CREDIT SUISSE

Usage of Scenarios at Credit Suisse
Second Annual Stress Test Modeling Symposium

June 2013

Executive Summary

Purpose: Overview of use of Stress Testing by Credit Suisse (Non-CCAR institution)

■ Scenarios used at all levels within CS (from BoD to trading desks) and externally with regulators

■ Quantitative elements of BoD's "Risk Appetite Statement" centred around stress testing

■ Used for both assessing acceptable levels of earnings volatility and for capital management

■ Various types of scenarios are used, including historical, forward looking, business-specific and counterparty credit scenarios

■ Used by our regulators for capital adequacy assessments

Stress Testing Framework Continues to Evolve

■ Broadening scope to non-position risks (e.g. funding, pension)

■ Increase depth and granularity of multi-factor scenarios (e.g. greater integration of market and credit stresses)

Scenario Framework: Risk Appetite and Capital Adequacy

- Scenario analysis complimentary to other risk management tools and techniques such as VaR and EC
- Form key part of the risk appetite and planning process with quarterly updates provided to the BoD
- Regulatory dialogue both on results and on internal framework and methodology

	Internal Risk Appetite	Regulatory Applications
Key Scenarios	• Severe Flight to Quality (slide 5) • Forward looking scenarios (slide 6)	• FINMA: macro-economic stress scenario (semi-annual) called the Loss Potential Analysis (LPA) • PRA: internal macro-economic scenario of appropriate severity benchmarked to the PRA Anchor Scenario (annual) • MAS: macro-economic scenario (annual)
Usage	• Capital and Earnings assessment over budget and forecast financial position • Forms part of the risk planning and Board of Directors limit setting process • Ongoing risk monitoring	• Used for capital adequacy assessment purposes at Group and legal entity level • Supplemental to Pillar 1
Coverage	• Coverage across several risk types (e.g. market, credit, business)	• Coverage across several trading risk types (e.g. market, credit, business) and non-trading risk types (e.g. pension, operational risk)

Scenario Framework: Types of Scenario

■ Scenario framework utilizes several types of scenario for risk management and capital adequacy purposes

Scenario Type	Description	
Primary Asset Class Scenarios (e.g. Equities)	▪ Used for risk management purposes ▪ Assess firm wide impact of scenario shocks ▪ Focus on individual risks (e.g. Interest Rate, Equity)	1
Combination	▪ Used for both risk management and capital adequacy purposes ▪ Covers multiple asset and risk types ▪ Severe Flight to Quality is an example combination scenario	1
Forward Looking	▪ Identified via discussion with internal economists, research and trading ▪ Updated on a periodic basis throughout the year ▪ Scenario themes include policy risk, macro stress, crowded trades, geopolitical	2
Business-specific	▪ Risk management and to address weaknesses of statistical measures (e.g. VaR) ▪ Limit monitored for derivative portfolios (e.g. Structured Derivatives) ▪ Applied at a business (or book) level	3
Credit Scenarios	▪ Used for risk identification and allocation ▪ Used for stress testing portfolio exposures and limit management ▪ Allows identification of wrong way risk	4

Primary Asset Class and Combination Scenarios

Primary Asset Class Scenario Calibration

- Scenarios are calibrated to reflect plausible levels of market activity

- Standardized severity levels (see right) allow comparability of severity across differing risk types, e.g. a bad week event in IR markets has a comparable probability to a bad week event in equity markets
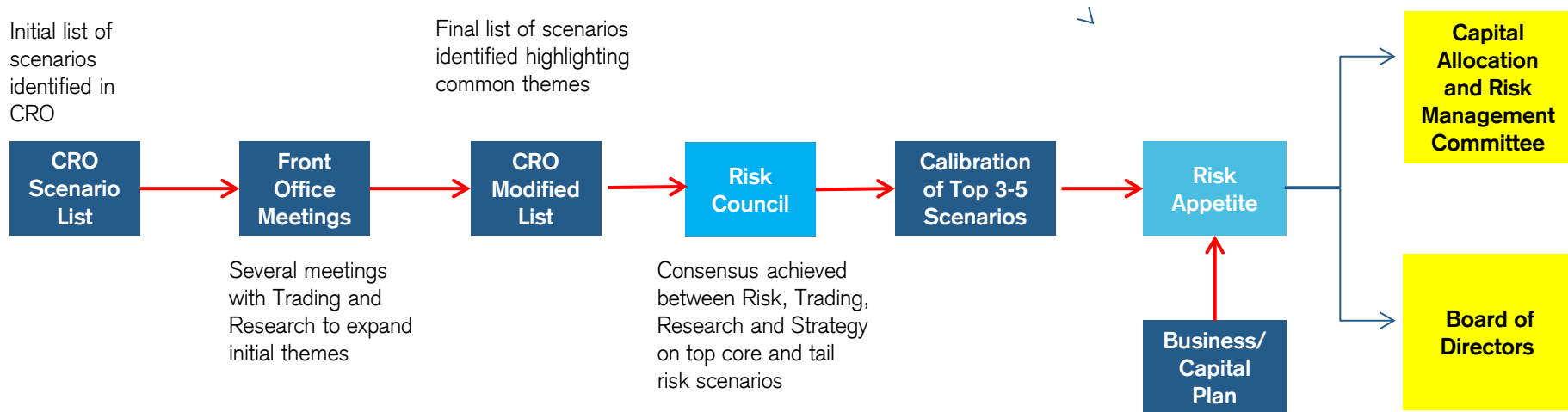
Combination Scenario:

