



## CAPITAL MANAGEMENT - FIRST QUARTER 2011

### CAPITAL MANAGEMENT

The purpose of the Bank's capital management practice is to ensure that the Bank has sufficient capital at all times to cover the risks associated with its activities. The framework for the Bank's capital management is rooted in the Capital Requirement Directive's (CRD) Pillar I, II and III. Pillar I contains a set of rules for calculating the minimum capital requirement. Pillar II describes the framework for the Bank's Internal Capital adequacy assessment process and the supervisory review, while Pillar III contains the disclosure aspect.

#### Internal Capital Adequacy Assessment Process (ICAAP)

Saxo Bank's ICAAP process follows four steps:

Step 1: Capital requirements using CRD (Pillar I)

Step 2: Self assessed capital requirement using a quantitative approach

Step 3: Self assessed capital requirement using a scenario based approach } (Pillar II)

Step 4: Capital adequacy determination

Step 5: Disclosure (Pillar III)

#### Business Activities

The Bank carries out the following main activities

- Online trading and investment and other investment services within capital markets to retail clients, corporations, financial institutions and white label clients.
- Professional portfolio, fund and asset management to retail and professional clients.
- Classic bank services in Denmark, primarily to retail clients, hereunder bank accounts and debit/credit cards, mortgage credit, bank advice services and pension products.

The Bank is exposed to a number of risk types stemming from these activities, which can be categorised as follows:

**Market Risk:** The risk of loss due to movements in market risk factors.

**Credit Risk:** The risk that counterparts or clients of the Bank fail to fulfil their obligations.

**Operational Risk:** The risk of loss resulting from inadequate or failed processes, people or systems, inaccuracy and improper disclosure of data. (including Legal and Information security risk)

**Liquidity Risk:** The risk of loss resulting from lack of liquidity.

**Business Risk:** reflects the risk of direct or indirect loss, or damaged reputation as a result of changes in external circumstances or events. Business risk includes all risks not mentioned under other risk categories.



Each risk category is described in details in the coming sections including a description of the measurement methods. These methods differ between methods used to estimate the capital requirement, which is the CRD pillar 1 statement, and methods used to estimate the capital adequacy, which is the ICAAP's estimate of the Bank's individual capital need.

### **Capital requirements, Pillar I**

This first step calculates the minimum capital using the Capital Requirements Directive (CRD), pillar I.

Saxo Bank uses the following methods to calculate risk-weighted assets for the three types of pillar I risks:

- Credit risk: The standard method
- Market risk: The standard method
- Operational risk: Basic indicator method

Saxo Bank does not take diversification effects between the risk types into account. The capital charge for each risk category is simply aggregated.

*At the end of the quarter, the risk-weighted assets calculated using the CRD method, totalled at 17,102.6m. The capital requirement is 8%, equal to an overall capital requirement of 1,368.2m. The capital contribution in each of the main risk categories were as follows; Credit risk: 359.1m Market risk: 603.8m and Operational risk: 405.3m.*

## Risk self assessment, Pillar II

The second step is to assess the actual risks to which the Bank is exposed.

Different risk types that the Bank is exposed to have been examined and split into ICAAP risk categories as shown in table 1.

**Table 1: Risk types mapped in ICAAP risk categories**

Risk categories	Credit Risk	Market Risk	Operational Risk	Business Risk	Liquidity Risk
General	√	√	√	√	√
Earnings				√	
Growth				√	
Credit risk	√				
Market risk		√			
Concentration risk	√	√		√	
Group risks	√	√	√	√	
Liquidity risk					√
Operational risk			√		
Control risk			√		
Business size				√	
Settlement risk	√		√		
Strategic risk				√	
Reputational risk			√	√	
Non-trading interest rate risk		√			
External risk	√		√	√	
Other conditions	√			√	
Stress testing	√	√	√	√	√

Different methods are applied to assess the Bank's capital need in each category which is described below.



