of loans by taking out other bank loans secured by property that are not subject to LTV limits.

in 2010, the Financial Action Task Force (FATF) recognized that Denmark had made significant progress in addressing many technical deficiencies identified in their mutual evaluation report. The DFSA has developed a risk-based on-site examination program to conduct inspections of banks' compliance with AML/CFT requirements. However, the DFSA still does not have adequate resources and powers to supervise compliance with AML/CFT and anti-fraud requirements, including within the banking and insurance sectors. Levels of suspicious transaction reporting also remain low.

50. An AML/CFT assessment will be conducted by the FATF in late 2015, and a detailed assessment report will be finalized in October 2016. The authorities are encouraged to effectively implement the revised FATF standard, in particular with regard to the regulation and supervision of financial institutions, politically exposed persons, and freezing of terrorist assets, and by conducting a money laundering/terrorist financing national risk assessment.

SAFETY NETS, BANK RESOLUTION, AND CRISIS MANAGEMENT

51. The authorities should designate and empower a resolution authority, and clarify the roles of, and coordination with, other agencies involved in the resolution process.¹⁸ The current institutional set-up for resolution involves several agencies, namely the DFSA, the FSC, the DN, the DGS, and the MOBG. While the DFSA initiates resolution via the enforcement of minimum capital requirements, the transfer to the FSC depends on a decision made by bank management, with the only alternatives being liquidation or private sector solutions. The designated resolution authority should have a robust mandate and governance structure, well-defined accountability, and a broad suite of resolution powers. In addition, it should have operational independence, be protected (together with its staff) against liability for discharging its duties in good faith, and have unimpeded access to firms for resolution planning and execution.

52. Further legal amendments are necessary to enhance the effectiveness of the Danish resolution scheme, allowing for the orderly resolution of all banks, including D-SIFIs. The pending transposition of the EU's Bank Recovery and Resolution Directive (BRRD) allows the Danish authorities to make progress in further strengthening the resolution regime. In line with international good practices, the authorities should consider:

- Providing the resolution authority with powers to effect forced mergers and recapitalization, implement bail-in, and appoint special administrators to restore the firm, or parts of its business, to ongoing and sustainable viability;
- Expanding existing powers to override shareholders, notably to effect recapitalizations or other measures to restructure the firm;

¹⁸ For more details, see the *Technical Note on Crisis Management, Bank Resolution, and Safety Nets*.

- Introducing powers to temporarily stay the exercise of contractual rights such as acceleration, early termination, set-off and netting rights;
- Providing for qualitative and quantitative resolution triggers in order to allow for the use of resolution powers before a firm is balance-sheet insolvent and before all equity has been fully wiped out;
- Mandating the preparation of resolution plans, at least for D-SIFIs; and provide the competent authorities with powers to require, where necessary, changes to firms' business practices, structures or organizations to improve resolvability; and
- Eliminating obstacles to the implementation of measures taken by resolution authorities within their legal powers and in good faith.

53. The current framework for cross-border coordination is useful, but there is room for closer cooperation. The Nordic-Baltic Cooperation agreement on cross-border financial stability that established the Nordic-Baltic Cross-Border Stability Group provides a preliminary framework for the sharing of costs associated with jointly agreed crisis management actions. To further strengthen the bank resolution framework on a cross-border basis, the authorities should (i) further harmonize national resolution regimes (e.g. the application of bail-in requirements), (ii) establish crisis management groups and firm-specific cooperation agreements for systemically important firms with cross-border activities and institution-specific crisis management groups, with a view to, inter alia, coordinate resolution strategies and resolvability assessments for those domestic banks whose failure may generate regional spillovers, and (iii) introduce mechanisms to give effect to foreign resolution measures. In addition, active participation in crisis management groups (and similar fora) of foreign firms that have a material presence in Denmark (notably Nordea), remains important.

54. The framework for emergency liquidity support should be formalized. While DN did not face impediments when providing emergency liquidity assistance (ELA) during the crisis, the preparation of (internal) policy guidelines is recommended. At a minimum, such guidelines should outline clear eligibility criteria (temporarily illiquid but otherwise solvent firms), and provide conditions for support (i.e. collateral, pricing and maturity, and other requirements imposed on recipients). The ELA framework should also formalize coordination arrangements between the DN and the DFSA for the purpose of providing ELA.