Severe Flight to Quality (SFTQ)

- Scenario assumes a repeat of Lehman's type scenario, experienced during Q4'08

- Scenario assumes a severe market crash in equity markets; along with widening of credit spreads and repeat of 2001 default rates (key parameters shown right)

- Market moves are largely calibrated to the worst historical monthly move since 2008

Severity	Description
Bad Day	Worst expected one day move in a year
Bad Week	Worst expected one week move in a year
Severe Event	Worst single event in recent history (10-20 years); calibrated to worst monthly move
Extreme Event	Calibrated to worst year in 100, e.g. for equities 2 x severe events occurring

Forward Looking Scenario Cycle

- Forward looking scenarios are also assessed to complement the suite of historical scenarios used
- Scenario identification and calibration is conducted in collaboration with internal economists, research and trading

Initial list of scenarios identified in CRO

Final list of scenarios identified highlighting common themes

| CRO Scenario List | → | Front Office Meetings | → | CRO Modified List | → | Risk Council | → | Calibration of Top 3-5 Scenarios | → | Risk Appetite |

Several meetings with Trading and Research to expand initial themes

Consensus achieved between Risk, Trading, Research and Strategy on top core and tail risk scenarios

Business/ Capital Plan

Capital Allocation and Risk Management Committee

Board of Directors

- A range of themes and scenarios have been assessed (see below)

Theme	Scenario
Macroeconomic	US recession; Europe recession; China slow landing; Swiss real estate decline/recession
Market	Euro break-up scenario; collapse of SNB EURCHF floor
Geopolitical	North Korea military tension; Middle East conflict
Policy	Early Fed QE exit; Financial Transaction Tax

③ Business Specific Scenarios

- Business specific scenarios are used to capture risks pertinent to specific businesses or products (e.g. structured derivatives). Other motivations include:
  - Provide more detail on portfolio/business unit specific risk ("deep dives")
  - Provide information to limit risk in certain areas (e.g. sensitivity based stress limits)
  - Pre-trade approval analysis

- Applied to exposures where statistical measures have limitations or where risks / products possess significant non-linearity

- Features of business specific scenarios include:
  - Can be calibrated as a historical or hypothetical scenario
  - Can allow a more granular analysis
  - Can be run for different liquidity horizons

④ Credit Scenarios

- Scenario definition for Counterparty Credit Stress Testing is an iterative process that involves expert judgement from senior members across Risk
- Credit Officers review scenarios results and discuss potential management actions
- Various types of scenarios are considered (summarised below)

Scenario type	Description	Use
Single Factor	Single factor scenarios are the building block for multifactor scenarios. They shock both primary risk factors and volatilities	For risk identification and allocation.
Multi Factor	Scenarios defined as combinations from single factor scenarios	For stress testing portfolio exposures and limit management
General Wrong Way Risk	Scenarios detrimental to counterparty creditworthiness	To identify cases where exposure increases (WWR)
Historical Scenarios	Historical scenarios e.g. Asian Crisis	To stress specific portfolios
Broker Dealer	Forward Looking Scenario representing the overnight market impact of a major broker dealer	For management of Broker Dealer exposures
Counterparty Default Scenarios	The scenario specification defines which entities are set to default. All trades referencing such entities are set to "jump-to-default" level	Scenarios used for identifying knock-on effect on exposure when key market players default