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Managing non-financial risks and the case study of Model Risk

UNIONE BANCARIA E BASILEA 3
RISK & SUPERVISION 2016

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Agenda

1 Enlarging the scope: the transition from OpRisk to non-financial risk

2 The case study of model risk

The transition from OpRisk to non-financial risk

The role for a "comprehensive" view to OpRisk

Non-financial risks management

New attitude towards OpRisk management (1/2)

Misguiding OpRisk capital figures

Regulators are focusing in the current discussion on the detection and prevention of OpRisk regardless of whether the corresponding events lead to direct OpRisk losses (captured by AMA models), loss of future earnings or are boundary cases, i.e. connected to another risk type. Other events (e.g. IT security events) cannot be addressed by capital at all.

Additionally the regulators currently challenge the simple approaches for operational risk and we see a discussion on the adequacy of the current AMA setups, capital floors, as well as a strong focus on AMA / Pillar II model validation.

Message to the industry

A structural break into OpRisk discipline is appearing, and not only as a consequence of BCBS. Bank's ORM practitioner need to critically re-evaluate their job.

[…] operational risk may materialise (**economic loss**, near miss, **loss of future earnings**, gain) and should also consider potential impacts in terms of other **related risks** (e.g. credit-operational risk, market-operational risk '**boundary cases**').

ECB, July 2014, Consultation Paper - Draft Guidelines for common procedures and methodologies for the supervisory review and evaluation process under Article 107 (3) of Directive 2013/36/EU

[…] underscore the need for supervisors to **increase focus** on **operational risk management** […] **certain risks** such as business continuity **cannot be addressed by capital** […] Consequently, firms and supervisors should focus more on the **prevention** and **detection** of operational risk as a complement for appropriate capital underpinning operational risk.

FSB, November 2012, Increasing the Intensity and Effectiveness of SIFI Supervision - Progress Report to the G20 Ministers and Governors

[…] crucial area of investigation is the review of the **validation** of banks' **internal models**. […] For operational risks, the main focus is the **adequacy** of the **governance framework** and the effectiveness of processes to **identify** the **risk** and **mitigate material exposures** to losses.

ECB, March 2015, ECB Annual Report on supervisory activities 2014,

Despite an **increase** in the number and severity of operational risk events during and after the financial crisis, **capital requirements** for operational risk have **remained stable or even decreased** for the standardised approaches, calling into question their effectiveness and calibration. Some of these events have even **threatened to precipitate bank failures**.

BCBS, October 2014, Consultative Document, Operational risk – Revisions to the simpler approaches

New attitude towards OpRisk management (2/2)

Non-Financial Risks (NFR): Focus on Governance, Identification and Culture

The regulator is identifying subcategories of risk types for which specialized knowledge is required to function as a second line of defence. RepRisk is gaining recognition from the regulators. Business model and thus business and strategic risks and their impacts an OpRisk (conduct, model risk) move into focus due to the current economic situation. With corporate and risk governance failure in the past and doubts on the implementations of a sound risk culture the regulator will strongly challenge governance and senior management oversight, especially on "soft" culture influenced topics as NFR.

Message to the industry

Your regulator is likely to focus in an audit on the governance, identification and mitigation of Non-Financial Risks, as well as on business and risk culture. Failure to demonstrate these topics is likely to trigger capital add-ons and regulatory actions.

[…] should pay particular attention to some sub-categories of operational risk because of their pervasive nature […] Such subcategories include, inter alia: a. **conduct risk**; b. **systems – IT risk**; and c. **model risk**. […]

ECB, July 2014, Consultation Paper - Draft Guidelines for common procedures and methodologies for the supervisory review and evaluation process under Article 107 (3 of Directive 2013/36/EU

The **viability of business models** and profitability drivers are another supervisory priority for 2015. The supervisor is keeping an eye on **aggressive "search-for-yield" strategies** with a view to identifying lax credit standards and defective pricing policies. […] also focusing on **governance** at the institutional level, such as the set-up of the board, its expertise, diversity, **challenges** and **culture**.