55. Targeted enhancements of the DGS should be considered. The DGS is a private, self governing institution established by an act of Parliament, financed by industry contributions. International best practices point to a number of potential improvements, including removing industry representatives from the DGS board, introducing a shorter payout period, enhancing funding arrangements (via risk-based premiums and an explicit funding backstop provided by the government), and introducing depositor preference. The offsetting of depositor claims should be limited to overdue financial obligations, to prevent imposing unnecessary hardship on insured depositors.

Appendix I. Key Recommendations of the 2006 FSAP

Financial stability recommendations	Implementation
Supervisors should make use of their regulatory authority to require additional capital in individual cases	Supervision became more intrusive following the crisis. The DFSA regularly monitors the risk weights applied by the institution and makes active use of Pillar 2 capital requirements.
Ensure close monitoring of the housing market, strict adherence to supervisory rules, and effective consumer information	DFSA's real estate valuation unit monitors the housing market development (offsite and onsite). New rules on risk labeling for loan secured with real property were introduced into Danish legislation in 2013. The authorities are studying the economic strength of households. The SRC analyzes developments on the housing market and can issue macroprudential recommendations.
Basel Core Principles for Effective Banking Supervision	
Formalize in law the organization of financial supervision	No changes. The powers and responsibilities of the DFSA are established in the Financial Business Act (FBA).
Increase the budgetary flexibility and the resources of DFSA	The resources of the DFSA have been increased significantly since 2006. The budget still follows the same approval procedures.
The "fit-and-proper" test should apply to holders of other key management position	As of 2010, the DFSA makes an assessment of every member of the BoD and senior management. The law was updated in 2010 to promote further improvements.
The DFSA should introduce routine monitoring of net funding, stress testing, and contingency liquidity planning	The DFSA introduced monthly liquidity stress testing requirements for Group 1 and 2 institutions and performs a standardized stress test from the remaining institutions. All institutions are required to have in place contingency funding plans.
The DFSA should consider routine meetings with management of banks	The DFSA has had for many years a yearly meeting with the top management of the largest banks.
IAIS Insurance Core Principles	
Apply more specific rule-based requirements to all companies	DFSA issued a binding EO on Management and Control of Banks, Insurance Companies.
Improve financial independence of DFSA	The budget of the DFSA has increased significantly, but the budget follows the same approval procedures as before.
Require that the suitability of auditors and actuaries be assessed	The fit & proper requirements still only apply to members of the BoD and senior management. Solvency II Directive implementation will introduce further improvements.
Establish internal audit functions for all companies	The internal audit function is still not mandatory for smaller entities.
DFSA should enlarge its activities on market analysis	The DFSA performs mark-to-market valuation on both assets and liabilities, performs stress testing, and assesses capital requirements based on Solvency II.

Larger life companies should be subject to a full inspection on a four-year cycle	DFSA performs yearly risk assessments of all life companies. Larger life companies are subject to full inspections at least every fourth years.
CPSS Core Principles for Systemically Important Payment Systems	
Sumclearing: The Danish Bankers Association should draft a memorandum providing a comprehensive description of the functioning of the system, the risk and liquidity management measures, etc. and implement a loss-sharing and liquidity arrangement	The Danish Bankers Association has written a memorandum describing the system. The description of exit criteria was made in cooperation with DN. Some measures have been implemented to lower the risks in the system and the Danish Bankers Association has recently introduced a number of measures to reduce liquidity risk in the clearings. Loss-sharing and liquidity arrangements have not been established.
Sumclearing: The overseers of the system should gather information on possible concentration risk, the amounts settled and the deposit risk for the smaller banks that use a specific settlement bank	DN regularly receives information from the system owner regarding which banks have access to the Sumclearing through other settlement banks. The information is received in connection with quarterly meetings and in case of changes.
KRONOS: Coordinate the contingency plans and develop broad testing of emergency procedures. Sumclearing: The contingency measures should be tested with participants and the emergency measures should be coordinated with other system providers	KRONOS: A consolidated Business Continuity Plan for KRONOS is currently being prepared. Upon completion of the current modernization of the retail payments settlement infrastructure (by end 2014), contingency measures will be tested regularly. Sumclearing: Contingency measures involving the participants in the system have been tested in relation to major projects for clearing/settlement. Yearly tests will be undertaken to secure business continuance.
KRONOS: Reconsider the discretionary powers with respect to access and exit; and formulate explicit exit procedures. Sumclearing: Facilitate public disclosure of access criteria	KRONOS: Entry criteria allow participation in KRONOS without significant restrictions. The terms and conditions for entry are publicly disclosed. The DN has some discretion with respect to entry and exit. Powers to suspend from KRONOS are deemed necessary for monetary policy purposes. Sumclearing: A publicly disclosed memorandum describes the access criteria and exit criteria.
DN should have a mission statement, an oversight methodology, and an implementation plan	The oversight policy and methodology were developed and have been implemented since 2007. They are currently being updated based on the CPSS-IOSCO standards.