### **Credit risk**

To assess the credit risk that the Bank is exposed to, the different counterparty types have been examined, and the outstanding counterparty risk has been determined in each case or each segment. The risk has been assessed using impact and likelihood, based on empirical data, expert judgement and credit ratings wherever applicable. In a similar fashion the credit risk has been determined on outstanding credit lines and accepted bank guarantees. A Monte Carlo simulation has been utilized, running one million simulations and a 30% event correlation, to determine the loss distribution of credit risk events. 30% correlation is chosen to simulate a stressed credit environment. The Bank uses expected shortfall, less expected loss (average of events greater than VaR) with a 99.9% confidence level on a one year time horizon. This means that all events in the tail of the distribution are considered when determining the adequate capital level. Credit risk outside the traded portfolio, including the domicile building, tangible assets and off balance sheet items, has been added using the standard method under the CRD.

Concentration risk from credit is captured in the credit portfolio model making large credit exposures relative more expensive (in term of capital) than small exposures.

Subsidiaries' credit risk has been included based on the underlying business activity. Subsidiaries within online trading and investment and other investment services within capital markets, are included using the same approach, in essence running simulations on the group's combined portfolio. Domicile buildings, tangible assets and off balance sheet items, are included using the standard method under the CRD. Subsidiaries offering professional portfolio, fund and asset management or classic bank services have been included using their respective individual capital adequacy numbers. These are aggregated at a group level using simple addition, offering no diversification effects.

*At the end of the quarter, the self assessed credit risk capital charge within online trading and investment services was 358.7m for the group.*

### **Market risk**

The market risk in the Bank has been determined using an exponentially weighted moving average VaR approximation to derive Expected Shortfall (ES) on the Bank's actual outstanding exposures. To better reflect the Bank's risk appetite the most recent monthly and weekly averages are compared and the largest number is selected as being representative of the Bank's current market risk appetite. The model uses actual correlations within the traded portfolio. ES is determined with 99.97% confidence, and a one day time horizon on foreign exchange, and a two day time horizon for products traded on an exchange, as the vast majority of the trading exposure can be eliminated within one or two days respectively.

To cater for concentration risk in the trading portfolio, if appropriate, a buffer is added to cater for price moves beyond what is embedded in the market risk ES calculation. In Q1 a 1% USD stress, representing DKK 35m, is added using the highest impact of the latest week or month.



Subsidiaries' market risk has been included based on the underlying business activity. Online trading and investment and other investment services within capital markets, are included using a CRD Pillar I approach where applicable. Results are aggregated at a group level using simple addition. Portfolio, fund and asset management or classic bank services have been included using their respective individual capital adequacy numbers. These have been aggregated at a group level using simple addition, offering no diversification effects.

*At the end of the quarter, the self assessed market risk capital charge within online trading and investment services was 122.4m for the group.*

### **Operational, Compliance and legal risk**

The risk from the Bank's operations is assessed through an interview process where likelihood and impact levels of events are determined in co-operation with applicable stakeholders. The risks have been assessed using the same simulation model as described under credit risk. The operational risk in the Bank has been determined using a portfolio approach and Monte Carlo simulation with a 0% event correlation. To incorporate stress, a number of combined event scenarios have been introduced in the simulation. These scenarios imply 100% correlation between underlying events, and consider severe impacts, setting impact and probability levels at average, worst out of 20 occurrences and worst out of 100 occurrences. The events are constructed using external data sources, and expert advice. A one-year time horizon and expected shortfall, less expected loss, with a 99.9% confidence level has been applied.

Subsidiaries' operational risk has been included based on the underlying business activity. Subsidiaries within online trading and investment and other investment services within capital markets, are included using the same simulation approach, in essence running simulations on the group's combined portfolio. Subsidiaries offering professional portfolio, fund and asset management or classic bank services have been included using their respective individual capital adequacy numbers. These are aggregated at a group level using simple addition, offering no diversification effects.