ECB, March 2015, ECB Annual Report on supervisory activities 2014

The same key risks continued to aggravate the challenge to the stability of the European financial system: […] Search for yield **behaviour risks** exacerbated by already materializing and potential snapbacks; Risks from **deteriorating conduct** of business of financial institutions; Increased concern about **IT risks** and **cyber-attacks**. […]

ESA, May 2015, 2014 Joint Committee Report on Risk and Vulnerabilities

The global financial crisis highlighted a number of **corporate governance failures** and **weaknesses**, including insufficient board oversight of senior management, inadequate risk management and unduly complex or opaque firm organisational structures and activities. […] more **intense supervisory oversight** is needed to evaluate the **effectiveness** of **improved** corporate governance, particularly **risk governance**, in affecting behaviour and improvements in this area will be ongoing and monitored.

FSB, October 2011, Intensity and Effectiveness of SIFI Supervision - Progress report on implementing the recommendations on enhanced supervision

[…] the scale of **misconduct** in some financial institutions has risen to a level that has the potential to **create systemic risks**.

FSB, 9 April 2015, To G20 Finance Ministers and Central Bank Governors, Financial Reforms – Progress on the Work Plan for the Antalya Summit

A framework in a nutshell (1/2)

CHALLENGE // CURRENT SITUATION

- **Non-Financial Risks** (OpRisk, RepRisk, Strategic/ Business Risk,…) typically not **managed sufficiently**
- **Current approaches** focus largely on current regulatory requirements and risk types for the **calculation** of **capital requirement**. The approaches have shown weaknesses in the identification and mitigation of risks.
- NFR have led to **extremely high losses** in the past couple of years; impact of NFR is **higher than suggested by capital requirements** as some NFR risks are **hidden** in other risk types such as credit risk, in incorrect model assumptions (model risk) or are not addressed at all by an advanced approach.
- NFR gain increasing regulatory attention (e.g.: Major regulatory challenge by BCBS on future OpRisk AMA setup, FSB identified **misconduct** as **systemic risk**, **ECB** focusses on identification & management of NFR as part of SREP
- Senior Management does **not obtain** a **complete picture** of the **bank's risk profile**
- **Wrong management attention** & **incentives** via capital requirements for risk management as NFR typically could not be quantified in a sufficient manner nor does capital always help to protect against those risks

SOLUTION

- **Effective combination** of **top-down** and **bottom-up** approaches for improved NFR Management
- Top-down: **in-depth knowledge** of **NFR** at **board level** and setting of **tone at the top**
- Bottom-up: **linkage** of individual activities for **subcategories** of **NFR** regarding **terminology**, **methods**, **processes** and **results**
- Improvement of **Three Lines of Defence** implementation, including **alignment** of **resources, 2nd LoD specialists** for **subcategories** of NFR, "incentivized" shift of responsabilities to 1st LoD
- **Focus on** the **specialized risk nature**, the **identification of risks** and **mitigation actions** instead on the **method** for **calculation** of **capital requirement**
- **NFR** as a **change-the-bank risk** as well as **disturbances** in **run-the-bank** mode including model risk
- **Incentives** and **sanctions** in line with a **sophisticated risk culture**
- **Catalogue** of specialized **solutions** for **identification** and **mitigation** for subcategories of NFR
- **Quantitative stuff** sill matters, but in a **revamped** fashion: **from risk modelling to risk analytics**

A framework in a nutshell (2/2)

VALUE

- **Transparency** and **effective management** of NFR
- **Mitigation** of potential **additional capital charge add-ons**
- **Cost savings** through **prevention** of **NFR events**
- **Reputational gain** through **prevention** of **NFR events**
- **Mitigation** of **personal liability** for executive and non-executive board members
- **Synergies** through **streamlined processes** across various types of risk identification
- Scenario analysis & war table discussion with OpRisk subcategories specialists allow to challenge an institution's risk map in order to **ensure adequate risk management coverage** on major topics (e.g. conduct & cyber risks).

OUR VISION FOR NON-FINANCIAL RISKS

- **Integrated Non-Financial Risk Management** for effective **resource allocation** & **prioritization** of risk **management efforts** across different sub-risk types, both with and without dedicated allocated capital
- Less focus on the calculation of capital, instead **sophisticated methods** for **early detection** and **mitigation**
- Enabling market partecipants to perform **active risk management** and **better aligning to new regulatory focus** (e.g. SREP)
- **Comparison** of **identified potential threads** & **Identification** of threads with **long term effects**
- **Overarching Control Framework** over all Non-Financial Risks front to back

Focus: variations in the positioning of 1st and 2nd LoD

The relationship between Line 1 and Line 2 must provide both robust oversight and support to the business' understanding and management of risk. The nature of this relationship will vary between institutions and risk types. The demonstration of effective risk management is more important than the adoption of any particular operating model

- Total clarity re risk ownership and accountability
- Total integrity in risk coverage
- Greater self sufficiency
- Better alignment to commercials

1st line Management of risk

Drivers of proximity:

- The nature and extent of risk exposures
- The extent of manual risk management processes
- The extent of limitations in 1st line skills and experience
- Recent issues and losses
- Regulatory attention
- Changes in the underlying risk profile (ie off-shoring, restructuring, acquisitions)

Distributed dedicated team, greater proximity, coach.