Formalize the oversight policy with respect to systems operated outside DN and broaden the scope of the oversight on Sumclearing	The oversight of systems operated outside DN (central securities depository, VP, and retail clearing systems) includes a framework for incident reporting, quarterly meetings with the system owners, and framework for oversight of operational risk at VP. Yearly reports of main oversight results are published. The scope of oversight of retail payment systems was clarified in March 2006.
CPSS IOSCO Recommendations for Securities Settlement Systems	
Perform a financial stability analysis of the effects of spillovers to other systems in case of failure of the largest participant	VP performed various financial stability analysis of its settlement process in 2011 as part of its self-assessment against the ESCB-CESR recommendations.
VP should coordinate and test its contingency plans and emergency procedures	VP operates a formalized system for identifying and managing operational risks. Contingency plans and emergency situations are tested on an annual basis (most recently in August 2013). VP contingency plans will be adapted in 2014 according to the recommendations from the FSB and the CPSS-IOSCO.
FATF Recommendations for Anti-Money Laundering and Combating the Financing of Terrorism	
Enhance the analysis of STRs. Ensure the FIU is able in all instances to obtain additional information without using a court order. Adopt written reporting requirements	All STR's are now subjected to an initial analysis in the Financial Intelligence Unit (FIU) upon intake. The legal position regarding the FIU's ability to obtain additional information from reporting entities has not been changed. Formal requirements for reporting have been introduced since 2012.
Introduce requirements to ensure that reporting entities have adequate screening procedures for hiring employees	There have been no changes to practices in this area.
Enhance scope and frequency of DFSA inspections for AML/CFT and scope of inspections by the Danish Commerce and Companies Agency (DCCA)	The DFSA has established an expert supervising task force as part of the FSA's Legal Department to conduct both onsite and offsite AML/CTF inspections. The activities of the DCCA have been transferred to the Danish Business Authority. The present scope and frequency of inspections are similar to the scope and frequency named in the follow-up report for DCCA.

Appendix II. Risk Assessment Matrix¹⁹

Potential Deviations from Baseline

Source of Risk and Relative Likelihood (High, medium, or low)	Expected Impact if Threat is Realized (High, medium, or low)
<p style="text-align: center;">High</p> <p>Protracted period of slower global growth in advanced and emerging economies:</p> <ul style="list-style-type: none"> Advanced economies: Lower-than anticipated potential growth and persistently low inflation due to a failure to fully address legacies of the financial crisis, leading to secular stagnation. Emerging markets: Maturing of the cycle, misallocation of investment, and incomplete structural reforms leading to prolonged slower growth. 	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> Weaker GDP growth and higher unemployment would increase nonperforming loans and lead to higher loan loss impairments, weighing on banks' profitability. Life insurance companies and pension funds would face difficulties in attracting long-term savings in an environment of low interest rates; servicing contracts with guaranteed interest rates would weigh on profitability. <p>This risk has been analyzed in a macrofinancial scenario.</p>
<p style="text-align: center;">High</p> <p>Surge in global financial market volatility</p> <ul style="list-style-type: none"> Global financial market volatility triggered by geopolitical tensions or revised market expectations about UMP exit/emerging market fundamentals. Broad-based correction in asset valuations and an intensification of liquidity strains. 	<p style="text-align: center;">Medium</p> <ul style="list-style-type: none"> Further increase in NPLs, along with higher loss rates due to real estate collateral devaluation, would put pressure on loan generation and banks' and MCIs' profitability. In the face of higher volatility, MCIs would be constrained in their ability to post additional collateral to maintain the bonds' cover ratios. Insurers and pension funds would face market-value losses on their investments, thereby endangering their solvency position, and lowering their investment income. <p>This risk has been analyzed in a macrofinancial scenario.</p>
<p style="text-align: center;">Low</p> <p>A drop in confidence in Danish covered bonds</p> <ul style="list-style-type: none"> A reassessment of household risk could increase concerns about mortgage banks and hence about covered bonds. Under stress conditions, the prospect of forcible extension of covered bond maturities could heighten investor concerns about refinancing risk. 	<p style="text-align: center;">High</p> <ul style="list-style-type: none"> Investors, especially foreigners, would retrench from the Danish covered bond market, which would create financing problems, especially for mortgage credit institutions. Mark-downs of covered bonds would hurt the solvency of banks, life insurance companies, and pension funds. <p>This risk has been analyzed in a sensitivity test.</p>