*At the end of the quarter, the self assessed operational risk capital charge within online trading and investment services was 269.7m for the group.*

### **Business risk**

The key potential business risks are identified, assessed and discussed on a meeting with participation of the CED's office and the Risk Director. The outcome of the discussions forms the basis for sensitivity analyses of net operating income.

The results of the sensitivity analyses are subsequently analyzed with the aid of a portfolio approach using Monte Carlo simulation. Each event is included with 3 sets of impact and probability (same approach as for combined scenarios under operational), assuming that the various events are independent. This method is applied to explicitly capture tail events, incorporating a stress measure in the model. Expected shortfall with a 99.9% confidence level is applied with a one year time horizon. Business risk is covered by the budgeted income. If the income is not sufficient, capital must explicitly be set aside.



Concentration risk from large events is captured in the risk model, making large impacts relative more expensive (in term of capital) than small impacts.

*At the end of the quarter, no explicit capital charge within online trading and investment services, beyond the budgeted income, has been set aside to cover business risk.*

#### **Liquidity risk**

The liquidity risk is determined as the increased cost of raising capital in a very illiquid market. Saxo has determined the liquidity risk based on scenarios with a liquidity shortfall within the Bank.

To the extent that the events can not be absorbed by the budgeted income, capital will be explicitly allocated to cover the risk.

*At the end of the quarter, no explicit capital charge within online trading and investment services, beyond the budgeted income, has been set aside to cover liquidity risk.*

#### **Professional portfolio, fund and asset management**

Subsidiaries offering professional portfolio, fund and asset management have been included using their respective individual capital adequacy numbers as described in the previous.

*At the end of the quarter, the self assessed Professional portfolio, fund and asset management capital charge was 113.8m for the group.*

#### **Classic bank services**

Subsidiaries offering classic bank services have been included using their respective individual capital adequacy numbers as described in the previous.

*At the end of the quarter, the self assessed Classic bank services capital charge was 170.0m for the group.*

#### **Buffer**

Saxo Bank includes a buffer to incorporate additional capital requirements identified, not covered by the previous assessment. A buffer is added, considering an increased volatility environment relative to the risk factor that contributes the most to the Banks market risk. Growth and new initiatives considers general growth expected to reach the set goals. Mergers, acquisitions and outsourcing agreements take into account planned projects but also the potential effect of terminating outsourcing agreements. New products and services consider increased exposure to new markets, products and added complexity. The general buffer including modelling risk is added as a conservative measure.

*At the end of the quarter, the capital buffer was set to 250.0m for the group.*

### Total capital

The capital needs for each risk category are aggregated using simple addition, without considering potential diversifying benefits from portfolio effects.

*At the end of the quarter, the total self assessed capital charge was 1,002.0m for the group.*

### Scenario based approach

The third step in the ICAAP estimates the capital and earnings effects of stress test scenarios regardless of the previous capital adequacy levels.

Stress tests are developed on the basis of the risk register. One or more stress scenarios are made in the major categories, consisting of one or more events from the register in the applicable risk category. Furthermore, Saxo Bank uses a number of combined stress scenarios, combining multiple events across risk categories. One of the combined events entails a close to unlikely chain of events, in order to ensure the utmost degree of stress. Where applicable, the stress test takes insurance coverage into account.