Aligned **agency**, on the ground

Partner from centre. Potential for advice model

Entirely **Centralised** 2nd line, 1st line is self sufficient, little proximity

1st line are experienced practitioners self-sufficient

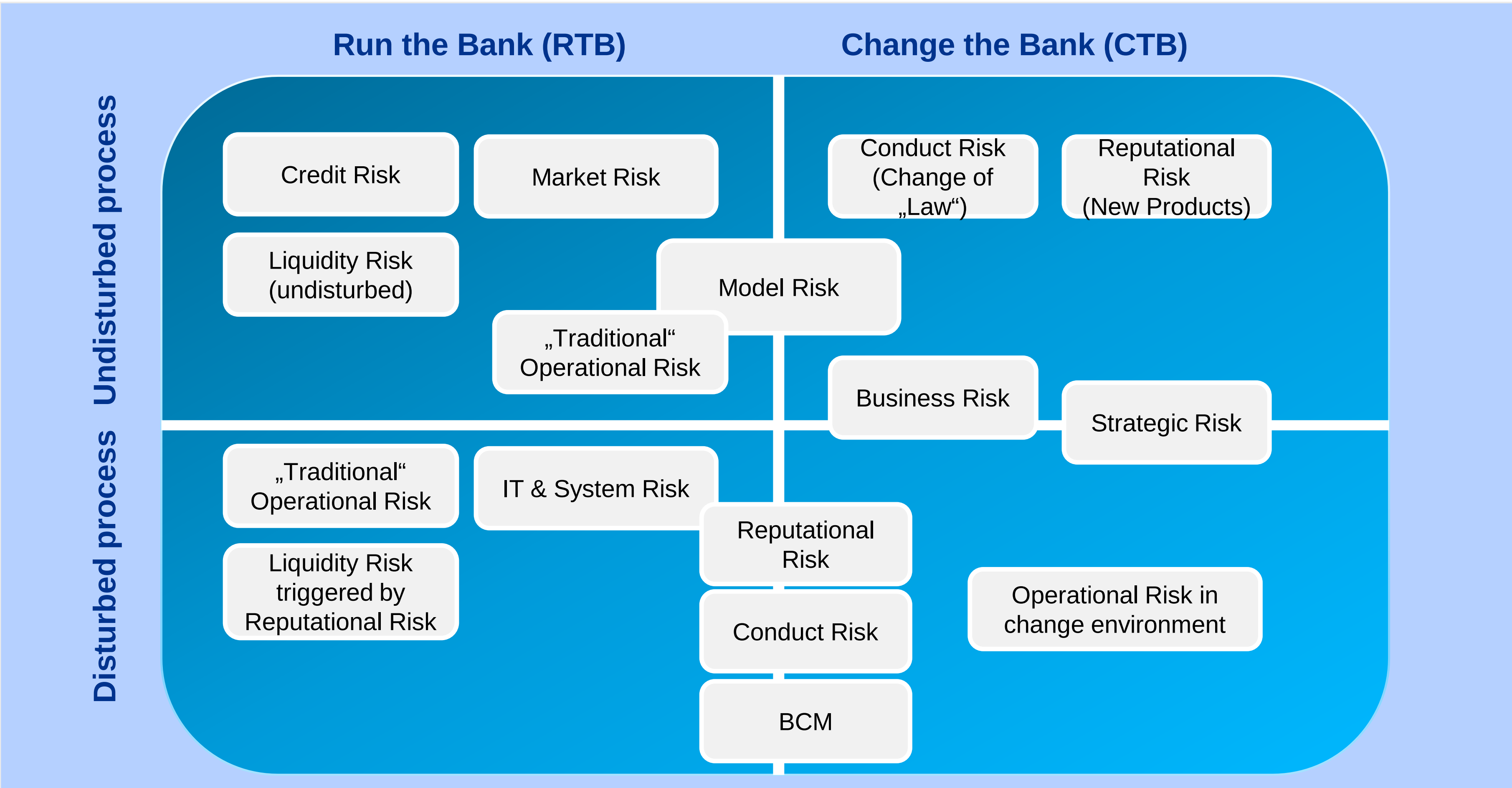
2nd line provides advice, training, monitoring