¹⁹ The Risk Assessment Matrix (RAM) shows events that could materially alter the baseline path (the scenario most likely to materialize in the view of IMF staff). The relative likelihood of risks listed is the staff's subjective assessment of the risks surrounding the baseline ("low" is meant to indicate a probability below 10 percent, "medium" a probability between 10 and 30 percent, and "high" a probability between 30 and 50 percent). The RAM reflects staff views on the source of risks and overall level of concern as of the time of discussions with the authorities. Non-mutually exclusive risks may interact and materialize jointly.

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
BANKING SECTOR: SOLVENCY RISK				
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> • <u>6 banking groups</u>: Danske Bank Group, Nykredit Realkredit Group, Nordea Bank Danmark Group, Jyske Bank Group, Sydbank Group, BRFkredit Group. • <u>5 commercial banks</u> (unconsolidated): Danske Bank A/S, Nykredit Bank (subgroup), Nordea Bank Danmark A/S, Jyske Bank (group level), Sydbank (group level). • <u>5 mortgage credit institutions</u> (unconsolidated): Realkredit Danmark A/S, Nykredit Realkredit A/S, Totalkredit A/S, Nordea Kredit, BRFkredit. 	<ul style="list-style-type: none"> • <u>5 commercial banks</u> (unconsolidated): Danske Bank A/S, Nykredit Bank A/S, Nordea Bank Danmark A/S, Jyske Bank A/S, Sydbank A/S. 	<ul style="list-style-type: none"> • N/A
	Market share	<ul style="list-style-type: none"> • 95 percent of mortgage credit sector's and 87 percent of commercial banks' total assets 	<ul style="list-style-type: none"> • 87 percent of commercial banks' total assets 	<ul style="list-style-type: none"> • N/A
	Data and baseline date	<ul style="list-style-type: none"> • Data: bank-internal portfolio, income and balance sheet data • Audited financial statements as of end 2013. • Exposure coverage: (i) all credit risk-sensitive exposures, (ii) all market risk-sensitive exposures, including Danish and foreign sovereign exposures in the held-to-maturity portfolio of the banking book; (iii) cash-flow based funding liquidity data. 	<ul style="list-style-type: none"> • Data: Bank-by-bank supervisory data from year end 2013. • Audited financial statements as of end 2013. • Exposure coverage: (i) all credit risk-sensitive exposures, (ii) all market risk-sensitive exposures, including sovereign exposures as part of gross bond holdings. 	<ul style="list-style-type: none"> • N/A
2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> • Constrained bottom-up stress test. • Participating banks' and mortgage credit institutions' internal risk management 	<ul style="list-style-type: none"> • DN top-down stress testing framework (balance sheet-based regulatory approach). 	<ul style="list-style-type: none"> • N/A