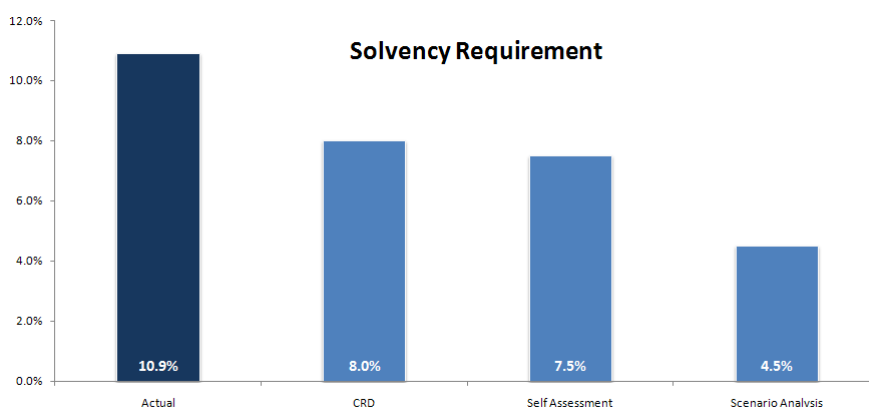
The stress scenarios are updated and reviewed according to changes in the market and economic environment, and at least once a year.

*At the end of the quarter, the most severe stress scenario, on the simulated events, represented a capital impact of 775.2m for the group.*

### Capital adequacy determination

To determine the appropriate level of capital, the results of the three steps are compared – both in nominal terms and as percentages. For step two and three, the percentage is determined by using the risk weighted assets calculated in step one as denominator. This represents the minimum regulatory required 8% of the risk weighted assets.

The largest percentage is determined and is considered as the minimum solvency level within which the Bank should operate.



*At the end of the quarter, the method that gave the largest capital requirement was the CRD based approach. This led to a self assessed capital requirement of 1,368.2m equal to a solvency level of 8%. At that time the Group had an actual solvency of 10.9%*



### **Capital planning**

Part of the ICAAP is planning future capital needs in relation to the business environment, growth and strategic plans in the years to come. Potential major changes to the risk profile, and thereby the future solvency need, are estimated using the ICAAP. This could be changes in the business strategy or competitive landscape, significant increases in traded volumes, fundamental changes in the market conditions, changes in the internal organisation, M&A activity, material changes in regulatory requirements or introductions of new products. This input is used in the strategic decision-making process by the Board of Directors and the Board of Management.

Furthermore the result of the ICAAP is used as input to the capital plan and the capital contingency plan.

The capital plan is a function of the estimated (budgeted) forecast of capital, risk and earnings.

The result of the ICAAP step three (stress testing) is used as input to the capital contingency plan. The financial consequences following the various scenarios and potential management actions are estimated using the methodology described under the ICAAP step two - whereby the most likely net financial consequences from a scenario appear. The potential management actions are revised should the estimated net financial consequences bring Saxo Bank below the required minimum capital level.

A full ICAAP is performed as often as required, but at least once a year. Capital adequacy levels adjusted according to the ongoing limit utilisation are reported to the Danish FSA on a quarterly basis.

Saxo Bank A/S





## DEFINITIONS

**Monte Carlo Simulation** – A technique used to approximate the probability of large portfolio event losses by running multiple simulations. Depending on the type of portfolio, this is based on empirical historic evidence, or on business expert's assessed impacts and probabilities. A very large number of simulations are generated to properly cover events with low probability. Based on the outcome, a loss distribution curve is examined to derive risk measures like VaR and expected shortfall.

**Expected Loss** – A measure that expresses a risk event's likelihood over a given period of time (probability) and the impact the Bank will suffer given the event occurs. By multiplying the annual probability with the impact, we are able to extract the annual expected loss for a given event, or for a given number of events. Expected loss with high predictability can be included in the budget as a cost, and be included as a part of operating the business.

**Value-at-Risk (VaR)** – A measure that expresses the largest loss likely to be suffered on a portfolio over a holding period with a given probability (confidence level). One-year VaR at 99% confidence, means that the one-year loss level will not (on average) be exceeded in 99 out of 100 years. In other words, in only 1 out of 100 years the losses is expected to exceed VaR.

**Expected shortfall (ES)** – An alternative measure to VaR. ES is more sensitive to the shape of the loss distribution in the tail of the distribution, and is the average impact of the simulated portfolio event losses greater than the level determined by VaR (at a given confidence level).