- Facilitate consensus and use of unambiguous language
- Independent assessment of risk
- Develop policy and tools
- Develop teaching and learning
- Monitor compliance

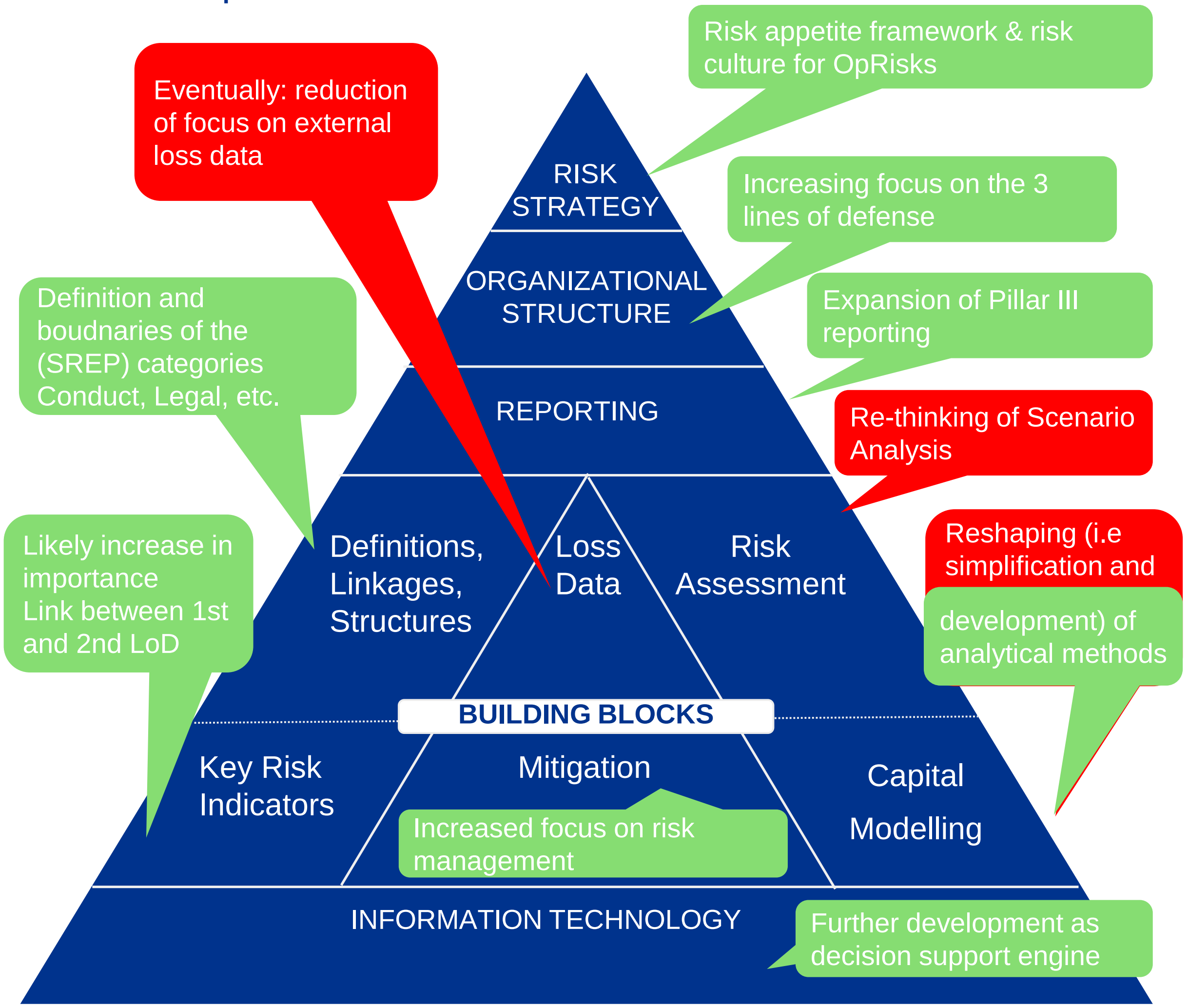
2nd line Oversight of risk

The difference between FR and NFR

This difference can be investigated from various points of view, e.g. from the risk origination to the understanding of related features, from the maturity level of risk management processes to the effects of risk materialization and mitigants…