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
		framework.		
	Satellite Models for Macro-Financial linkages	<ul style="list-style-type: none"> • <u>Credit risk</u>: Banks' Internal Ratings Based (IRB) models and internal models for portfolios under the Standardized Approach; Basel III regulatory framework for calculating capital requirements. Direct and indirect credit risk covered. • <u>Market risk</u>: banks internal risk management models; Basel III regulatory framework for calculating capital requirements, including the market risk effect on RWA through stressed Value-at-Risk (VaR). • <u>Pre-impairment income</u>: bank internal risk management models. • <u>Liquidity risk</u>: Section 152 Danish Financial Business Act requirements (Funding Ratio, Excess Liquidity Coverage (ELC)); and CRD IV Liquidity Coverage Ratio. Estimates include both contractual and behavioral cash-flows, as well as market liquidity shocks. • <u>Credit growth</u>: scenario-dependent, dynamic balance sheet assumption (unconstrained). 	<ul style="list-style-type: none"> • <u>Credit risk</u>: Sectoral credit risk factor model (Abildgren and Damgaard, 2012); linear and static regression model. Regressors include unemployment rate, real long- and short-term interest rates, real growth in house prices. Parameter estimates are then recalibrated based on expert judgment; direct and indirect credit risk covered. • <u>Market risk</u>: Repricing of market-risk sensitive exposures, excluding sovereign debt holdings. • <u>Pre-impairment income</u>: Main income and expenses balance sheet items estimated from linear regression models, with institute-specific add-on estimated from past performance. • <u>Credit growth</u>: Endogenous growth modeling depending on profitability. • No tests for market and funding liquidity risks. 	• N/A
	Stress test horizon	• Five years (2014Q1–2018Q4); plus separate estimate of impact under full Basel III implementation (2019)		• N/A
3. Tail shocks	Scenario analysis	<p>Stress scenarios are generated by the IMF's EUROMOD model. <u>Baseline scenario</u>: IMF World Economic Outlook (WEO), October 2013.</p>		

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
		<p><u>Protracted Slow Growth scenario</u> (Protracted period of slower global growth and prolonged weak consumer confidence in Denmark): Under this scenario, euro area growth deteriorates gradually but persistently. With this uncertainty combined with slower pace of improvement in house prices and household balance sheets, consumer confidence in Denmark does not recover sufficiently to boost private consumption. This would undermine the recovery, with lower levels of exports, residential investment and private consumption. Real GDP growth would be lower each year by about 0.5 percentage points than in the baseline scenario. Depressed collateral prices and slower GDP growth will have a negative impact on asset quality and profitability, increasing the share of NPLs and dampening the already weak profit-generation capacity. The five-year cumulative shock corresponds to a little over one standard deviation move in annual GDP growth relative to the baseline.</p> <p><u>Severe Stress scenario</u> (Surge in global financial market volatility due to geopolitical tensions, revised expectations about UMP exit in the United States, or concerns about fundamentals in emerging economies). Under this scenario, a slowdown in most major export markets (euro area, other Nordics, and the United States) would weigh heavily on Danish exports, undercutting the recovery sharply. Re-emergence of euro zone stress would also affect Denmark via shaken consumer confidence and delay the recovery of private consumption and house prices. A slowdown in emerging markets economies would reduce external demand for Danish exports. Real GDP growth would be lower by -3.8 percentage points in 2014 and -1.6 percentage points in 2015 than in the baseline scenario. Depressed collateral prices, higher unemployment, and lower GDP growth would have a negative impact on banks' profitability and asset quality. The adverse scenario constitutes a 2½ standard deviation shock (5.4 percentage points) to the two-year cumulative real GDP growth rate for 2014–15 compared to the baseline.</p>		
	Sensitivity analysis	<ul style="list-style-type: none"> • <u>Sovereign risk</u>: (country-specific yield shocks, including on own sovereign; including and excluding held-to-maturity portfolio of the banking book. • Hike in <u>Danish covered bond spreads</u> by 100 and 500 basis points. 	<ul style="list-style-type: none"> • N/A. 	<ul style="list-style-type: none"> • N/A.