Impact across the whole ORM framework



Further Development

Optimization/Reduction

Emerging industry focus

- Reorganizing the three LoD
- "Manageble" Risk Appetite
- Cascading down and embedding Risk Appetite into BU and SF
- Enlarging scope of LDC ("risk" scope & attributes)
- Model with greater explanatory power of the cause-effect relationship
- Estabilishing structured process to transform risk information into actions
- Discussion around the mission of ORM department

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The case study of model risk

Background

Model risk management overview

Model risk management framework

Governance

Model risk regulatory requirements

Financial crisis and Regulators' reactions

The **global financial crisis** showed that controls or governance frameworks associated with **financial, operational and risk management models** can be **fragmented** or **decentralized**, **incomplete** or **unreliable**

Regulators have increased scrutiny to ensure that financial institutions maintain **effective and sustainable Model Risk Management programs**

Banks must demonstrate not only the **validity of** individual **models** but also the **efficiency of controls** covering the **design**, **development**, **revision** and **use** of models

Model Risk management could be critical given the **size and complexity** of typical model portfolio, the **highly-specialized knowledge** encapsulated in them, the **sophistication** of both the **algorithms** and the **underlying technologies**, and the **extent and diversity** of the environments in which they are used

Definitions

Model risk management importance has grown after the crisis, and poses some questions about both model and model risk definitions

Model definition

— What is the definition of *“model”?* (eg. should a single parameter be considered a model itself?)

— Who is the owner of model's definition and who decides what is a model?

— Which model should be considered/in scope (regulatory, managerial, accounting)?

Model risk definition

— Is model risk a stand-alone risk? Should it be considered just another type of Operational risk?

— What impacts should be considered in assessing model risk? (eg. Financial losses, Regulatory penalties, loss of customers,…)

— Who/which organizational structure is responsible of establishing and managing the model risk framework?

— Does model risk require to be formally defined? (eg. ad-hoc policies)

Definitions

Definitions and measures of model and model risk differ in literature among authors … but "regulatory" definitions have been provided

Model definition

"….the term model refers to a ***quantitative method, system, or approach*** *that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates. A model consists of three components: an information input component, which delivers assumptions and data to the model; a processing component, which transforms inputs into estimates; and a reporting component, which translates the estimates into useful business information"*

(Supervisory Guidance on Model risk Management - Board of Governors of the Federal Reserve System Office of the Comptroller of the Currency)

Model risk definition

"The use of models invariably presents ***model risk****, which is the* ***potential for adverse consequences from decisions based on incorrect or misused model outputs and reports****. Model risk can lead to financial loss, poor business and strategic decision making, or damage to a bank's reputation";*

(Supervisory Guidance on Model risk Management - Board of Governors of the Federal Reserve System Office of the Comptroller of the Currency)

"… ***model risk*** *means the potential loss an institution may incur, as a consequence of decisions that could be principally based on the output of internal models, due to errors in the development, implementation or use of such models";*

(Art. 3.1.11 CRD IV)

Model risk types

Model risk types

“Wrong” models

Methodology

- Not consistent methodology
- Not applicability of the model

Data representativeness

- Old data
- Data not representative from an economical point of view
- New variables derived from exogenous factors
- Population change

Inappropriate usage of the model

Model implementation

- Potential errors caused by a wrong definition of model estimation/development

Calibration errors

Model complexity

- The methodology could be based on wrong hypothesis generating misleading results

Model risk stems from decisions based on wrong models or not appropriately used or misunderstood models (unavoidable or avoidable uncertainties)

Examples of possible negative impact

Illustrative

Financial losses	— Financial products are sold or bought at wrong price — Incorrect internal transfer prices (such as funding curve) give wrong incentives to business units — Hedging strategies are not effective and/or too expensive — Flawed creditworthiness assessment causes loans granted at incorrect interest rate	***Financial & Business Risk***
Risk exposure not in line with risk appetite	— Underestimation of market, credit or other risk leads to high unexpected losses in the future — Flawed creditworthiness assessment causes higher than intended credit risk exposure — Risk limits are too low (or too high) — Management's risk appetite is not properly reflected in business decisions	***Financial & Business Risk***
Capital shortage or misallocation	— Underestimated risk exposure might lead to capital shortages once the risks materialize — Incorrect economic capital allocation leads to sub-optimal business portfolio from risk/return perspective — Flaws in risk capital attribution to business units or business activities	***Business Risk***
Liquidity shortage	— Flaws in liquidity models cause incorrect decisions in liquidity risk management leading to high funding costs or liquidity shortages	***Liquidity Risk***
Loss of customers	— Flawed creditworthiness assessment causes loss of creditworthy customers — Overstatement of sell prices lead to customers outflow	***Reputational & Business Risk***
Flaws in regulatory or financial statements	— Financial assets and liabilities are stated at incorrect book values in the balance sheet — Loan loss provisions are misstated — Valuation adjustments (such as CVA) are incorrect — Regulatory risk capital requirement calculated with internal models is understated (or overstated)	***Operational & Accounting Risk***
Regulatory penalties	— Not addressed model weaknesses lead to higher regulatory risk capital factors (multipliers) — Regulator might impose restrictions to business that rely on flawed model	***Business Risk***

Model risk negatively impacts financial institution and should be managed similar to other types of risk (credit, market, operational, …)

Model "lifecycle" and Model Risk Management Activities

Activities to mitigate the Model Risk are already carried out within a typical model "lifecycle" …

… a structured model risk management framework supports and completes the activities already carried out, in order to provide a more stringent oversight on this risk

Model lifecycle

Model development → **Model validation** → **Model use**

Communication and reporting

Follow up management actions

— Activities and controls are carried out throughout the model life cycle in order to mitigate and minimize the model risk

Model Inventory

— Following the definition of "model", it must proceed with mapping the models included in the scope of assessment

Model Risk Assessment

— Assess model risk in terms of both quantitative and qualitative impacts

— Models classification based on materiality criteria and assessment results

Illustrative

		Risk Assessment results		
		Range A	Range B	Range C
Materiality	Class A	HIGH	HIGH	MEDIUM
	Class B	HIGH	MEDIUM	MEDIUM
	Class C	MEDIUM	LOW	LOW

Monitoring/ Mitigation actions

— Based on risk assessment results specific mitigation actions are put in place on high risk models

Model "lifecycle" - Overview

Model lifecycle

Model development
- Sound methodology
- Pre-implementation testing
- User acceptance tests
- Model change policy

Model validation
- Permanent quality challenge
- Risk based and business oriented
- Conclusions & impact

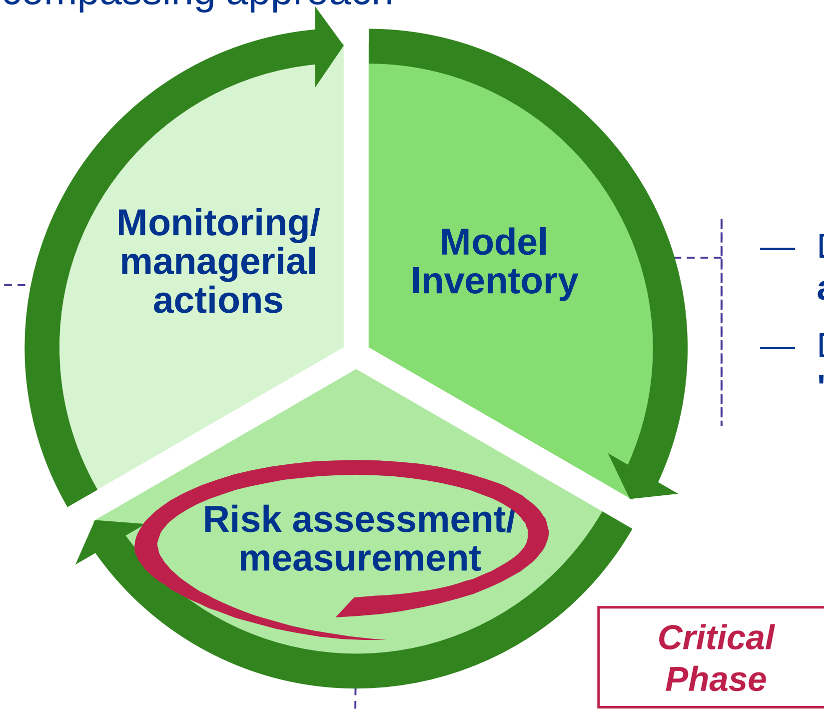
Model use
- Internal controls
- Aware of model limitations
- Interpretation of model results
- Data quality monitoring
- Model backtesting