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
		<ul style="list-style-type: none"> • <u>Credit concentration and counterparty credit risk</u>: (i) simultaneous default of largest 1, 3, 5, and 10 largest single exposures (paragraph 145, Art. V Danish Financial Business Act (DFBA)); (ii) simultaneous default of 1, 3, 5, 10, and all Large Exposures (defined according to paragraph 145, Art. IV DFBA); • <u>Assumptions</u>: All off-balance sheet exposures covered (not only the 75 percent via the Credit Conversion Factor); conservative LGD assumption of 45 percent (for all banks and all tests); group-internal exposures excluded; losses calculated after deduction of eligible collateral (up to certain limits e.g. on housing collateral); • <u>Impact measure</u>: Change in capital ratio with and without gross profits as first line of defense. 		
4. Risks and Buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Credit risk, direct and indirect • Credit concentration and counterparty default risk • Market risk (incl. sovereign risk) • Market liquidity risk • Funding liquidity risk • Funding cost risk 	<ul style="list-style-type: none"> • Credit risk, direct and indirect • Market risk (excl. sovereign risk) • Funding cost risk 	<ul style="list-style-type: none"> • N/A
	Behavioral adjustments	<ul style="list-style-type: none"> • Dynamic balance sheet assumption, bank-specific. • Depending on result and contractual obligations. • Constant portfolio allocation/composition. • No management actions. 	<ul style="list-style-type: none"> • Balance sheet growth modeled endogenously, conditional on profitability. The risk-weights reported by banks under the bottom-up test were applied in the top-down test. • The risk-weights are kept constant for 	<ul style="list-style-type: none"> • N/A

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
		<ul style="list-style-type: none"> No capital increases. Outflow of capital due to CRD4 phasing-out and redemptions of AT1/T2 capital (where relevant). 	<p>the remaining period.</p> <ul style="list-style-type: none"> Tax assumed at 25 percent of profits before tax. Dividend payout assumed at 25 percent of profits after tax before dividends. No management intervention assumed in asset disposal, lending standards or portfolio allocation. 	
5. Regulatory and Market-Based Standards and Parameters	Calibration of risk parameters	<ul style="list-style-type: none"> <u>Credit risk</u>: (PD and LGD): point-in-time parameters for Expected Loss estimation; through-the-cycle and point-in-time for capital requirements. <u>Market risk</u>: scenario parameters provided in terms of haircuts. 	<ul style="list-style-type: none"> <u>Credit risk</u>: Point-in-time “impairment rates” (i.e., loss rates) modeled directly (no explicit modeling of PD, LGD). <u>Market risk</u>: scenario parameters provided in terms of haircuts. 	<ul style="list-style-type: none"> N/A
	Regulatory/Accounting and Market-Based Standards	<ul style="list-style-type: none"> CRD IV phase-in arrangements for CET1, Tier 1, and Total Capital. Includes Capital Conservation Buffer (CCB), SIFI buffer, as well as bank-specific Pillar 2 add-ons). IAS 39 accounting standards. RWA behave dynamically according to changes in credit and market risk parameters. 	<ul style="list-style-type: none"> CRD IV phase-in arrangements for CET1, Tier 1, and Total Capital. Includes Capital Conservation Buffer (CCB), SIFI buffer, as well as bank-specific Pillar 2 add-ons). IAS 39 accounting standards. RWA behave dynamically according to changes in credit and market risk parameters. 	<ul style="list-style-type: none"> N/A
6. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> Evolution of capital ratios Solvency test result drivers System-wide capital shortfall Percentage of assets below regulatory 	<ul style="list-style-type: none"> Evolution of capital ratios System-wide capital shortfall Capital shortfall. 	<ul style="list-style-type: none"> N/A

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
		minimum.		
BANKING SECTOR: LIQUIDITY RISK				
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> Excess liquidity coverage test: 81 banks LCR: 16 banks and MCIs Funding ratio: 85 banks 	• N/A	• N/A
	Market share	• 100 percent in terms of assets	• N/A	• N/A
	Data and baseline date	<ul style="list-style-type: none"> Institutions internal and supervisory data as of March 2014. Unconsolidated data for excess liquidity coverage test and funding ratio Consolidated data for LCR 	• N/A	• N/A
2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> Coverage ratios (Excess Liquidity Coverage and CRD IV Liquidity Coverage Ratio) Structural maturity mismatch ratio: Cash-flow-based using maturity buckets (Funding Ratio) 	• N/A	• N/A
3. Risks and Buffers	Risks	• Multi-factor scenarios comprising funding liquidity shocks and market liquidity shocks.	• N/A	• N/A
	Buffers	• Counterbalancing capacity.	• N/A	• N/A
4. Tail shocks	Size of the shock	<ul style="list-style-type: none"> Dry-up of wholesale funding markets, loss in deposit funding; shocks to market values of liquid assets; downgrades of financial institutions. Please see detailed scenario tables for Excess Liquidity Coverage, and the CRD IV for details on LCR parameterization. 	• N/A	• N/A