Communication and reporting
- Management reports supporting decisions
- Open and transparent communication of model weaknesses and limitations
- Communication between key stakeholders (model use, model validation, model development)
- Reports understandable for 3rd parties

Follow up mitigation actions
- On-going rectification of model weaknesses
- Transparent and traceable management of model weakness
- Adherence to restrictions in model use
- Adequate model reserves or risk capital add-ons

Model Risk Management activities

KPMG approach aims at **identifying, quantifying and mitigating model risk** managing its sources through an encompassing approach



- Adoption of **a more stringent monitoring** for models with an high level of risk
- Activation of **managerial actions to reduce the risk**
- Model **Decommissioning**

- Definition of **"what is a model"**
- Definition of **the "model attributes"**

- Adoption of a **standardized approach** to evaluate model's inner risk
- Overall **assessment of the model ris**k through the integration of different valuations
- **Model's materiality**

Model risk governance

Model risk management is not a merely quantitative activity but requires to set up a strong and resilient governance framework

…through the strong commitment of many organizational functions …

- **Model developer**
- **Model owner**
- **Independent MRM group(*)**
- **Model Committee**
- **Internal Audit**

… and developing and maintaining strong governance, policies, and controls over the model risk management framework

Board of Directors and Senior Management oversight	Clear definition of roles and responsibilities	Policies, procedures and guidelines
Independent model validation (incl. usage of external resources)	Internal audit review	Documentation

(*) The location, structure, and independence of MRM functions could vary across banks

European requirements: CRD IV/CRR

1. **All models need to be validated (CRD IV)**
2. **Specific requirements for valuation models (Pillar 2, Prudent Valuation, ...)**
3. **Further specific requirements for internal risk models (credit, market, op, counterparty)**

CRD IV, CRR	— Competent authorities shall ensure that institutions implement policies and processes **to evaluate and manage the exposures including model risk** (Art. 85 CRD IV) — Within the context of **prudent valuation**: institutions have to acknowledge model risk (Art. 105.10/11/13 CRR)
Pillar 2 – European SREP	— Do bank management understands the assumptions underlying the measurement systems? — Are they aware of the degree of relevant model risk? — Do internal models under-estimate capital requirements? — For which business activities do banks use models? — Which control measures (back testing, expert judgment …) are in place? — Are the control measures sound (control frequency; follow-up after defect ...)? — Stress Testing and scenario analysis by authorities: how significant might be model impact? — Are some models improperly used? Are sound internal model validation/review processes in place?
Target Review of Internal Model	— The ECB is going to undertake the Target Review of Internal Models (TRIM) aimed to evaluate banks' internal models for market and credit risk. Banks, in anticipation of regulatory scrutiny and expected on-site visit in 2017, are implementing their own model risk management frameworks

Model risk regulatory requirements – US perspective

US Industry current status

Increasing pressure from Supervisors

Pre "Supervisory Guidance"

Models are built and used as needed by independent individuals and business units on an ad-hoc basis:

- There is no standardized approach to building or evaluating models
- Model use is not clearly defined
- No independent review
- No mechanism for identifying or tracking issues

Current State

Models are validated by an independent team in a manner analogous to practices outlined in OCC 2011-12/ FRB SR11-7:

- Models are built by a model development team
- Models are evaluated for conceptual soundness via a review of the input, processing and reporting components
- Issues identified through validations are tracked and managed
- Most focus is on models related to the CRO and CFO domain
- P&L unit model management practices are in the early stages

Target State

Model risk is "actively" managed as any other risk. In other words, the risk introduced by models is managed at each phase in model's life cycle – development, implementation and use. An enterprise view of model risk is established along with:

- A complete and robust model inventory
- Understanding of model use and decisions made across specific frameworks
- Process verification and benchmarking modeling
- Aggregated risk by BU/Enterprise and clear Board level reporting
- Some discussions of quantification of model risk and appetite statements

We are far away to see an organization fully compliant with supervisory expectations, so lot of work is still to be done!

Thank you

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