Domain		Assumptions		
		Bottom-Up (financial institutions, DFSA, IMF FSAP team)	Top-Down (DN, IMF FSAP team)	Top-Down (FSAP Team)
5. Regulatory and Market-Based Standards and Parameters	Regulatory standards	<ul style="list-style-type: none"> • Section 152 DFBA and Supervisory Diamond. • CRD IV (final version). 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A
6. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> • Excess Liquidity Coverage, Liquidity Coverage Ratio, and Funding Ratio for the full sample and, separately, for different size buckets. • Number of banks that do not pass stress test; liquidity shortfall; potential to close shortfall. • Distribution measures of individual results. 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A

Domain		Assumptions
		Bottom-Up by Insurance Corporations
INSURANCE AND PENSION FUND SECTOR: SOLVENCY RISK		
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> • 4 life insurance groups (Danica, Nordea Liv, PFA Pension, Sampension) • 4 non-life insurance groups (Alm.Brand, Codan, Topdanmark, Tryg) • 1 pension fund (ATP)
	Market share (gross premiums)	<ul style="list-style-type: none"> • Life: 50 percent • Non-Life: 65 percent
	Data and baseline date	<ul style="list-style-type: none"> • Companies' own data • Reference date: 01/01/2014 • Worldwide consolidation
2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> • Companies' internal models
	Valuation	<ul style="list-style-type: none"> • Market-consistent valuation of assets and liabilities
	Stress test horizon	<ul style="list-style-type: none"> • Five years (2014–2018) • Instantaneous shocks in sensitivity analyses
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Slow growth scenario (protracted period of slower global growth and prolonged weak consumer confidence in Denmark) • Adverse scenario (Re-emergence of financial stress in the euro area, protracted economic and financial volatility for emerging markets, and tighter financial condition in the United States)
	Sensitivity analysis	<ul style="list-style-type: none"> • Sharp increase in interest rates • Sovereign spread increases • Covered bond spread increases • Catastrophic event
4. Risks and Buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Interest rates, equity, property, FX, credit spreads, lapses • Summation of risks within scenarios, no diversification effects
	Buffers	<ul style="list-style-type: none"> • Absorption effect of technical provisions (profit sharing) • Absorption effect of deferred taxes
	Behavioral adjustments	<ul style="list-style-type: none"> • Management actions limited to non-discretionary rules in place at the reference date
5. Regulatory and Market-Based	Calibration of risk parameters	<ul style="list-style-type: none"> • Interest rates: macro-model generated • Equity: 90th and 95th percentile of empirical return distribution • Property: 90th and 95th percentile of empirical return distribution

Domain		Assumptions
		Bottom-Up by Insurance Corporations
Standards and Parameters		<ul style="list-style-type: none"> • Currency: macro-model generated • Credit spreads: a) Corporate bonds: 85th and 90th percentile of empirical return distribution, for financials/non-financials/AAA-rated covered bonds; b) Sovereign bonds: • Lapses: Mass lapse event, expert judgment • Catastrophic event: a) Repetition of 1999 windstorm (“Anatole”); b) 1-in-100 years probable maximum loss • Sensitivity analyses: expert judgment for sharp interest rate increase and covered bond spread increases; 90th percentile of empirical yield changes for sovereign spread shock
	Regulatory/Accounting and Market-Based Standards	<ul style="list-style-type: none"> • National solvency regime (individual solvency requirement of an insurer is the higher of a) Solvency I requirements and b) QIS5-like Solvency II requirements)
6. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> • Impact on solvency ratios • Capital shortfall for companies falling below 100 percent solvency ratio • Impact on net income • Contribution of individual shocks • Dispersion measures of solvency ratios and net income